AN

ILLUSTRATED FLORA

OF THE

NORTHERN UNITED STATES, CANADA

AND THE

BRITISH POSSESSIONS

FROM NEWFOUNDLAND TO THE PARALLEL OF THE SOUTHERN BOUNDARY OF VIRGINIA, AND FROM THE ATLANTIC OCEAN WESTWARD TO THE 102d MERIDIAN

BY

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THE DESCRIPTIVE TEXT
Chiefly prepared by Professor Britton, with the assistance of Specialists in several Groups; the Figures also drawn under his Supervision

IN THREE VOLUMES

Vol. I

OPHIOGLOSSACEAE TO AIZOACEAE

FERNS TO CARPET-WEED

NEW YORK
CHARLES SCRIBNER'S SONS
1896
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THE present work is the first complete Illustrated Flora published in this country. Its aim is to illustrate and describe every species, from the Ferns upward, recognized as distinct by botanists and growing wild within the area adopted, and to complete the work within such moderate limits of size and cost as shall make it accessible to the public generally, so that it may serve as an independent handbook of our Northern Flora and as a work of general reference, or as an adjunct and supplement to the manuals of systematic botany in current use.

To all botanical students, a complete illustrated manual is of the greatest service; always useful, often indispensable. The doubts and difficulties that are apt to attend the best-written descriptions will often be instantly solved by figures addressed to the eye. The greatest stimulus, moreover, to observation and study, is a clear and intelligible guide; and among the aids to botanical enquiry, a complete illustrated handbook is one of the chief. Thousands of the lovers of plants, on the other hand, who are not botanists and are not familiar with botanical terms or the methods of botanical analysis, will find in the illustrations of a complete work the readiest means of comparison and identification of the plants that grow around them; and through the accompanying descriptions they will at the same time acquire a familiarity with botanical language. By these facilities, not only will the study of our native plants be stimulated and widened among all classes, but the enjoyment, the knowledge and the scientific progress derivable from these studies will be proportionately increased.

Though most European countries have complete illustrations of the flora of their own territory, no similar work has hitherto been attempted here. Our illustrated works, some of them of great value, have been either sumptuous and costly monographs, accessible to comparatively few, or confined to special groups of plants, or have been works of a minor and miscellaneous character, embracing at most but a few hundred selected species, and from incompleteness, therefore, unsuited for general reference. Scarcely one-quarter of the species illustrated in the present work have ever been figured before. That no such general work has been previously attempted is to be ascribed partly, perhaps, to the imperfect exploration of our territory, and the insufficiency of the collections to enable such a work to be made approximately complete; partly to the great number of species required to be figured and the consequent difficulty and cost of the undertaking, and partly to the lack of any apparent demand for such a work sufficient to warrant the expense of the enterprise.

The increased accumulations of material in our largest herbaria, the result of multiplied explorations, and the widely extended interest in the study of our native plants, seem now to justify the endeavor to supply a complete illustrated work adapted to general use.

The enterprise, projected by Judge Brown, and maintained and supervised by him throughout, has been diligently prosecuted for the past six years. Its execution has been mainly the work of Dr. Britton. The text, founded upon a careful examination of living or herbarium specimens, has been chiefly prepared by him, with the assistance, however, of specialists in a few groups who have contributed the descriptions for certain families as stated in the footnotes. The figures also have been drawn by artists under his immediate supervision; except those of most of the grasses, drawn by Mr. Holm, under the eye of Prof. Scribner; while the work in all its parts has been carefully revised by both authors. The keys to the genera and species, based upon a few distinctive characters, will, it is believed, greatly facilitate the determinations.

In preparing a new work of this character, the authors have felt that there should be no hesitation in adopting the matured results of the botanical studies of the last half century here and in Europe, so as to bring the work fully abreast of the knowledge and scientific conceptions of the time, and make it answer present needs. Although this involves changes in systematic order, in nomenclature, and in the division of families and genera, such as may

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It seems to some to be too radical, no doubt is entertained that time will fully justify these changes in the judgment of all, and demonstrate that the permanent advantages to Botanical Science will far outweigh any temporary inconveniences, as has been already so fully shown in Ornithology and other zoological sciences.

The work will be completed in three volumes and will be issued as rapidly as it can be printed, the text being already written and the figures drawn.

Area.

The area of the work extends from the Atlantic Ocean westward to the 102d Meridian, a little beyond that of Gray's Manual, so as to include the whole of the State of Kansas; and northward from the parallel of the southern boundary of Virginia and Kentucky to the northern limits of Labrador and Manitoba. For convenience, the whole of Nebraska has been included, thus permitting the illustration of practically the entire Flora of the northern portion of the Great Plains.

The Flora of Canada and the British possessions not being distinguishable by any well marked features from that of the adjacent parts of the United States, and not embracing more than about 300 additional species, it was deemed best to include this more northern territory, in order to present a manual of the whole Flora of the northeastern part of the continent, with the exception of that of Greenland and the Arctic Circle, which is much the same on both continents; nearly all the Arctic plants are, however, included, as but very few of them are strictly confined to the Arctic Zone.

Figures.

Within the above area there are over 4,000 recognized species, more than three times the number in Bentham's Illustrated Handbook of the British Flora. To illustrate all these in a work of moderate size and cost, only parts of each plant could usually be figured, and these mostly below life-size. To exhibit full-page illustrations would have added fourfold to the bulk of the work, and the consequent more limited sales would have necessarily increased the price in a much greater proportion, and thus have thwarted the primary object, viz., to supply a work adapted to general circulation and use. On the other hand, it was found that any considerable further reduction of the figures in order to reduce the size of the work, would be at the sacrifice of the clearness and usefulness of the illustrations.

In the general plan adopted and in giving parts only of the larger plants, it has been the constant aim to make the reduction of each figure as little below life-size as possible, to select the most characteristic parts for illustration and to preserve the natural proportions. In these respects, it is believed, the present work will be found to be at least not inferior to that above named and often superior.

The cuts are all from original drawings for this work, either from life or from herbarium specimens, though reference has constantly been made to published plates and figures. All have been first drawn life-size from medium-sized specimens, and afterwards reduced to the proportion indicated by the fraction near the bottom of each cut, most of them being from \( \frac{1}{2} \) to \( \frac{2}{3} \) of medium life-size. By this method the illustrations do not suffer from the use of a magnifier, but are improved by it and regain their full expression.

Enlargements of special parts are added in most of the illustrations in order to show more clearly the floral structure, or minute organs, or the smaller flowers. These are in various degrees of enlargement, not deemed necessary to be stated. The figures are uncolored, because coloring, except in costly work, obscures the fineness of linear definition and injures the cuts for descriptive and educational uses.

The Classification of Plants.

The Plant Kingdom is composed of four Subkingdoms, or primary groups:

1. Thallophyta, the Algae, Fungi and Lichens.
2. Bryophyta, the Mosses and Moss-allies.
3. Pteridophyta, the Ferns and Fern-allies.
4. Spermatophyta, the Seed-bearing plants.

The subkingdoms are divided into Classes, the Classes into Orders, the Orders into Families, the Families into Genera, and the Genera into Species, a species being composed of all the individuals of a kind capable of continuous successive propagation among themselves, and being the only group marked out by nature by such a definite and positive boundary.
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In addition to these main ranks, subordinate ones are sometimes employed, when further division is desirable; thus a Class may be separated into Subclasses, as the Class Angiospermae into the Subclasses Monocotyledones and Dicotyledones; Families may be separated into Tribes, as in the treatment of Gramineae in the following pages; Genera are often separated into Subgenera; and in the case of Species, where certain individuals are found to exhibit features of structure or aspect differing more or less constantly from the majority of the kind, these are set off as Varieties or Subspecies. Often the varieties or subspecies are subsequently found to be distinct species.

The variability of some species, caused by the operation of the forces collectively known as the factors of organic evolution, is so great, and the variation being often toward a related species, that it is sometimes very difficult to determine whether certain individuals belong to one or to the other, or to a variety of one or the other. This leads to different opinions. The actual fact, whether of the same species or not, may usually be ascertained by the close examination of a large number of specimens, or by growing the forms in question side by side, when, if they are the same, their rapid approximation will be manifest; though if their natural habitats are in different soils, this latter experiment may not be a satisfactory test.

The grouping of Species into Genera, and of Genera into Families, though based upon natural characters and relationships, is not governed by any definite rule that can be drawn from nature for determining just what characters shall be sufficient to constitute a Genus or a Family. These divisions are, therefore, necessarily more or less arbitrary and depend upon the judgment of scientific experts, in which natural characters and affinities, as the most important and fundamental factors, do not necessarily exclude considerations of scientific convenience. The practice among the most approved authors has accordingly been various. Some have made the number of genera and families as few as possible. This results in associating under one name species or genera that present marked differences among themselves. The present tendency of expert opinion is to separate more freely into convenient natural groups, as genera and families, according to similarity of structure, habit, form or appearance. While this somewhat increases the number of these divisions, it has the distinct advantage of decreasing the size of the groups, and thus materially facilitates their study. This view has been taken in this work, following in most instances, but not in all, the arrangement adopted by Engler and Prantl in their recent great work, "Natürliche Planzenfamilien," noting yet quite completed, in which all known genera are described.

Systematic Arrangement.

The Nineteenth Century closes with the almost unanimous scientific judgment that the order of nature is an order of evolution and development from the more simple to the more complex. In no department of Natural Science is this progressive development more marked or more demonstrable than in the vegetable life of the globe. Systematic Arrangement should logically follow the natural order; and by this method also, as now generally recognized, the best results of study and arrangement are obtained. The sequence of Families adopted 50 or 75 years ago has become incongruous with our present knowledge; and it has for some time past been gradually superseded by truer scientific arrangements in the later works of European authors.†

The more simple forms are, in general, distinguished from the more complex, (1) by fewer organs or parts; (2) by the less perfect adaptation of the organs to the purposes they subserve; (3) by the relative degree of development of the more important organs; (4) by the lesser degree of differentiation of the plant-body or of its organs; (5) by considerations of antiquity, as indicated by the geological record; (6) by a consideration of the phenomena of embryogenesis. Thus, the Pteridophyta, which do not produce seeds and which appeared on the earth in Silurian time, are simpler than the Spermatophyta; the Gymnospermae in which the ovules are borne on the face of a scale, and which are known from the Devonian period onward, are simpler than the Angiospermae, whose ovules are borne in a closed cavity, and which are unknown before the Jurassic.

In the Angiospermae the simpler types are those whose floral structure is nearest the

structure of the branch or stem from which the flower has been metamorphosed, that is to say, in which the parts of the flower (modified leaves) are more nearly separate or distinct from each other, the leaves of any stem or branch being normally separated, while those are the most complex whose floral parts are most united. These principles are applied to the arrangement of the Subclasses Monocotyledones and Dicotyledones independently, the Monocotyledones being the simpler, as shown by the less degree of differentiation of their tissues, though their floral structure is not so very different nor their antiquity much greater, so far as present information goes. For these reasons it is considered that Typhaceae, Sparganaceae, and Orchidaceae are the simplest of the Monocotyledones, and Orchidaceae the most complex; Saururaceae the simplest family of Dicotyledones, and Compositae the most complex.

Inasmuch as evolution has not always been progressive, but some groups, on the contrary, have clearly been developed by degradation from more highly organized ones, and other groups have been produced by divergence along more than one line from the parent stock, no linear consecutive sequence can, at all points, truly represent the actual lines of descent.

The sequence of families adopted by Engler and Prantl, in "Natürliche Pflanzenfamilien" above referred to, has been closely followed in this book, in the belief that their system is the most complete and philosophical yet presented. The sequence of genera adopted by them has for the most part also been accepted, though this sequence within the family does not attempt to indicate greater or less complexity of organization.

It was originally intended to present a conspectus of the orders and families included in this work in the Introduction, as is indicated upon page 62 of this volume. But as the printing proceeded it was deemed better to place this at the end of the third volume.

Nomenclature.

The names of genera and species used in this work are in accordance with the Code of Nomenclature devised by the Paris Botanical Congress in 1867, as modified by the rules adopted by the Botanical Club of the American Association for the Advancement of Science at the meetings held at Rochester, New York, in August, 1892, and at Madison, Wisconsin, in August, 1893. These names were mostly elaborated in the "List of Pteridophyta and Spermatophyta growing without Cultivation in Northeastern North America," prepared by the Committee of that association and published in 1894 as the fifth volume of Memoirs of the Torrey Botanical Club. The synonyms given under each species in this work include the recent current names, and thus avoid any difficulty in identification.

The necessity for these rules of nomenclature arose from the great confusion that has existed through the many different botanical names for the same species or genera. Some species have had from 10 to 20 different names, and, worse still, different plants have often had the same name. For about 200,000 known species of plants there are not fewer than 700,000 recorded names. Such a chaotic condition of nomenclature is not only extremely unscientific, burdensome and confusing in itself, but the difficulty and uncertainty of identification which it causes in the comparative study of plants must make it, so long as it continues, a serious and constant obstruction in the path of botanical inquiry.

The need of reform, and of finding some simple and fixed system of stable nomenclature, has long been recognized. This was clearly stated in 1813 by A. P. De Candolle in his Théorie Élémentaire de la Botanique (pp. 228–250), where he declares priority to be the fundamental law of nomenclature. Most systematists have acknowledged the validity of this rule. Dr. Asa Gray, in his Structural Botany, says (p. 348): "For each plant or group there can be only one valid name, and that always the most ancient, if it is tenable; consequently no new name should be given to an old plant or group, except for necessity."

This principle was applied to Zoology in the "Stricklandian Code," adopted in 1842 as Rules of the British Association, and revised in 1860 and 1865 by a committee embracing the most eminent English authorities, such as Darwin, Henslow, Wallace, Clayton, Balfour, Huxley, Bentham and Hooker. In American Zoology the same difficulties were met and satisfactorily overcome by a rigid system of rules analogous to those here followed and now generally accepted by zoologists and palaeontologists.

At an International Botanical Congress held at Paris in 1867, in which unfortunately the English botanists did not participate, A. De Candolle presented a system of rules which, with modifications, were adopted, and, as above stated, are the foundation of the present rules of the botanists of the American Association. These rules were in part adopted also by the International Botanical Congress held at Genoa in 1892, and by the Austro-German botanists at
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their meeting in September, 1894; and while in the 9th Edition of the London Catalogue of British Plants published in 1895, these rules as respects the names of genera are largely followed; out of 440 genera in common with ours, all but 18 bear the same names as here given.*

It cannot be too often repeated that the object of these rules is not to introduce new names, but to restore the old and the true ones. The rules of the botanists of the American Association, adopted as above, are as follows. A brief explanation of the objects attained by them is appended:

**Rule 1.** Priority of publication is to be regarded as the fundamental principle of botanical nomenclature.

This has been generally acknowledged in theory as the guiding principle for determining which name should be borne by an animal or plant differently named by different writers. Various causes have retarded its application in practice. Its adoption is the only practicable way of securing stability to the original names. It has also been generally considered that the author who first defines or describes an animal or plant is entitled to the distinction of having his own name associated with the name assigned to it; and this is also necessary for reasons of accuracy, because in numerous instances different plants have been called by the same name. In most cases the synonyms given in this work, with the date of publication, indicate the original name and the reason for its restoration under this rule.

**Rule 2.** The botanical nomenclature of both genera and species is to begin with the publication of the first edition of Linnaeus' "Species Plantarum" in 1753.

Some past date must of necessity be taken, in order to fix the limits within which priority shall be reckoned. Prior to the publication of "Species Plantarum" in 1753, the absence of any general binomial nomenclature, and the meagre, uncertain and inadequate descriptions by most prior authors, make any earlier date beset with difficulties. The result of much discussion has been to fix that work, with which modern nomenclature substantially begins, as the "point of departure." That date received the endorsement of the International Botanical Congress at Genoa in 1892, and has since been accepted by most botanists in America and Europe. Under this rule, no reference is made to names used prior to that work.

**Rule 3.** In the transfer of a species to a genus other than the one under which it was first published, the original specific name is to be retained.

From different views of the limits of genera, or from further knowledge of a plant, it often happens that it must be transferred to a different genus from that to which it was first assigned. Upon such a transfer, Rule 3 requires the original name of the species to be continued, and preserves its stability. Thus, out of the genus *Polypodium* of Linnaeus, three other groups have been permanently associated: *Drynopteris* (Asplenum), *Cystopteris* and *Pliegopteris*. The Long Beech Fern (p. 19), called *Polypodium Phegorphes* by Linnaeus, belongs to the generic group named *Phegorphes* by Fée in 1840. Rule 3 forbids the use of the new specific name, *polypodioides*, given to this plant by Fée, and requires the former specific name of *Linnaeus* to be preserved, and the plant thus becomes *Phegorphes Phegorphes*, an accidental re-duplication that occurs in but few instances in the whole field of nomenclature. The Twin-leaf fern was called *Podophyllum diphyllyum* by Linnaeus in 1753, and *Jeffersonia binata* by Persoon in 1805. Persoon restored the Linnaean specific name, making the plant *Jeffersonia diphylla*, the correct binomial under the rule, and the one which the plant has borne for nearly one hundred years.

**Rule 4.** The original name is to be maintained, whether published as species, subspecies or variety.

Plants and animals are continually described as species which subsequent authors conclude are but varieties, and those first understood as varieties prove by subsequent study to be entitled to specific rank. Rule 4 maintains the first designation as the proper one, and avoids much confusion. Examples are numerous: See Figs. 28, 38, 61 et seq.

**Rule 5.** The publication of a generic name or a binomial invalidates the use of the same name for any subsequently published genus or species, respectively.

Thus in the case of the Long Beech Fern, above cited, though the specific name *polypodioides* is held to have been improperly given to it by Fée, the binomial, *Phegorphes polypodioides*, cannot be used for it if the Linnaean plant be not destroyed for any reason be lost or discarded, the name *polypodioides* must remain available as the next lawful substitute, and thus the principle of nomenclature—once a synonym always a synonym.

This rule operates to maintain one name only for a genus or species, and that, the first one applied to it, unless this was properly the name of another, in which case the next oldest

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is to be used. By mistake or inadvertently the same name has frequently been given to several different genera or species, and it has repeatedly occurred that a name believed by the author to be a synonym is shown by another to be a valid designation.

Rule 6. Publication of a genus consists only, (1) in the distribution of a printed description of the genus named; (2) in the publication of the name of the genus and the citation of one or more previously published species as examples or types of the genus, with or without a diagnosis.

Rule 7. Publication of a species consists only, (1) in the distribution of a printed description of the species named; (2) in the publishing of a binomial, with reference to a previously published species as a type.

Rule 8. Similar generic names are not to be rejected on account of slight differences, except in the spelling of the same word.

Thus Epidendrum and Epidendron are but different spellings of the same word; only one of them can therefore be used; the same of Elodes and Elodea.

Rule 9. In the case of a species which has been transferred from one genus to another, the original author must always be cited in parenthesis, followed by the author of the new binomial.

Thus Dryopteris Louchiles (L.) Kunze (Fig. 26) is so cited, because Linnaeus first gave the plant the specific name Louchiles, while Kunze first combined that name with the accepted genus Dryopteris.

Rule 10. In determining the name of a genus or species to which two or more names have been given by an author in the same volume, or on the same page of a volume, precedence shall decide. 6

The Latin names of families have mostly been adopted as currently used, without reference to priority or terminations, as no rule on that subject has yet been formally adopted by botanists. It seems desirable, however, that the scientific names of families should also follow some uniform system, and as a very large proportion of botanical family names have long been formed by the termination aceae affixed to some prominent genus of the group, that this rule should be applied to the few remaining families otherwise named. All would thus be brought into a harmonious system of nomenclature, as the zoologists have done by the adoption of the ending idae for all zoological families. The English common names of families are similarly adopted from some characteristic genus of the group; as Pink Family, Mustard Family, Mint Family, etc. The Carophyllaceae, in the absence of any genus Caryophyllum, might thus become Alsinaeaceae; the Cruciferae, Brassicaeae; the Labiatae, Menthaeae or Lamiaceae.

English Names of Plants.

The general desire for some English name to the different plants described has been met so far as possible. All names in common use have been inserted, so far as they have come to the authors' knowledge, except such as were merely local, or where they were too numerous for insertion. An exception has also been made in a few instances where a common name, from its false suggestion, as in the name of Dog's-tooth Violet (p. 420) for Adder's-tongue, is calculated to mislead as to the nature of the plant. Where no previous names in common use could be found, the names given are founded on some characteristic circumstance of description, habitat, site or author. Names used in England have been freely availed of, but the use of the same common name for different plants there and here has occasionally required the omission of one or the other. The use of the same name for different plants has been rejected, except where there is no such close affinity or resemblance between them as is likely to cause confusion.

Pronunciation.

In botanical names derived from Greek or Latin words, their compounds, or derivatives, the accent, according to the ordinary rule, is placed upon the penultimate syllable, if it is long in Latin quantity; otherwise, upon the antepenult. Many names, however, have been given to

6The rules have been closely followed in the publications of The United States National Museum; the Divisions of Botany and Forestry of the United States Department of Agriculture; The Missouri Botanical Garden; The Torrey Botanical Club; The University of Nebraska; The Botanical Survey of Nebraska; The Department of Botany of Columbia University; The Geological and Natural History Survey of Minnesota; The Botanical Survey of Indiana, and many other societies and institutions. Also in Professor Sargent's "Silva of North America," Professor Underwood's "Native Ferns and their Allies," Professor Kellerman's "Plants of Ohio," Mr. Newhall's "Shrubs of Northeastern America," and by a large number of other authors in less extensive writings.
plants in honor of individuals, which, having nothing Latin about them except the terminal form, and the pronunciation given to them by botanical authors being diverse, are here accented like the names of the persons, so far as euphony will permit. This rule is followed because it is believed to agree with the prevailing usage among botanists in ordinary speech; because it is in accord with the commemorative object of such names, which ought not to be obscured by a forced and unnatural pronunciation; and because the test applied to words properly Latin, viz., the usage of the Latin poets, cannot be applied to words of this class. We therefore give Torreyi, Vaseyi, Careyi, Jamesii, Alleni, rather than Torreyi, Vaskeyi, Careyi, Jamessi, Alleni.

The acute accent is used to denote the short English sound only; as in bat, bêt, bid, nöt, nôt; the grave accent, to denote either of the other English sounds, whether long, broad or open; as a in bâle, ball, bär, bâre, lâud; e in ève, thère; i in pine, pique, machine; o in nôte, mûve; u in pûre, rûde. The accent for the short or longer English sound is based upon current English usage, as given in the chief English dictionaries from Walker's to the most recent, and without reference to the supposed ancient pronunciation.

Much diversity has been found in botanical works in the accented syllable of many modern Latin adjectives ending in -inus, -ina, -inum, derived from Latin words. As these adjectives are derived from Latin roots and are regularly formed, their pronunciation should properly follow classical analogies. When signifying, or referring to, time, material, or inanimate substances, they should, therefore, according to Andrews & Stoddard's rule, have the penult usually short, and the accent on the antepenult; as in gossypina, cannabina, secalina, salicina, amygdalina, and other adjectives derived from plant names, like the classic nárdinus, cyprinus, fáginus. When these adjectives have other significations than those above referred to, the penult under the ordinary Latin rule is usually long and accented; as in lupulina, leporina, hystricina, like the classic ursina, canina.

The Use of Capital Letters.

In accordance with the recommendations of the Committee on Nomenclature of the Botanical Club of the American Association for the Advancement of Science, specific or varietal names derived from persons or places, or used as the genitive of generic names or as substantives, are printed with an initial capital letter. There is much difference of opinion as to the desirability of this practice, many botanists, and almost all zoologists, following the principle of writing all specific names with a small initial letter. Should this custom prevail, much information concerning the history and significance of the specific names would be lost. Thus in the Tulip-tree, Liriodendron Tulipifera, the specific name Tulipifera was the ancient generic name; and the same with Lythrum Sativaria, L. Hyssopifolia, L. Vul-neraria, and many other species. In all other forms of writing, personal adjectives such as Nuttalii, Engelmanni or Torreyi are printed with capitals. We adhere to the ordinary literary usage.

Varieties

are printed as trinomials, e. g., Rynchospora glomerata paniculata, the contraction var. or the Greek letters α or β commonly inserted between the specific and varietal name being dispensed with. The comma sometimes placed between the specific or varietal name and the name of the author is omitted, in accordance with the opinions of the same committee.

Assistance.

Cordial acknowledgment for assistance and advice is hereby tendered to Professor Thomas C. Porter, who has continuously, from the inception of the enterprise, coöperated in its execution by suggestion, information and the contribution of specimens, and who has read all the proofs; to Mr. Eugene P. Bicknell, who has supplied many specimens and read the proofsheets; to Professor Lucien M. Underwood, for the text of the Pteridophyta; to Mr. Frederick V. Coville, for the text of the Juncaceae; to Dr. John K. Small, for the text of Polygonaceae and Euphorbiaceae, and for assistance and critical notes on many other families; to Mr. Geo. V. Nash, for the text of the Gramineae; to Professor F. Lamson-Scribner, for supervising the drawings of Gramineae, and for manuscript notes on many genera and species of that family; to Mr. Arthur Hollick, for supervision of the drawings; to Mr. Edmund P. Sheldon, for the text of Lemnaceae; to Mr. Charles E. Smith, for critical examination of the final proof-sheets, and to many others who by the contribution of specimens or notes have facilitated the production of the work.
INTRODUCTION.

The text for the families Typhaceae, Sparganiaceae, Naiadaceae, Scheuchzeriaceae, Araceae, Eriocaulaceae, Pontederiaceae, Smilaceae and Orchidaceae, was prepared by the late Rev. Thomas Morong, and has been printed with very little change from his manuscript.

Draughtsmen.

Most of the drawings have been executed by Mr. F. Emil; he has made all the figures of the Pteridophyta, Gymnospermae, and nearly all of the Monocotyledones, with the exception of those of Gramineae, Melanthaceae, Liliaceae and Convallariaceae; also nearly all of the apetalous Choripetalae, and a considerable portion of the Sympetalae. Miss Millie Timmerman (now Mrs. Heinrich Ries) drew the bulk of the polypetalous Choripetalae, the enlarged parts being mostly inserted by Mr. Arthur Hollick; she also did some work on several of the sympetalous families. Mr. Joseph Bridgham drew the Melanthaceae, Liliaceae and Convallariaceae; also the Ericaceae, Primulaceae and several related families. Mr. Theodor Holm drew most of the Gramineae. Mr. Hollick has made some drawings and numerous enlargements of special parts throughout the work. Miss Mary Knight and Mr. Rudolph Weber have also contributed drawings.

Symbols Used.

° is used after figures to indicate feet.
' is used after figures to indicate inches.
" is used after figures to indicate lines, or twelfths of an inch.
\ over syllables indicates the accent, and the short English sound of the vowel.
^ over syllables indicates the accent, and the long, broad, open or close English sound.

New York, August 15th, 1896.
ILLUSTRATED FLORA.

Subkingdom PTERIDÓPHYTA.*
FERNS AND FERN-ALLIES.

Plants containing woody and vascular tissues in the stem and producing spores asexually, which, on germination, develop small flat mostly green structures called prothallia (gametophyte). On these are borne the sexual reproductive organs, the female known as archegones, the male as antherids. From the fertilization of the oosphere of the archegone by spermatozoids produced in the antherids, the asexual phase (sporophyte) of the plants is developed; this phase is represented by an ordinary fern, lycopod or horsetail.

This subkingdom comprises about 4000 living species, of which more than three-fourths are confined to tropical regions. The number of extinct species known probably exceeds those living. They appeared on the earth in the early part of the Palaeozoic Era, reached their greatest abundance in Carboniferous Time, but have since been mainly replaced by plants of higher organization, so that at present they form only about one-fiftieth of the total flora. The time of year noted under each species indicates the season at which the spores are mature.

Family 1. OPHIOGLOSSÆCEAE Presl, Pterid. 6. 1836.
Adder's-tongue Family.

More or less succulent plants consisting of a stem and leaf growing from a fleshy root. Sporanges formed of the interior tissues, naked, borne in a spike or panicle and opening at maturity by a transverse slit. Spores copious, yellow. Prothallium subterranean, devoid of chlorophyll.

Three genera, the following represented on both continents; the third, Helminthostachys is native of southern Asia.

Veins reticulate; sporanges cohering in a distichous spike.
Veins free; sporanges distinct, borne in spikes or panicles.


Low plants from a small fleshy rootstock, with slender fleshy roots, the bud for the following year formed at the side of the base of the stem. Leaves solitary, borne on the stem, simple in our species. Spike terminal, formed of the two rows of large coalescent sporanges. Veins of the leaf reticulate. Spores copious, sulphur-yellow. [Name from the Greek, signifying the tongue of a snake, in allusion to the narrow spike of sporanges.]

About 10 species of wide geographic distribution. Besides the following, three others are found in the southern United States, one of them extending to California.

*Text contributed by Professor Lucien M. Underwood.
1. Ophioglossum vulgatum L. Adder's-tongue. (Fig. 1.)


Rootstock short, oblique; stem slender, erect, simple, glabrous, 2'-12' high, bearing the sessile thin ovate or elliptic-oblong leaf (sterile segment) near its middle; sterile segment 1'-3' long, 1/2'-1 1/2' wide, rather firm in texture, distinctly reticulated; spike solitary, 1/2'-1' long, erect, the axis extending beyond the sporanges into a point.

In moist meadows and thickets, or sometimes on dry hillsides, Prince Edward Island to Alaska, south to New Jersey, Kentucky and Arizona. Also in Europe, Asia, Africa and Australia. May-Aug.


Fleshy plants with short erect rootstocks, and clustered fleshy roots, the bud for the succeeding year imbedded in the base of the stem. Sterile portion (leaf) pinnately or ternately divided or compound, the fertile portion pinnate or tripinnate with sessile distinct sporanges in rows on either side of its branches, forming large panicles in some species. Veins free. Spores of various shades of yellow. [Greek, in allusion to the grape-like clusters of sporanges.]

About 15 species, mostly natives of the northern hemisphere, one or two occurring in Australia. Besides the following, another, B. boreale, occurs in Alaska.

Bud for the following year enclosed in the base of the stem; plants mostly surf.

Vernation wholly straight; sterile portion simple or 2-5-lobed.

1. B. simplex.

Vernation partly inclined in one or both portions.

Buds glabrous; sterile portion pinnate; small plants, mature in early summer.

Sterile portion alone bent in vernation, its segments fan-shaped.

2. B. Lunaria.

Both portions bent in vernation; segments of sterile portion narrow.

3. B. malvaceifolium.

Bud pilose; sterile portion ternate, long-stalked; larger plants, mature in autumn.

4. B. ternatum.

Vernation wholly inclined, recurved in the fertile portion; sterile portion triangular, sessile.

5. B. lanceolatum.

Bud enclosed in a cavity at one side of the base of the stem; sterile portion ternate and compound; plant large.

1. Botrychium simplex E. Hitchcock.

Little Grape-fern. (Fig. 2.)


Plant 2'-7' high, slender, very variable. Sterile portion ovate, obovate or oblong, entire, lobed or pinnately parted, borne near the base of the stem or higher, sometimes above the middle; fertile portion a simple or slightly compound spike, sometimes reduced to only a few sporanges; spores large for the genus, minutely tuberculatc; bud for the following year enclosed in the base of the stem; apex of both fertile and sterile portions erect in vernation.

In moist woods, meadows or swamps. Prince Edward Island to Maryland, west to Wyoming and California. Also in northern Europe. May-June.
2. Botrychium Lunaria (L.) Sw. Moonwort. (Fig. 3.)


Plant very fleshy, 2'-12' high. Sterile portion usually sessile, borne at or above the middle of the stem, pinnate with 2-8 pairs of lunate or fan-shaped lobes which vary from crenate to entire and are either close and imbricated or distant; fertile portion 2-3-pinnate, often dense, 1'-2' long, often about the height of the sterile; bud for the following year glabrous, enclosed in the base of the stem; apex only of the sterile portion bent over the nearly straight fertile portion in vernation.


3. Botrychium matricariaefolium A. Br.
Matricary Grape-fern. (Fig. 4.)

Botrychium matricariaefolium A. Br. in Doell, Rhein. Pl. 24. 1843.

Plant 2'-12' high, often very fleshy. Sterile portion borne above the middle of the stem, short-stalked, ovate or oblong, 1-2-pinnatifid or rarely 2-pinnate, with obtuse divisions and narrow toothed segments; midveins disappearing by continued branching; fertile portion 2-3-pinnate, often much branched; spores tuberculate; bud for the following year glabrous, enclosed in the base of the stem; apex of both sterile and fertile portions turned down in vernation.

In grassy woods and swamps, Nova Scotia to New Jersey, west to Ohio. Also in Washington and in Europe. May-June.

4. Botrychium ternatum (Thunb.) Sw. Terinate Grape-fern. (Fig. 5.)


Plant 4'-16' high, very fleshy, often slightly pubescent. Sterile portion long-stalked from near the base of the stem, broadly triangular, ternate, variously compound, the divisions stalked; ultimate segments varying from round-reniform to ovate-lanceolate, their margins entire or finely incised; bud for the following year pilose, enclosed in the base of the stem; apex of both portions bent down with a slight inward curve in vernation.

In moist meadows, woods and on hill-sides, Nova Scotia to Florida, west to California. Also in Europe, eastern Asia and Australia. The sterile portion is persistent through the winter. Sept.-Dec.

Varies greatly; the large forms are known as var. australe, smaller forms with obliquely lanceolate segments as var. obliquum, similar forms with finely dissected segments as var. dissectum, and small forms with roundish-reniform segments as var. lunarioides.
5. Botrychium lanceolatum (S. G. Gmel.) Angs. Lance-leaved Grape-fern. (Fig. 6.)


Plant 3'-9' high, somewhat fleshy. Sterile portion closely sessile at the summit of the stem, 1' or more wide, 3-lobed or broadly triangular and 2-pinnatifid, the ultimate segments lanceolate, acute, oblique, entire or dentate; midvein continuous, with forking veinlets; fertile portion slightly overtopping the sterile, short-stalked, 2-3-pinnate; bud for the following year glabrous, enclosed in the base of the stem; fertile portion recurved its whole length with the shorter sterile portion reclined upon it in vernation.

In meadows, woods and swamps, Nova Scotia to Alaska, south to New Jersey, Ohio and in the Rocky Mountains to Colorado. Also in Europe and Asia. June-July.

6. Botrychium Virginianum (L.) Sw. Virginia Grape-fern. (Fig. 7.)


Botrychium gracile Pursh, Fl. Am. Sept. 656. 1814.

Plant 4'-2° high, the stem slender. Sterile portion nearly or quite sessile above the middle of the stem, spreading, thin, ternate with the primary divisions pinnate to 2-pinnate and the segments 1-2-pinnatifid; ultimate segments oblong, more or less toothed near the apex; epidermal cells flexuous; fertile portion long-stalked, 2-3-pinnate; bud for the following year pilose, enclosed in a glabrous cavity at one side of the lower part of the stem; fertile portion recurved its whole length, the sterile reclined upon it in vernation.

In rich woods, Nova Scotia to Florida, west to British Columbia and Arizona. Also in Europe and Asia. June-July.


Royal Fern Family.

Large ferns with stout often erect rootstocks, 1-2 pinnate leaves coiled in vernation, the veins free, mostly forked, running to the margins of the pinnules or lobes. Sporangia large, globose, with mere traces of an elastic ring of cells or none, borne on modified contracted pinnae in the typical genus; in Todea, a genus of the southern hemisphere, in clusters (sori) on the lower surfaces of the pinnules.

Two living genera, Osmunda and Todea.
i. OSMUNDA L. Sp. Pl. 1063. 1753.

Tall swamp ferns, growing in large crowns, with the fertile (spore-bearing) portions very much contracted, the short-pedicelled naked sporanges on the margins of their rachis-like divisions, which are destitute of chlorophyll. Veins forked. Very regular and prominent. Sporangae thin, reticulated, opening by a longitudinal cleft into two halves, a few parallel thickening cells near the apex representing the rudimentary transverse ring. Spores copious, green. [From Osunder, a name for the god Thor.]

Six species, mostly of the north temperate zone. Only the following occur in North America.

Leaves bipinnate, fertile at the apex.
Sterile leaves bipinnatifid.

Pinnae of sterile leaf with a tuft of tomentum at base; fertile leaf distinct from sterile.

Pinnae of sterile leaf without a tuft of tomentum at base; leaves fertile in the middle.

1. Osmunda regalis L. Royal Fern.

*Osmunda regalis* L. Sp. Pl. 1065. 1753.

Rootstock stout, bearing a cluster of several tall bipinnate leaves, 2°-6° high, and 1° or more wide. Sterile pinnae 6'-12' long, 2'-4' wide, the pinnules oblong-ovate or lanceolate-oblong, sessile or slightly stalked, glabrous, finely serrulate, especially near the apex and occasionally crenate towards the base which is truncate, oblique or even cordate; fertile pinnules linear-cylindric, panicked at the summit, withering and shrivelling with age, greenish before maturity, but becoming dark brown after the spores have fallen.

In swamps and marshes, New Brunswick to Florida, west to the Northwest Territory and Mississippi. Also in Mexico, Europe and Asia. Ascends to 3000 ft. in Virginia. May-July.

2. Osmunda cinnamomea L. Cinnamon Fern.

*Osmunda cinnamomea* L. Sp. Pl. 1066. 1753.

Rootstock very large, widely creeping, bearing a circular cluster of sterile leaves with one or more fertile ones within. Stipes 1° or more long, clothed with ferruginous tomentum when young, glabrous when old; sterile leaves 1°-5° long, glabrous when mature, except a small tuft of tomentum at the base of each pinna; pinnules linear-lanceolate, deeply pinnatifid into oblong obtuse segments; fertile leaf contracted, bipinnate, soon withering; sporanges cinnamon-colored after the copious green spores have been discharged.

In wet places, Nova Scotia to Minnesota, south to Florida and Mexico. Forms occur with leaves variously intermediate between the fertile and sterile; some being sterile at the apex, others in the middle, others on one side only. Ascends to 5000 ft. in Virginia. May-June.
3. Osmunda Claytoniana L. Clayton’s Fern. (Fig. 10.)


Rootstock stout, bearing a circle of 2-pinnatifid leaves 2°-6° high, 6'-10' wide; sterile pinnae without tufts of tomentum at the base, linear-lanceolate, deeply cleft into oblong obtuse segments, some of the leaves contracted in the middle and bearing 2-3 pairs of fertile pinnate pinnae with dense, cylindric divisions which are greenish at first, afterwards dark brown, finally withering; leaves clothed with tomentum when young, glabrous when mature, the fertile ones taller than the sterile, and finally widely recurving.

In swamps and moist soil. Newfoundland to Minnesota south to North Carolina and Missouri. Ascends to 5000 ft. in Virginia. Also in India. May-July.

Family 3. HYMENOPHYLLACEAE Gaud. in Freyc. Voy. 262. 1826. Filmy-fern Family.

Membranaceous, mostly small ferns with filiform or slender creeping rootstocks. Leaves usually much divided. Sporangia sessile on a filiform, usually elongated receptacle, surrounded by a transverse ring which opens vertically.

Two genera, Hymenophyllum L., and the following, comprising some 200 species, very abundant in tropical regions, a few occurring in the temperate zones.

1. TRICHOMANES L. Sp. Pl. 1097. 1753.

Delicate filmy ferns, the leaves usually much divided. Sporangia flattened, surrounded by a broad entire transverse ring opening vertically, sessile on the lower part of the slender filiform receptacle. Receptacle surrounded by a tubular or funnel-shaped indusium which is truncate or slightly 2-lipped. [Greek, in allusion to the thin hair-like segments of some species.]

About 100 species, mostly of tropical regions. Besides the following, another occurs in Alabama.

1. Trichomanes radicans Sw.
Bristle-fern. (Fig. 11.)

Trichomanes radicans Sw. Fl. Ind. Occ. 3: 1736. 1806.

Rootstock filiform, wiry, tomentose, creeping. Stipes (petioles) ascending, 1'-3' long, naked or nearly so; leaves 2'-8' long, 8'-1½' wide, membranaceous, lanceolate or ovate-lanceolate, 2-3-pinnatifid; pinnae ovate, obtuse, the upper side of the cuneate base parallel with or appressed to the narrowly winged rachis; segments toothed or cut into linear divisions; indusia terminal on short lobes, 1-4 on a pinnule, the mouth slightly 2-lipped; receptacle more or less exerted, bristle-like, bearing the sessile sporanges mostly near the base.

On wet rocks, Kentucky to Florida and Alabama. Also in the West Indies, Mexico, tropical America, Europe, Asia and Africa. Summer.

Ferns of various habit, with simple or pinnate leaves. Sporangia borne in spikes or panicles, ovoid, sessile, provided with an apical ring, opening vertically by a longitudinal slit.

Five genera and about 75 species, the following genera represented in the north temperate zone, the others tropical in distribution.

Sporangia in close 2-ranked spikes; leaves filiform.

Sporangia in ample panicles; pinnules palmate.

1. **SCHIZÆÀA** J. E. Smith, Mem. Acad. Tor. 5: 419. pl. 19. f. 9. 1793.

Small slender ferns with filiform or linear leaves, the fertile distinct from the sterile. Sporangia sessile in close distichous spikes along the single vein of the narrow divisions of the fertile leaves, provided with a complete apical ring. [Greek, in allusion to the cleft leaves of some species.]

A genus of 16 species, of wide geographic distribution, mostly in tropical regions.

1. **Schizaea pusilla** Pursh. Curly-grass. (Fig. 12.)


Sterile leaves linear, very slender and tortuous. Fertile leaves longer, 3'-5' high, the fertile portion terminal, consisting of about 5 pairs of crowded pinnules, forming a distichous spike; sporangia ovoid or pyriform, sessile in two rows along the single vein of the narrow incurved linear divisions of the fertile leaf, partially concealed by its incurved margins which are hooded at the apex and ciliate; ring apical, the sporangia opening by a vertical slit.

In wet soil, pine barrens of New Jersey and in Nova Scotia. Rare and local. Aug.-Sept.


Twining or climbing ferns, the lower divisions sterile, variously stalked and lobed, the fertile terminal, panicked. Sporangia ovoid, solitary or two together in the axils of imbricated scale-like indusia, provided with an apical ring, opening vertically. Indusia fixed by their broad bases to short oblique veinlets. [Greek, in allusion to the flexible stipes.]

Sixteen species, mostly of tropical distribution.

1. **Lygodium palmátum** (Bernh.) Sw. Climbing Fern. Hartford Fern. (Fig. 13.)


Rootstock slender, creeping. Stipes slender, flexible and twining; leaves 1'-3' long, their short alternate branches 2-forked, each fork bearing a nearly orbicular 4-7-lobed pinnule which is more or less cordate at the base with a narrow sinus; surfaces naked; fertile pinnules contracted, several times forked, forming a terminal panicle; sporangia solitary, borne on the alternate veins which spring from the flexuous midvein of the segments, each covered by a scale-like indusium.

In moist thickets and open woods, Massachusetts to Pennsylvania, south to Florida and Tennessee. Ascends to 2100 ft. in eastern Pennsylvania. Summer.

**Fern Family.**

Ferns of various habit, the rootstocks horizontal, often elongated, or short and erect, the leaves simple, pinnate, pinnatifid or decounpound, coiled in vegetation. Sporangia borne in clusters (sori) on the lower side or margins of the leaves or their segments, stalked, provided with a vertical ring of cells, opening transversely. Sori with or without a membranaceous covering (indusium). Prothallium green.

About 70 genera and 3000 species of very wide geographic distribution. The family includes by far the greater number of living ferns.

Spore-bearing leaves closely rolled together, with necklace-like segments.

Leaves all flat or their edges only slightly revolute.

Sori dorsal or marginal, provided with special indusia.

Sori roundish, indusia less than twice as long as broad.

1. **Onoclea**.

Indusium roundish or stellate.

2. **Woodia**.

Indusium cup-shaped or somewhat 2-valved.

3. **Dicksonia**.

Indusium partly inferior, fixed by a broad base and enclosing the sori like a hood.

4. **Cyrtopteris**.

Indusium superior, fixed by its centre or sinus.

5. **Dryopteris**.

Sori linear or oblong; indusia more than twice as long as broad.

6. **Woodwardia**.

Sori in chain-like rows parallel to the midribs or rachises.

7. **Asplenium**.

Sori all oblique to the midrib or rachises; veins free.

8. **Scolopendrium**.

Sori confluent in pairs with an apparently double indusium opening in the middle; leaf simple.

9. **Camptosorus**.

Sori single on the upper side of a veinlet or rarely crossing it.

10. **Pellaea**.

Sori partly parallel to the midrib, partly oblique; veins united.

11. **Adiantum**.

Sporangia at the ends of veins, borne on a reflected portion of the leaf.

12. **Pteris**.

Sporangia borne on a continuous vein-like receptacle which connects the apices of the veins.

13. **Cryptogramma**.

Sporangia at or near the ends of unconnected veins.

14. **Pellaea**.

Leaves of two forms: stipes pale.

15. **Cheilanthes**.

Leaves uniform; stipes usually dark colored.

16. **Nototheca**.

Sori mostly forming a continuous indusium around the segment.

17. **Polypodium**.

Sori minute; indusium usually interrupted, if continuous the segments small and bead-like.

1. **ONOCLEÀ L.** Sp. Pl. 1062. 1753.

Coarse ferns with the fertile leaves closely rolled up into necklace-like or berry-like segments, and entirely unlike the broad pinnatifid sterile ones. Sori round, borne on the back of the veins. Indusium very thin and membranous, hemispheric or hood-shaped, fixed at the inferior side of the sorus. Sporangia pedicelled, provided with a dorsal ring, bursting transversely. Fertile leaves unrolling at maturity, allowing the spores to escape, and remaining long after the sterile leaves have been killed by frost. [Name ancient, not originally applied to these plants.]

Three species, natives of cold and temperate regions. Only the following are known to occur in North America.

Fertile leaf bipinnate; veins anastomosing.

1. **O. sensibilis**.

Fertile leaf simply pinnate; veins free.

2. **Struthiopteris**.
1. *Onoclea sensibilis* L.  
*Sensitive Fern.*  
(Fig. 14.)

*Onoclea sensibilis* L. Sp. Pl. 166. 1753.

Rootstock rather slender, copiously rooting; fertile leaves 1°-2½° high, persistent over winter, much contracted, and with short pinnules rolled up into berry-like closed involucres forming a narrow panicle; sterile leaves 1°-4½° high, broadly triangular, deeply pinnatifid, the segments lanceolate-oblong, entire, undulate, or the lower pairs sinuate-pinnatifid; veins freely anastomosing; lowest segments tapering both ways from the middle; veins forming a somewhat regular series of semi-elliptic areoles next the midvein and numerous smaller areoles between this series and the margin.

In moist soil, Newfoundland and Ontario to the Northwest Territory, south to Florida, Louisiana and Kansas. Ascends to 3000 ft. in Virginia. Various intermediate forms between the sterile and fertile leaves occur. Sensitive to early frosts. Aug.–Nov.

2. *Onoclea Struthiopteris* (L.) Hoffm.  
*Ostrich Fern.*  
(Fig. 15.)


Rootstock stout, ascending, bearing a circle of sterile leaves with one or more fertile ones within. Fertile leaves 1°-1½° high, simply pinnate with necklace-shaped pinnae which are formed of the closely revolute margins; sori crowded and confluent; sterile leaves 2°-7° high, 6°-15° wide, broadly lanceolate, pinnae, much the broadest above the middle and gradually tapering below, the lower pinnae being gradually much reduced; veins pinnae, free and simple; texture firm; rootstocks stoloniferous.


Small or medium-sized ferns, growing in rocky places, with 1-2-pinnate or pinnatifid leaves and round sori borne on the backs of simply forked free veins. Indusia inferior, thin and often evanescent, roundish or stellate, either small and open or early bursting at the top into irregular lobes or segments. Stipes often jointed above the base and separating at the joint. [Name in honor of Joseph Woods, 1776-1864, English architect and botanist.]

About 15 species, natives of temperate and cold regions. Besides the following, another occurs in the southwestern United States.

*Indusium* minute or evanescent, flat, concealed beneath the sori, its margin cleft into slender hair-like segments.

Stipes obscurely jointed near the base; cilia of the indusium inflexed over the sporanges.

1. *W. iteensis.*  
Leaves with more or less rusty chaff underneath.

Leaves glabrous or nearly so.

Leaf lanceolate, not tapering below; pinnae cordate-ovate, 5-7-lobed.

Leaf linear or linear-oblong, often tapering both ways; pinnae deltoid.

Stipes not jointed; cilia of the indusium very short, hidden by the sporanges.

Puberulent; indusium deeply cleft, ending in hairs with cylindric cells.

Leaves and stipes glabrous; indusium divided to centre into beaded hairs.

*Indusium* distinct, at first enclosing the sporanges, splitting into jagged lobes.

4. *W. scopulina.*

5. *W. oregana.*

1. Woodsia Ilvensis (L.) R. Br. Rusty Woodsia. (Fig. 16.)


Rootstock short, caespitose. Leaves lanceolate, 4'-10' long, pinnate, glabrous above, more or less covered with rusty chaff beneath, as are also the slender stipes; pinnae crowded, sessile, pinnately parted, the crowded segments oblong, obscurely crenate; stipes jointed near the base; sori borne near the margins of the segments, somewhat confluent when old; indusium minute, concealed beneath the sorus, its margin cleft into filiform segments which are inflexed over the sporanges and inconspicuous, especially when the latter have scattered their spores.


2. Woodsia alpina (Bolton) S. F. Gray. Alpine Woodsia. (Fig. 17.)

Acrostichum alpinum Bolton, Fil. Brit. 76. 1790.

Rootstock short, caespitose. Leaves narrowly oblong-lanceolate, 2'-6' long, 8'-12" wide, scarcely narrower below the middle; pinnae cordate-ovate or triangular-ovate, pinnately 5-7-lobed, glabrous or very nearly so on both surfaces; stipes jointed near the base; sori somewhat scattered on the segments; indusium as in the preceding species.


3. Woodsia glabella R. Br. Smooth Woodsia. (Fig. 18.)


Rootstock small, caespitose. Stipes obscurely jointed at the base; leaves linear or narrowly lanceolate, 2'-5' long, 4'-8" wide; pinnae deltoid to ovate, the lower remote, obtuse, crenately lobed, often somewhat smaller than the middle ones, glabrous or nearly so; sori scattered on the segments; indusium minute, membranous, with 6-10 radiating segments, covered by the sporanges, its filamentous segments only inflexed over them when young as in the two preceding species.

Rocky Mountain Woodsia. (Fig. 19.)


Rootstock short, creeping, densely chaffy. Stipes 2'-4' long, not jointed, puberulent like the rachis and lower surface of the leaf with minute flattened hairs and stalked glands; leaves lanceolate, 6'-12' long, tapering from about the middle to both ends; pinnae numerous, oblong-ovate, pinnatifid into 10-16 oblong toothed segments; indusium hidden beneath the sporanges, very deeply cleft into short cilia with cylindric cells.

In crevices of rocks, northern Minnesota and western Ontario to Oregon, south in the Rocky Mountains to Arizona and in the Sierra Nevada to California. Summer.

5. Woodsia Oregana D. C. Eaton.
Oregon Woodsia. (Fig. 20.)


Rootstock short. Stipes and leaves glabrous throughout; stipes not jointed, brownish below; leaves 2'-10' long, elliptic-lanceolate, the sterile shorter than the fertile; pinnae triangular-oblong, obtuse, pinnatifid; lower pinnae reduced in size and somewhat remote from the others; rachis straw-colored; segments oblong or ovate, dentate or crenate, the teeth often reflexed and covering the submarginal sori; indusia minute, concealed by the sporanges, divided almost to the centre into a few beaded hairs.

On rocks, northern Michigan and Minnesota and Manitoba to British Columbia, south in the Rocky Mountains to Arizona and in the Sierra Nevada to California. July-Aug.

6. Woodsia obtusa (Spreng.) Torr.
Blunt-lobed Woodsia. (Fig. 21.)

Polypodium obtusum Spreng. Anleit. 92. 1804.
Hypopeltis obtusa Torr. Comp. 380. 1824.

Rootstock short, creeping. Stipes not jointed, pale green, 3'-6' long; leaves broadly lanceolate, 6'-15' long, minutely glandular-pubescent, nearly 2-pinnate; pinnae rather remote, triangular-ovate, or oblong, pinnately parted into obtuse oblong crenate-dentate segments; veins forked and bearing the sori on or near the minutely toothed lobes; indusium conspicuous, at first enclosing the sporanges, at length splitting into several jagged lobes, which are much wider than those in any of the preceding species.

On rocks, Nova Scotia (according to Macoun) and Maine to northern New York, Wisconsin and British Columbia, south to Georgia, Alabama, the Indian Territory and Arizona. Ascends to 2200 ft. in Virginia. July-Aug.
Large ferns with 2-3-pinnatifid leaves, and creeping or erect rootstocks, many tropical species arborescent. Sori small, globular, marginal or submarginal. Sporangia borne in an elevated globular receptacle, enclosed in the membranous cup-shaped inferior indusium which is open at the top and on the outer side adherent to a reflexed toothlet of the leaf. Sporangia pedicelled, provided with a vertical ring which bursts transversely. Veins always free. [Name in honor of James Dickson, English nurseryman and botanist, 1738-1822.]

About 50 species, of wide distribution, the greater number in tropical America and Polynesia.

1. Dicksonia punctiloba (Michx.) A. Gray. Hay-scented Fern. (Fig. 22.)

Dicksonia pilosissima Willd. Enum. 1826. 1809.
Dicksonia punctiloba A. Gray, Man. 628. 1848.

Rootstock slender, extensively creeping, not chaffy. Stipes stout, chaffless, pale green and sweet-scented; leaves 1°-3° long, 5'-9' wide, ovate-lanceolate, acute or acuminate, frequently long-attenuate, usually 3-pinnatifid, thin and delicate; rachis and under surface minutely glabulolar and pubescent; sori minute, each on a recurved toothlet, usually one at the upper margin of each lobe; sporangia few; indusium cup-shaped with a delicate membranous irregular margin.

In various situations, most abundant on open hill-sides, New Brunswick and Ontario to Indiana and Minnesota (according to Upham), south to Alabama and Tennessee. Ascends to 5600 ft. in Virginia. Aug.


Delicate rock ferns with slender stipes, 2-4-pinnate leaves, and roundish sori borne on the backs of the veins. Indusium membranous, hood-like, attached by a broad base on its inner side and partly under the sorus, early opening and somewhat evanescent. Veins free. Sporangia pedicelled, provided with a transversely bursting vertical ring. [Greek, signifying Bladder-fern, in allusion to the inflated indusium.]

Five species, natives of the north temperate zone. Only the following known in North America.

Leaves ovate-lanceolate or lanceolate, 2-3-pinnate.

Leaves broadest at base, long-tapering, bearing bulblets beneath.

Leaves scarcely broader at base, short-pointed; no bulblets.

Leaves deltoid-ovate, 3-4-pinnate.

1. Cystopteris bulbifera (L.) Bernh. Bulblet Cystopteris. (Fig. 23.)


Rootstock short, copiously rooting. Stipes 4'-6' long, light colored; leaves elongated, lanceolate from a broad base, 1°-2½° long, 2-3-pinnatifid or pinnate; pinnules crowded, toothed or pinnatifid; rachis wingless, commonly bearing underneath in the axils of the pinnae and segments, large fleshy bulblets which fall away and propagate the plant; indusia short, truncate on the free side, early thrown back and withering so that the sori appear naked at maturity.

On wet rocks and in ravines, especially on limestone, Quebec to Wisconsin, south to Tennessee and Arkansas. Ascends to 3500 ft. in Virginia. July-Aug.
2. Cystopteris frágilis (L.) Bernh. Brittle Fern. (Fig. 24.)

*Polypodium fragilis* L. Sp. Pl. 1091. 1753.


Rootstock short. Stipes 4'-8' long; leaves thin, oblong-lanceolate, only slightly tapering below, 4'-10' long, 2-3-pinnatifid or pinnate; pinnae lanceolate-ovate, irregularly pinnatifid, with a broad central space and bluntly or sharply toothed segments decurrent along the margined or winged rachis, without bulblets; indusia narrow or acute at the free end, early withering and exposing the sori which finally appear naked; texture membranous.

On rocks and in moist grassy woods, Newfoundland to Alaska, south to Georgia and Arizona. Also in South and Central America, Europe, Asia and New Zealand; almost cosmopolitan in distribution. Ascends to 5000 ft. in New Hampshire. May-July.

3. Cystopteris montána (Lam.) Bernh. Mountain Cystopteris. (Fig. 25.)


Rootstock slender, widely creeping. Stipes 6'-9' long, slender; leaves deltoid-ovate, 3-4-pinnate, about 6' long and broad, the lowest pinnae deltoid-lanceolate and much larger than the upper, their inferior pinnales 1'-1½' long; segments deeply divided into oblong lobes, deeply toothed; sori numerous; indusia acute, soon withering, exposing the sori and causing them to appear naked at maturity.

On rocks, Labrador and Quebec to British Columbia, south to the north shore of Lake Superior, and in the Rocky Mountains to Colorado. Also in northern Europe and Asia. Aug.


Ferns with 1-3-pinnate or pinnatifid leaves and round sori usually borne on the backs of the veins, the fertile and sterile leaves similar in outline. Indusia flat or flattish, orbicular and peltate or cordate-reniform, superior, fixed by its sinus or depressed centre. Stipe continuous, not jointed with the rootstock. Sporangia abundant, pedicelled, the vertical ring bursting transversely. Veins free in the northern species, uniting occasionally or even freely in some of the southern. [Greek, signifying Oak-fern, in allusion to the forest habitat of most species.]

About 350 species, of wide geographic distribution. Besides the following some 10 others occur in the southern and western parts of North America. The first three species are sometimes separated as a distinct genus. (*Polystichum* Roth, 1797.)
POLYPODIACEAE.

Indusium orbicular, entire, peltate, fixed by the depressed centre.
Leaves once pinnate.
Stipes short; lower pinnae much reduced.
Leaves bipinnate.

1. Dryopteris L. Kuntze. Holly-fern. (Fig. 26.)

**Dryopteris Lonicirhtis** Kuntze, Rev. Gen. Pl. 813. 1891.

Rootstock short, stout, densely chaffy. Stipes 1'-5' long, bearing large dark brown scales with some smaller ones; leaves rigid, coriaceous, evergreen, narrowly lanceolate in outline, once pinnate; pinnae broadly lanceolate-falcate, 1'-2' long, acute or acuminate at the apex, strongly auricled on the upper side at the base and obliquely truncate on the lower, densely spinulose-dentate, the lowest commonly triangular and shorter; sori large, at length contiguous, borne nearer the margin than the midrib, commonly quite close to the margin; indusium orbicular, entire, fixed by its depressed centre.

On rocks, Labrador to Alaska, south to Ontario and British Columbia, and in the Rocky Mountains to Utah. Also in northern Europe and Asia. Aug.

2. Dryopteris acrostichoides (Michx.) Kuntze. Christmas Fern. (Fig. 27.)

**Aspidium acrostichoides** Sw. Syn. Fil. 41. 1806.
**Dryopteris acrostichoides** Kuntze, Rev. Gen. Pl. 812. 1891.

Rootstock stout, creeping. Stipes 5'-7' long, densely chaffy; leaves lanceolate in outline, 6'-2' long, 3'-5' wide, rigid, evergreen, subcoriaceous, once pinnate; pinnae linear-lanceolate, somewhat falcate, 1'-3' long, acutish at the apex, half halberd-shaped at the base, bristly with appressed teeth, the lower little smaller, sometimes deflexed; fertile fronds contracted at the summit, bearing the large contiguous sori near the middle, which soon cover the whole lower surface; indusium orbicular, entire, fixed by its depressed centre, persistent.

In woods and on hillsides, most abundant in rocky places. New Brunswick and Nova Scotia to Florida, west to Ontario, Wisconsin and Mississippi. Ascends to 7200 ft. in Maryland. July-Aug.

Forms with cut-lobed or incised pinnae are known as var. **Schweinitzii**; occasional forms are 2-pinnatifid.
3. **Dryopteris Braunii** (Spennner) Underw. Braun's Holly-fern. (Fig. 28.)

*Aspidium Braunii* Spennner, Fl. Frib. t. 9. 1825.

*Dryopteris aculeata* var. *Braunii* Underw. Native Ferns, Ed. 4, 112. 1893.

Rootstock stout. Stipes 4'-5' long, chaffy with both broad and narrow brown scales; leaves oblong-lanceolate, not coriaceous, 2 pinnate, the rachis chaffy, at least below; pinnae numerous, close together, lanceolate or linear-lanceolate, broadest at the base, cut to the midvein into ovate or oblong pinnules; middle pinnae 23'-4' long, the lower gradually shorter; pinnules truncate and nearly rectangular at the base, acute or obtuse, sharply toothed and beset with long soft hairs and scales; sori small, mostly nearer the midvein than the margin; indusium orbicular, peltate, entire.

In rocky woods, Quebec to Alaska, south to Maine, the mountains of Pennsylvania, and to Michigan and British Columbia. Ascends to 5000 ft. in Vermont. Aug.

4. **Dryopteris Noveboracensis** (L.) A. Gray. New York Fern. (Fig. 29.)


*Dryopteris Noveboracensis* A. Gray, Man. 639. 1848.

Rootstock slender, widely creeping. Leaves lanceolate, tapering both ways from the middle, 10'-2' long, 4'-6' wide, membranous, long-acuminate at the apex, once pinnate; pinnae lanceolate, sessile, long-acuminate, deeply pinnatifid, ciliate and finely pubescent beneath, 13'-3' long, the two or more lower pairs gradually shorter and de-flexed, commonly distant; segments flat, oblong, obtuse, the basal ones often enlarged; veins simple or those of the basal lobes forked; sori not confluent, borne near the margin; indusium minute, reniform, delicate, gland-bearing, fixed by its sinus.

In moist woods and thickets, Newfoundland to Ontario and Minnesota, south to North Carolina and Arkansas. Ascends to 5000 ft. in Virginia. Sometimes sweet-scented in drying. July-Sept.

5. **Dryopteris Thelypteris** (L.) A. Gray. Marsh Shield-fern. (Fig. 30.)

*Acrostichum Thelypteris* L. Sp. Pl. 1071. 1753.

*Dryopteris Thelypteris* A. Gray, Man. 639. 1848.

Rootstock slender, creeping. Leaves lanceolate or oblong-lanceolate, scarcely narrower at the base than at the middle, 10'-23' long, 4'-6' wide, short-acuminate at the apex, membranous, once pinnate; pinnae linear-lanceolate, short-stalked or sessile, mostly horizontal, acuminate at the apex, nearly truncate at the base, 13'-3' long, slightly pubescent beneath, deeply pinnatifid; segments oblong, obtuse or appearing acute from the strongly revolute margins; veins regularly once or twice forked; sori crowded, 10-12 to each segment; indusia reniform, slightly glandular or glabrous.

In marshes and wet woods, rarely in dry soil, New Brunswick to Manitoba, south to Florida, Louisiana and Kansas. Ascends to 2000 ft. in Vermont. Also in Europe and Asia. Summer.
6. Dryopteris simulata Davenp. Massachusetts Shield-fern. (Fig. 31.)

As synonym.

Rootstock wide-creeping, slender, brownish; stipes 6'-20' long, straw-colored, dark brown at base, with deciduous scales; leaves 8'-20' long, 2'-7' wide, oblong-lanceolate, tapering to an acuminate apex (abruptly tapering in the fertile leaf), little or not at all narrowed at the base; pinnae 12-20 pairs, lanceolate, pinnatifid, the segments obliquely oblong, obtuse, entire, slightly revolute in the fertile leaf; surfaces finely pubescent, especially near the midribs; texture rather thin; veins simple, nearly straight; sori rather large, somewhat distant, 4-10 to each segment; indusia finely glanular at the margins, withering-persistent.

In woodland swamps, New Hampshire to the Indian Territory. Close to the preceding species. Summer.

7. Dryopteris frágans (L.) Schott. Fragrant Shield-fern. (Fig. 32.)

Polypodium fragrans L. Sp. Pl. 1894. 1753. 
Dryopteris fragrans Schott. Gen. Fil. 1834.

Rootstock stout, chaffy with brown shining scales. Stipes 2'-4' long, chaffy; leaves lanceolate, firm, glanular and aromatic, pinnate or nearly 2-pinnate, acuminate at apex, narrowed to the base, 3'-12' long; pinnae deeply pinnatifid, numerous, lanceolate, acute, ½'-1½' long; segments oblong, obtuse, dentate or nearly entire, nearly covered by the large sori; indusium thin, nearly orbicular, persistent long after the sporanges have matured, its margin ragged and sparingly gland bearing, the sinus narrow.

On rocks, Labrador to Alaska, south to Maine, Vermont, the Adirondack Mountains and Wisconsin. Ascends to 4000 ft. in Vermont. Also in Greenland, Europe and Asia.

8. Dryopteris cristàta (L.) A. Gray. Crested Shield-fern. (Fig. 33.)

Dryopteris cristata A. Gray, Man. 631. 1848.

Rootstock stout, creeping, densely chaffy. Stipes of the sterile leaves 2'-5' long, those of the fertile 6'-10' long; leaves linear-oblong or lanceolate, acuminate at the apex, gradually and slightly narrowed to the base, rather firm, 1½'-2½' long, 4'-6' wide, pinnae; pinnae lanceolate or triangular-ovate, acuminate, deeply pinnatifid or the lower pinnae, the segments 6-10 pairs, serrate or incised; sori about midway between the margin and midrib; indusium thin, orbicular-reniform, glabrous.

In wet woods and swamps, Newfoundland to Manitoba, south to Kentucky and Arkansas. Ascends to 2700 ft. in Maryland. Also in Europe and Asia. July-Aug.


Leaves 2½'-4' long, with oblong-lanceolate pinnae, which are broadest at the base and 4'-6' long; segments 8-16 pairs, linear-oblong, obscurely serrate; veins pinnately forked, bearing the sori near the midvein. Maine and Ontario to New Jersey, Pennsylvania and Wisconsin.
9. Dryopteris Goldieána (Hook.) A. Gray. Goldie’s Fern (Fig. 34.)


_Dryopteris Goldiana_ A. Gray, Man. 631. 1848.

Rootstock stout, widely creeping, chaffy. _Stipes_ 10'-18' long, chaffy at least below; leaves broadly ovate, rather firm, 2'-4' long, usually 1' or more wide, glabrous or nearly so, dark green above, pinnate or nearly 2-pinnate; lower pinnae broadly lanceolate, widest at about the middle, 6'-9' long, 1'-2' wide, pinnately parted into about 20 pairs of oblong-linear subfalcate segments which are serrate with appressed teeth; _sori_ very near the midrib, close together but distinct, large; _indusium_ orbicular, fixed by its narrow sinus, glabrous, persistent.

In rich woods, New Brunswick to Minnesota, south to North Carolina and Tennessee. Ascends to 5000 ft. in Virginia and to 2500 ft. in Vermont. July-Aug.

10. Dryopteris marginális (L.) A. Gray. Evergreen Wood-fern. (Fig. 35.)


_Aspidium marginale_ Sw. Syn. Fil. 50. 1806.

_Dryopteris marginalis_ A. Gray, Man. 632. 1848.

Rootstock stout, ascending, densely chaffy with dark brown shining scales. _Stipes_ 3'-8' long, chaffy below; leaves borne in a crown, ovate-oblong or ovate-lanceolate in outline, subcoriaceous, 6'-9' long, pinnate or 2-pinnate, acuminate at the apex, slightly narrowed at the base; pinnae numerous, lanceolate, nearly sessile, glabrous, 2'-5' long, the lower broader and shorter than the middle ones, the upper pinnatifid, the lower pinnately parted into oblong, sometimes slightly falcate obtuse entire dentate or pinnately lobed pinnales; _sori_ distinct, close to the margin, covered by the glabrous _indusium_ which is fixed by its sinus.

In rocky woods and on banks, Prince Edward Island to the Northwest Territory, south to Alabama and Arkansas. Ascends to 5000 ft. in Virginia. A hybrid with _D. cristata_ is described. Leaves evergreen. July-Aug.

11. Dryopteris Filix-Más (L.) Schott. Male Fern. (Fig. 36.)


_Dryopteris Filix-mas_ Schott, Gen. Fil. 1534.

Rootstock stout, ascending or erect, chaffy. _Stipes_ 4'-6' long, very chaffy below; leaves broadly oblong-lanceolate, acute, or acuminate at the apex, slightly narrowed to the base, 1'-3' long, rather firm, half evergreen, pinnate or partly 2-pinnate; pinnae lanceolate, broadest at the base, gradually acuminate to the apex, 3'-6' long, pinnatifid almost to the rachis or pinnately divided into oblong glabrous lobes or pinnales; pinnales slightly dentate, incised or nearly entire; _sori_ large, borne near the midvein, more numerous on the lower halves of the segments; _indusium_ firm, convex, glabrous, orbicular-reniform, fixed by its sinus.

In rocky woods, Labrador to Alaska, south to northern Michigan and British Columbia, and in the Rocky Mountains to Arizona. Also in Greenland, Europe and Asia, and in the Andes of South America. Aug. The rootstock of this and the preceding species furnish the drug Filix-mas, used as a vermifuge.
12. Dryopteris spinulosa (Retz.) Kuntze. Spinulose Shield-fern. (Fig. 37.)

Dryopteris spinulosa Retz. Fl. scand. Ed. 2. 250. 1795.


Dryopteris spinulosa Kuntze, Rev. Gen. Pl. 8: 3. 1891.

Rootstock stout, chaffy. Stipes 6'-18' long, bearing a few pale brown deciduous scales; leaves ovate-lanceolate, 2-pinnate, the pinnae oblique to the rachis, elongated-triangular, rather thin, the lower pairs broadly triangular, slightly shorter than the middle ones; pinnae oblique to the midrib, connected by a very narrow wing, oblong, incised or pinnatifid with spinulose-toothed lobes; indusium glabrous, orbicular-reiniform, fixed by its sinus.

In rich woods, Newfoundland to Alaska and Washington, south to Kentucky and Michigan. Ascends to 5000 ft. in Virginia. Also in Europe and Asia. July-Aug.

Dryopteris spinulosa intermediá (Muhl.) Underw.

Native Ferns, Ed. 4. 116 (1893).


Dryopteris intermediá A. Gray, Man. 630. 1848.

Aspidium spinulosum var. intermedium D. C. Eaton in A. Gray, Man. Ed. 5. 665. 1867.

Scales of the stipes few, brown with a darker centre; leaves oblong-ovate, 2-3-pinnate, the pinnae oblong lanceolate, spreading, the lowest unequally triangular-ovate; pinnales crowded, pinnately divided; indusium delicate, beset with stalked glands. Labrador to Alaska, south to North Carolina and Missouri. (?) We have chosen this commonest American form for illustration.

Dryopteris spinulosa dilatá (Hoffm.) Underw. Native Ferns, Ed. 4. 116. 1893.


Aspidium spinulosum var. dilatánum Hook. Brit. Fl. 4: 444. 1830.

Dryopteris dilatáta A. Gray, Man. 631. 1848.

Scales of the stipe large, brown with a darker centre; leaves broadly ovate or triangular-ovate, commonly 3-pinnate; pinnales lanceolate-oblong, the lowest often much elongated; indusium glabrous. Newfoundland to Washington and Alaska, south along the Alleghenies to North Carolina and Tennessee and to Ohio and Nebraska. Also in Europe and Asia.

13. Dryopteris Boottii (Tuckerm.) Underw. Boott's Shield-fern. (Fig. 38.)

Aspidium Boottii Tuckerm. Hovey's Mag. 9: 145. 1843.


Dryopteris Boottii Underw. Native Ferns, Ed. 4. 117. 1893.

Rootstock stout, ascending. Stipes 8'-12' long, covered, at least below, with thin pale-brown scales; leaves elongated-oblong or elongated-lanceolate in outline, thin, acuminate at the apex, slightly narrowed at the base, nearly or quite 2-pinnate, 18°-25° long, 3'-5' wide; pinnales lanceolate, long-acuminate, broadest at the nearly sessile base; pinnales broadly oblong, very obtuse, the lower pinnatifid; sori distinct, borne about half way between the midrib and margin; indusium orbicular-reiniform, minutely glandular.


6. PHEGÓPTERIS Fée, Gen. Fil. 2: 42. 1850-52.

Medium sized or small ferns with 2-3-pinnatifid or ternate leaves and small round sori borne on the backs of the veins below the apex. Stipe not jointed with the rootstock. Indusium none. Fertile (spore-bearing) and sterile leaves similar. Sporangia pedicelled, provided with a vertical ring, bursting transversely. [Greek, signifying Beech-fern.]

About 100 species of wide geographic distribution. Besides the following another occurs in western North America.

Leaves triangular, 2-pinnatifid; pinnae sessile, adnate to the winged rachis.

Leaves as broad as long, or broader, usually light green.

Leaves ternate, with the three divisions peltioted; rachis wingless.

1. P. Phegopteris.
2. P. hexagonoptera.
3. P. Dryopteris.
1. Phegopteris Phegopteris (L.) Underw. Long Beech-fern. (Fig. 39.)


Rootstock slender, creeping, somewhat chaffy at least when young. Stipes 6'-9' long; leaves triangular, thin, mostly longer than wide, 4'-9' long, 3'-6' wide, acuminate at the apex, pubescent, especially on the veins beneath; pinnae lanceolate or linear-lanceolate, acuminate at the apex, sessile, broadest above the base, pinnately parted very nearly to the rachis into oblong obtuse entire segments, the lower pair deflexed and standing forward; basal segments, at least those of the upper pinnae, decurrent and adnate to the winged rachis; sori small, borne near the margin.

In moist woods and on hill-sides, Newfoundland to Alaska, south to the mountains of Virginia, and to Michigan and Washington. Ascends to 4000 ft. in Vermont. Also in Europe and Asia. Aug.

2. Phegopteris hexagonoptera (Michx.) Fée. Broad Beech-fern. (Fig. 40.)


Rootstock slender, creeping, chaffy, somewhat fleshy. Stipes 8'-18' long, straw-colored, naked; leaves triangular, as broad as or broader than long, 7'-12' wide, slightly pubescent and often slightly glandular beneath, acuminate at the apex; uppermost pinnae oblong, obtuse, dentate or entire, small, the middle ones lanceolate, acuminate, the very large lowest pair broadest near the middle, pinnately parted nearly to the midvein into linear-oblong obtuse segments; sori mostly near the margin.

In dry woods and on hill-sides, Quebec to Minnesota, south to Florida and Louisiana. Ascends to 4000 ft. in North Carolina. Leaves fragrant. Aug.

3. Phegopteris Dryopteris (L.) Fée.

Oak-fern. (Fig. 41.)


Rootstock slender, creeping. Stipes slender, 4'-12' long, chaffy at least near the base; leaves thin, broadly triangular, almost glabrous, 4'-8' wide, ternate, the three primary divisions stalked, pinnate or partly 2-pinnate, the terminal one slightly larger, all spreading more or less at right angles to the stipe; pinnules lanceolate or oblong-lanceolate, obtuse or subacute, sessile; segments oblong, obtuse, entire or crenate, close together.

In moist woods, thickets and swamps, Newfoundland to Alaska, south to Virginia, Minnesota, Oregon, and in the Rocky Mountains to Colorado. Ascends to 2400 ft. in the Catskills. Also in Europe and Asia. Aug.

Phegopteris Dryopteris Robertiana (Hoffm.) Davenport.

Cat. Davenport. Herb. Suppl. 47. 1883.
Polypodium Robertianum Hoffm. Deutsch. Fl. 1795.

Stipes 6'-10' long, straw-colored when dry; leaves 6'-8' long, mostly erect, 5'-7' wide, deltoid-ovate, 2-pinnate, the lowest pinnate much the largest, pinnatifid or again pinnate; upper pinnae smaller, pinnatifid, lobed or entire; sori numerous. Labrador to Iowa and Idaho. Also in Europe.
7. **WOODWÁRDIA** J. E. Smith, Mem. Acad. Tor. 5: 411. 1793.

Large and rather coarse ferns of swamps or wet woods, with pinnate or nearly 2-pinnate leaves and oblong or linear sori, suuk in cavities of the leaf and arranged in chain-like rows, parallel to the margins of the pinnae. Leaves all alike or the pinnae of the fertile ones much narrower than those of the sterile. Indusia subcoriaceous, fixed by their outer margins to a veinlet and covering the cavity like a lid. Veins more or less reticulated. Sporangia pedicelled, provided with a vertical ring, bursting transversely. [Name in honor of Thomas Jenkinson Woodward, 1745-1820, English botanist.]

Six species, mostly of the north temperate zone. Besides the following, another occurs on the Pacific coast of North America.

Leaves uniform; veins free between the sori and the margin.
Leaves of two kinds; veins everywhere anastomosing.

1. **Woodwardia Virginica** (L.) J. E. Smith. Virginia Chain-fern. (Fig. 42.)

2. **Woodwardia areolata** (L.) Moore.

**Acrostichum areolatum** L. Sp. Pl. 1666. 1753.
**Woodwardia angustifolia** J. E. Smith, Mem. Acad. Tor. 5: 411. 1793.
**Woodwardia areolata** Moore, Index Filicum, xlv. 1857.

Rootstock slender, widely creeping, chaffy. Leaves of two kinds, the fertile taller than the sterile and borne on longer stipes, 1°-2° high, their pinnae much contracted, narrowly linear, 3'-5' long, 6'-9' wide, distant, their bases connected by a very narrow wing to the rachis or quite distinct; sterile leaves deltoid-ovate, membranous, broadest at the base, or sometimes with one or two small pinnae below, the apex acuminate, the segments lanceolate or oblange-lanceolate, acute or acuminate, minutely serrulate, sometimes undulate, their bases connected by a rather broad rachis-wing; veins forming numerous areolae.

In swamps and moist soil, Maine to Florida, Tennessee, Louisiana, and Arkansas; also in Michigan. Ascends to 3000 ft. in North Carolina. Aug.-Oct.

**Net-veined Chain-fern.** (Fig. 43.)

Large ferns with oblong or strap-shaped mostly entire leaves, and linear elongated sori which are almost at right angles to the midrib and contiguous in pairs, one on the upper side of a veinlet, the other on the lower side of the next contiguous veinlet, thus appearing to have a double sinusium opening longitudinally along its middle. Sporangia pedicelled, the ring vertical, bursting transversely. [Greek, in allusion to the centipede, Scolopendra.]

Five species, mainly of temperate regions. Only the following is known to occur in North America.

1. **Scolopendrium Scolopendrium** (L.) Karst. Hart's-tongue. (Fig. 44.)

*Asplenium Scolopendrium* L. Sp. Pl. 1079. 1753.

*Scolopendrium vulgaris* J. E. Smith, Mem. Acad. Tor. 2: 421. 1793.

*Asplenium Scolopendrium* Karst. Deutsch. Pl. 278. 1880-83.

Rootstock short, erect or ascending, chaffy with light brown scales. Stipes 2'-6' long, fibrillose-chaffy below or sometimes up to the base of the leaf; leaves simple, bright green, firm, 7'-18' long, 1'-2½' wide, cordate at the base, the margins entire or undulate, the lower surface of the midrib sometimes chaffy; pairs of sori distinct, 2'-7' long; conspicuous on the lower surface, the sporanges dark brown at maturity; veins free, usually once forked near the midrib.


Slender ferns with tapering simple entire or undulate leaves, bearing linear or oblong sori several times longer than broad, irregularly scattered on either side of the reticulate veins or sometimes crossing them, partly parallel to the midrib and partly oblique to it, the outer ones more or less approximate in pairs. Indusium membranous. Sporangia pedicelled, provided with a vertical ring which opens transversely. [Greek, referring to the bent or curved sori.]

Two species, the following of eastern North America, the other of northern Asia.

1. **Camptosorus rhizophyllus** (L.) Link. Walking-fern. (Fig. 45.)

*Asplenium rhizophylla* L. Sp. Pl. 1078. 1753.


Rootstock short, usually creeping, somewhat chaffy. Stipes light green, 1'-6' long, tufted, spreading; leaves rather thin, lanceolate, simple, long-acuminate at the apex, cordate, hastate or rarely narrowed at the base, 4'-9' long, sometimes with a more or less elongated pair of basal auricles; tip of the leaf and sometimes the tip of one or both of the basal auricles rooting and forming a new plant by the ultimate withering away of its tissue, but commonly two or sometimes as many as four plants are found connected; sori usually numerous, very irregularly scattered on the lower surface.


Large or small ferns with simple lobed pinnate 2-3-pinnate or pinnatifid leaves, and linear or oblong sori oblique to the midrib or rachises. Leaves uniform, or the fertile sometimes different from the sterile. Veins free in our species. Indusia straight or curved, opening towards the midrib when single. Sporangia pedicelled, provided with an elastic ring, bursting transversely. [Ancient Greek name; some species were supposed to be remedies for diseases of the spleen.]

A genus of some 350 species, of very wide geographic distribution. Besides the following, five others occur in Florida and three in the western parts of the United States.

Sori straight or rarely slightly curved, attached to the upper side of a vein; leaves mostly small (except in No. 7).

Leaves pinnatifid or pinnate below, tapering to a point.

Stipes blackish below; lobes rounded or the lowest acuminate.

Leaves once pinnate.

Pinnæ 3'-15' long, mostly blunt.

Rachis chestnut-brown or blackish.

Pinnæ auricled at the upper side of the base.

Pinnæ opposite, oblong; rachis dark brown or black.

Pinnæ partly alternate, lanceolate; rachis chestnut-brown.

Pinnæ not auricled, partly alternate, partly opposite.

Rachis green; pinnæ not auricled.

Pinnæ 2'-5' long, acute or acuminate.

Leaves 2-3-pinnatifid.

Stipes green; leaves ovate-deltoid; pinnules fan-shaped, veins flabellate.

Stipes dark at the base, green above.

Leaves ovate-lanceolate, broadest near the base.

Leaves lanceolate, broadest above the middle.

Stipes chestnut-brown throughout, as also the lower part of the rachis.

Sori usually more or less curved, sometimes horseshoe-shaped, often crossing to the outer or lower side of the veinlet; large ferns. (No. 7 may be looked for here.)

Leaves 2-pinnatifid; segments blunt, scarcely crenate.

Leaves 2-pinnate; pinnules acute, toothed or pinnatifid.

1. Asplenium pinnatifidum Nutt. Pinnatifid Spleenwort. (Fig. 46.)


" Rootstock short, creeping, branched, chaffy. Stipes tufted, polished, blackish below, green above, 2'-5' long, somewhat chaffy below, at least when young; leaves broadly lanceolate in outline, 3'-10' long, firm, tapering upward to a long narrow point, pinnatifid or the lower parts pinnate; lowest pinnæ or occasionally several pairs sometimes tapering to a point like that of the apex of the leaf; lobes or pinnæ rounded or the lowest acuminate; sori commonly numerous, straight or slightly curved.

2. *Asplenium ebenoides* R. R. Scott. Scott's Spleenwort. (Fig. 47.)


Rootstock short, chaffy. Stipes blackish throughout, tufted, 1½'-4' long; leaves lanceolate in outline, variable in size and length, 3"-9" long, 1'-2' wide at the base, firm, tapering into a very long narrow acuminate apex, pinnatifid, or commonly pinnate below, the segments or pinnae lanceolate from a broad base, acute or acuminate, irregular in length, the lower sometimes shorter than those just above; sori several on each segment, straight or slightly curved; indusium narrow, reflexed when the sporanges are mature.

On limestone, Connecticut to Indiana, south to Alabama. Rare and local except in the last named locality. Ascends to 1400 ft. in Virginia. The plant usually occurs with *Camptosorus rhizophyllus* and *Asplenium platyneuron* and is suspected of being a hybrid between them.

3. *Asplenium parvulum* Mart. & Gal. Small Spleenwort. (Fig. 48.)


Rootstock short, creeping, chaffy with black stiff scales. Stipes tufted, blackish and shining, 1'-2" long; leaves rather firm, linear-oblong or linear-oblancoate, 3'-10' long, 5''-12'' wide, once pinnate; pinnae 2'-6' long, mostly opposite, oblong, obtuse, entire or crenulate, auricled on the upper side and nearly sessile, the middle ones the longest, the lower gradually shorter and reflexed; rachis dark brown or black; sori oblong, short, borne about midway between the midrib and the margin of the pinnae, nearly or quite straight.

On limestone, Virginia to Florida, west to Missouri, Texas and New Mexico. Ascends to 2400 ft. in Virginia. Also in Mexico. June-Oct.

4. *Asplenium platyneuron* (L.) Oakes. Ebony Spleenwort. (Fig. 49.)


Rootstock short. Stipes densely tufted, purplish-brown and shining, 1'-4' long; leaves linear, 8'-15' long, ½'-1½' wide, firm, once pinnate, the rachis chestnut-brown; pinnae 20-40 pairs, lanceolate, subfalcate, alternate or partly so, sessile, crenate, serrate or incised, auricled on the upper side at the base and occasionally also on the lower; lower pinnae gradually smaller and oblong or triangular; sori 8-12 on each side of the midrib of the pinnae, becoming crowded at maturity.

On rocks and banks, preferring limestone soil, Maine and Ontario to Florida, west to Colorado, the Indian Territory, Louisiana and Texas. Ascends to 4200 ft. in North Carolina. July-Sept.
5. *Asplenium Trichomanes* L. Maiden-hair Spleenwort. (Fig. 50.)

*Asplenium Trichomanes* L. Sp. Pl. 1080. 1753.

Rootstock short, nearly erect, chaffy with blackish scales. Stipes densely tufted, commonly numerous, 1'-5' long, purplish-brown and shining; leaves linear in outline, 3'-8' long, 6'-10' wide, rather rigid, once pinnate, evergreen; pinnae oval or roundish-oblong, inequilateral, partly opposite, partly alternate, or nearly all opposite, cuneate at the base, the point of attachment to the dark brown rachis narrow, their margins slightly crenate; sori 3-6 on each side of the forking and evanescent midrib, short, narrowed at either end; sporanges dark brown when mature.

On rocks, preferring limestone, throughout nearly the whole of North America except the extreme north. Ascends to 2500 ft. in Vermont. Also in Europe, Asia, South Africa and the Pacific Islands. July-Sept.

6. *Asplenium viride* Huds. Green Spleenwort. (Fig. 51.)


Rootstock stout, creeping, chaffy with brown nerveless scales. Stipes numerous, densely tufted, brownish below, green above; leaves linear-lanceolate, 2'-8' long, 4'-10' wide, once pinnate, pale green, soft, herbacons or almost membranous; rachis green; pinnae 12-20 pairs, ovate or rhomboid, deeply crenate, obtuse, unequal sided, their upper edges narrowed suddenly at the base, the lower obliquely truncate; sori oblong and numerous or scattered and fewer.

On rocks, New Brunswick to British Columbia, south to the Green Mountains of Vermont. Also in northern Europe and Asia. Summer.

7. *Asplenium angustifolium* Michx. Narrow-leaved Spleenwort. (Fig. 52.)


Rootstock stout, creeping, rooting along its whole length. Stipes growing in a crown, brownish or green above, chaffless, 8'-12' long, sometimes slightly scaly toward the base; leaves lanceolate in outline, 1º-2º long, once pinnate, glabrous; pinnae 20-30 pairs, linear-lanceolate, or those of the sterile leaves lanceolate, acuminated at the apex, obtuse or truncate at the base, 2'-5' long, flaccid, the margins entire or slightly crenulate; fertile leaves commonly taller than the sterile, narrower, their pinnae generally much narrower, often falcate; sori 20-30 on each side of the midrib, linear, close together, the indusia at length concealed by the mature sporanges.

In moist woods and shaded ravines, Quebec to Wisconsin, south to Virginia and Kentucky. Ascends to 1700 ft. in the Adirondacks, to 2500 in the Catskills. Aug.
8. Asplenium Ruta-muraria L. Wall Rue Spleenwort. (Fig. 53.)

Asplenium Ruta-muraria L. Sp. Pl. 1081. 1753.

Rootstock short, ascending. Stipes tufted, naked, slender, green, 2'-3' long; leaves ovate or deltoid-ovate in outline, 2'-5' long, glabrous, evergreen, 2-3-pinnate or pinnatifid above; pinnae and pinnules stalked; pinnules rhombic or obovate, mostly obtuse, dentate or incised, cuneate at the base; veins flabellate; sori few, linear-oblong, confluent when mature and covering nearly the whole pinnule, the indusium membranaceous and delicate.

On limestone, Vermont to Michigan, south to Alabama and Missouri. Also in Europe, Asia and northern Africa. July-Sept.

9. Asplenium montanum Willd. Mountain Spleenwort. (Fig. 54.)


Rootstock short, chaffy at the summit. Stipes tufted, naked, slender, blackish at the base, green above, 2'-3' long; leaves ovate-lanceolate in outline, acuminate at the apex, rather firm, 1-2-pinnate; lower pinnae longest, pinnate or pinnatifid, the lobes or segments ovate or oblong; upper pinnae less divided, merely toothed or incised; veins obscure; sori linear-oblong, short, the lower ones sometimes double, usually abundant, often confluent at maturity and concealing the narrow membranous indusium.

On dry and moist rocks, Connecticut and New York to Georgia, west to Ohio and Arkansas. Ascends to 1500 ft. in North Carolina. June-Aug.

10. Asplenium fontanum (L.) Bernh. Rock Spleenwort. (Fig. 55.)


Rootstock short, ascending, clothed with narrow dark scales at the apex. Stipes tufted, 1'-3' long, somewhat blackish at the base especially on the inner side, usually glabrous; leaves lanceolate, broadest above the middle, thin, 2-3-pinnate, 3'-6' long, 6'-1½' wide, acuminate at the apex, narrowed to the base; pinnae 10-15 pairs, the segments deeply dentate with spinulose teeth; sori only 1 to 4 on each segment, covered with a membranous subentire indusium, rarely confluent.

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11. *Asplenium Bradleyi* D. C. Eaton. Bradley’s Spleenwort. (Fig. 56.)


Rootstock short, chaffy with brown scales. Stipes tufted, slender, 2'-3' long, chestnut-brown throughout; leaves oblong-lanceolate or oblong, acuminate at the apex, not narrowed at the base, pinnate with 8-12 pairs of short-stalked or sessile, oblong-ovate pinnae, the lower again pinnatifid or pinnate with oblong obtuse lobes or pinnales, which are toothed at the apex, the upper pinnatifid with dentate or nearly entire lobes; rachis brown; sori short, borne near the midrib, covered with the narrow indusium until maturity.

On rocks, preferring limestone, New York to Georgia and Alabama, west to Arkansas. Local. July-Sept.

12. *Asplenium acrostichoides* Sw. Silvery Spleenwort. (Fig. 57.)


Rootstock slender, sinuous, creeping. Stipes 8'-12' long, straw-colored, somewhat chaffy below at least when young; leaves lanceolate in outline, 1'-3' long, 6'-12' wide, acute or acuminate at the apex, narrowed to the base, pinnate-pinnatifid; pinnae linear-lanceolate, sessile, acuminate, deeply pinnatifid into numerous oblong obtuse or subacute, slightly crenate segments; sori crowded, slightly curved or straight, the lower ones often double; indusium light-colored and somewhat shinning when young.


13. *Asplenium Filix-fœmina* (L.) Bernh. Lady-fern. (Fig. 58.)


Rootstock creeping, rather slender for the size of the plant. Stipes tufted, 6'-10' long, straw-colored, brownish or reddish; leaves broadly oblong-ovate or oblong-lanceolate, acuminate at the apex, 1'-3' long, 2-pinnate; pinnae lanceolate, acuminate, short-stalked or the upper ones sessile, 4'-8' long; pinnales oblong-lanceolate, incurved or serrate, their lobes or teeth often again toothed, those toward the ends of the pinnae confluent by a very narrow margin to the secondary rachis; sori short, the indusia straight or variously curved, sometimes horseshoe-shaped.

In woods, thickets, and by walls and fences, Nova Scotia to Alaska, south to Florida, Louisiana and Arizona, thus throughout nearly all of North America. Ascends to 6000 ft. in North Carolina, and to 2000 ft. in Vermont. Also in Europe and Asia. June-Aug.
Graceful ferns of rocky hillsides, woods and ravines, with much divided leaves and short marginal sori borne on the under side of the reflexed and altered portion of the pinnule which serves as an indusium. Stipes and branches of the leaves very slender or filiform, polished and shining. Sporangae borne at the ends of free forking veins, provided with a vertical ring which bursts transversely. [Name ancient.]

A genus of 80 or 90 species, mostly of tropical America. Besides the following another occurs in Florida, one in Texas and one in California.

1. Adiantum Capillus-Veneris L

Rootstock creeping, rather slender, chaffy with light-brown scales. Stipes very slender, black, or nearly so and shining, 3'-9' long; leaves ovate-lanceolate in outline, 2 pinnate below, simply pinnate above, membranous, commonly drooping, 6'-2' long, 4'-12' wide at the base; pinnules and upper pinnae wedge-obovate or rhomboid, rather long-stalked, glabrous, the upper margin rounded and more or less incised, crenate or dentate-serrate, except where it is recurved to form the indusia; main and secondary rachises and stalks of the pinnules black or dark brown like the stipe.

In ravines, Virginia to Florida, west to Missouri, Utah and California. Ascends to 1500 ft. in Kentucky. Also in tropical America, and widely distributed in the warmer parts of the Old World. June-Aug.

2. Adiantum pedatum L

Rootstock slender, creeping, chaffy, rooting along its whole length. Stipes 9'-18' long, dark chestnut-brown, polished and shining, dichotomously forked at the summit; leaves obliquely orbicular in outline, 8'-18' broad, membranous, the pinnae arising from the upper sides of the two branches of the stipe, somewhat radiately arranged, the larger ones 6'-10' long, 1'-2' wide; pinnules oblong, triangular-oblong, or the terminal one fan-shaped, short-stalked, the lower margin entire and slightly curved, the upper margin cleft, lobed or dentate, bearing the linear-oblong, often short sori.

In woods, Nova Scotia to British Columbia, south to Georgia and Arkansas, in the Rocky Mountains to Utah and to California. Ascends to 5000 ft. in Virginia. Also in Alaska and western Asia. July-Sept.

Large, mostly coarse ferns, our species growing in sunny places, with variously divided or in some tropical species simple leaves, and marginal linear continuous sori which occupy a slender or filiform receptacle, connecting the tips of free veins. Indusium membranous, formed of the reflected margin of the leaf. Sporangia pedicellated, provided with a vertical ring which bursts transversely. Stipes continuous with the rootstock. [Greek name for ferns, from the fancied resemblance of their leaves to the wings of birds.]

About 100 species of very wide geographic distribution, mostly of warm and tropical regions. Besides the following, three others occur in the southeastern United States.

1. **Pteris aquilina** L. Brake. Bracken. (Fig. 61.)


Rootstock stout, woody, horizontal, subterranean. Stipes 1°-2° long, straw colored or brownish; leaves 2°-4° long, 1°-3° wide, usually glabrous, ternate, the three branches each 2-pinnate; upper pin- nules undivided, the lower more or less pinnatifid.

In dry or moist sunny places, distributed over nearly the whole of North America, except the extreme north, and over nearly the whole of the Old World. Ascends to 5000 ft. in North Carolina. Forms with pubescent lower leaf surfaces occur in southern New York and New Jersey. July–Sept.


Pinnules sometimes linear and entire, or with the segments less crowded and the terminal lobe attenuate, narrow and entire. In sandy soil, New York to Florida and Texas, and in tropical America.


Light green, alpine and arctic ferns with leaves of two kinds, the segments of the sterile much broader than those of the fertile, the sporangia in oblong or roundish sori, which are at length confluent and cover the backs of the fertile pinnae. Indusium formed of the somewhat altered margin of the pinnule, at first reflexed to the midrib, so that the segments appear pod-like, at length opening out flat. Sporangia pedicellated, provided with a vertical ring which bursts transversely, borne at or near the ends of unconnected veins, copious, light brown. [Greek, in allusion to the hidden sporanges.]

Two species, the following of northern North America, the other of boreal regions of Old World.

1. **Cryptogramma acrostichoides** R. Br. American Rock-brake. (Fig. 62.)


*Allosorus acrostichoides* Spreng. Syst. 4: 66. 1827.

Rootstock rather stout, short, chaffy. Stipes densely tufted, straw-colored, 2°-6° long, chaffy below, very slender; leaves ovate or ovate-lanceolate in outline, thin, glabrous, 2-3-pinnate, the sterile shorter than the fertile, their ultimate segments and pinnules crowded, ovate, oblong or ovobate, obtuse, crenate or slightly incised; fertile leaves with linear or linear-oblong segments 3°-6° long, 1° or less wide, the margins involute to the midrib at first, at maturity expanded and exposing the light brown sporanges.

Forming dense patches among rocks, Labrador and Hudson Bay to Alaska, south to Lakes Huron and Superior, in the Rocky Mountains to Colorado and to California. Summer.

Rock-loving small or medium-sized ferns with pinnate or pinnatifid leaves and intramarginal sori borne on the ends of unconnected veins, at length confluent and forming a marginal line. Indusium commonly broad and membranous, formed of the reflexed margins of fertile segments which are more or less modified and membranous. Fertile and sterile leaves similar. Stipes usually dark-colored. Sporangia provided with a vertical ring which bursts transversely, pedicelled, copious, usually dark brown. [Greek, in allusion to the dark-colored stipes.]

About 55 species of wide geographic distribution. Besides the following, some 12 others occur in the western and southwestern parts of North America.

Texture of the leaves thin; veins plainly visible.
Texture coriaceous; leaves evergreen; veins obscure.
Leaves pinnate or 2-pinnate with large pinnules.
Leaves small, 3-pinnate, the pinnules narrow.

1. Pellaea Stéleri (S. G. Gmel.) Watt. Slender Cliff-brake. (Fig. 63.)


Rootstock slender, creeping, thread-like, somewhat sealy. Stipes scattered, 2'-3' long, straw-colored or pale brown, slightly chaffy below; leaves thin membranous, ovate in outline, 2'-5' long, 1'-2' wide, 2-3-pinnae or pinnatifid above, the fertile taller than the sterile and with narrower pinnules and segments; pinnae lanceolate-deltoid, cut to the rachis into a few blunt or subacute slightly lobed or entire segments; indusium broad, continuous; veins of the fertile leaves mostly only one-forked, everywhere apparent and conspicuous.


2. Pellaea atropurpurea (L.) Link.
Purple-stemmed Cliff-brake.
(Fig. 64.)


Rootstock short, densely clothed with rusty slender hair-like scales. Stipes tufted, 2'-6' long, dark purple or nearly black; leaves coriaceous, lanceolate or ovate-lanceolate in outline, 4'-12' long, 2'-6' wide, simply pinnate or 2-pinnate below; rachis dark-brown or purple, glabrous or pubescent; pinnules and upper pinnae 1'-2' long, glabrous, 3' or less wide, short-stalked or sessile; indusium formed of the slightly altered incurved margin of the pinnules; veins obscure, commonly twice forked.

On rocks, preferring limestone, Ontario to the Northwest Territory and British Columbia, south to New Jersey, Georgia, the Indian Territory, Arizona and northern Mexico. Ascends to 2200 ft. in Virginia. June-Sept.
3. *Pellaea densa* (Brack.) Hook.  
Oregon Cliff-brake. (Fig. 65.)

*Onychium densum* Brack. Fil. U. S. Expl. Exp. 120. 1854.


Rootstock rather slender, chaffy with blackish scales. Stipes densely tufted, wiry, slender, light brown, 3'-5' long; leaves ovate or triangular-oblong in outline, 1'-3' long, densely 3-pinnate, the segments 3''-5'' long, linear, nearly sessile, acuminate or mucronate, those of the fertile leaves tapering at each end, with narrowly recurved margins; apices of the rare sterile leaves sharply serrate, these otherwise similar to the fertile ones.

Mt. Albert, Gaspé, Quebec. Also from British Columbia to Wyoming and California. Summer.


Mostly pubescent or tomentose rock-loving and small ferns with much divided leaves, the sori terminal on the veins, at first small, ultimately more or less confluent. Indusium formed of the reflexed margin of the leaf, roundish and distinct or more or less confluent. Sporangia pedicelled, provided with an elastic ring which bursts transversely, often much concealed in the scales or tomentum which covers the segments in many species. [Greek, in allusion to the lipped indusia of some species.]

About 65 species, of temperate and tropical regions. Besides the following, some 14 others occur in the western and southwestern parts of North America and one in Florida.

Leaves nearly glabrous, 2-pinnate.
Leaves hirsute and glandular, not tomentose; indusia not continuous.
Leaves more or less tomentose; indusia mostly continuous.
Leaves 2'-5' long; stipes slender, at length nearly glabrous.
Leaves 6'-15' long; stipes stout, densely brown-tomentose.

1. *Cheilanthes Alabamensis* (Buckl.) Kunze. Alabama Lip-fern. (Fig. 66.)


Rootstock creeping, rather stout and short, clothed with slender brown scales. Stipes black, 3'-7' long, slender, wiry, villous at least towards the base with rusty wool; leaves lanceolate in outline, glabrous, 2'-10' long, 2-pinnate; pinnae numerous, ovate-lanceolate, acuminate, very short-stalked, the lowest usually smaller than those above; pinnules oblong or triangular-oblong, mostly acute, often auriculate on the upper side at the base, more or less toothed or incised; indusia pale, membranous, interrupted by the incising of the pinnae.

2. Cheilanthes lanosa (Michx.) Watt. Hairy Lip-fern. (Fig. 67.)


*Cheilanthes vestita* Sw. Syn. Fil. 128. 1806.


Rootstock short, creeping, covered with pale rusty-brown scales. Stipes tufted, wiry, chestnut-brown, 2'-4' long, hirsute; leaves herbaceous, oblong-lanceolate in outline, 4'-9' long, 1'-2' wide, gradually attenuate to the apex, 2-pinnate; pinnules somewhat distant, lanceolate-deltoid, acute, deeply pinnatifid or incised, more or less covered with almost bristly hairs and usually somewhat glandular, obtuse or subacute; sori numerous, covered by the infolded ends of the rounded or oblong lobes.

On rocks, southern New York to Georgia, west to Missouri, Arkansas and Texas. Ascends to 1900 ft. in North Carolina. July–Sept.

3. Cheilanthes grácilis (Fée) Mett. Slender Lip-fern. (Fig. 68.)


Rootstock short, covered with narrow brown scales lined with black. Stipes densely tufted, slender, about as long as the leaves, at first covered with woolly hairs, at length nearly glabrous; leaves ovate-lanceolate in outline, 2'-4' long, 1'-2' wide, 3-pinnate or 2-pinnate with the pinnules pinnatifid, the upper surface slightly tomentose, the lower densely matted with whitish-brown woolly hairs; upper pinnae oblong-ovate, the lower deltoid, the lowest distant; ultimate segments or lobes minute, the terminal ones slightly larger than the others, all roundish or obovate and much crowded; indusium narrow, formed of the inrolled unchanged margin of the segments.


4. Cheilanthes tomentosa Link. Woolly Lip-fern. (Fig. 69.)

*Cheilanthes tomentosa* Link, Hort. Berol. 2: 42. 1833.

Rootstock stout, short, densely chaffy with slender light brown scales. Stipes tufted, 4'-8' long, rather stout, densely brown-tomentose even when mature; leaves oblong-lanceolate in outline, 3-pinnate, 6'-18' long, densely tomentose, especially beneath, with slender brownish-white obscurely articulated hairs; pinnae and pinnules ovate-oblong or oblong-lanceolate, the ultimate pinnules about ½'' long, the terminal ones sometimes twice as large as the others; indusium pale, membranous, continuous.

Mostly small rock-loving ferns, with 1-3-pinnate or pinnatifid leaves and marginal roundish or oblong sori, which are at first distinct but soon confluent into a narrow band. Indusium none, but the sporanges are sometimes at first covered by the inflexed margin of the leaf. Veins free. Sporanges pedicelled, provided with a vertical transversely bursting ring. Lower surface of the leaf often covered with a white or yellow waxy powder, or in some species with a dense tomentum. [Greek, in allusion to the woolly lower surfaces.]
About 40 species, of wide distribution, most numerous in America. Besides the following, some 13 others are found in the mountainous portions of the southwestern United States.

1. Notolaena nivea dealbata (Pursh) Dav. Powdery Notolaena. (Fig. 70.)

Notolaena nivea var.dealbata Dav. Cat. Davenp. Herb. Suppl. 44. 1853.

Rootstock short, chaffy with narrow brown scales. Stipes tufted, wiry, very slender, shining, dark brown, 1'-3' long; leaves triangular-ovate in outline, acute, broadest at the base, 1'-4' long, 3-4-pinnate, the rachis black and shining; pinnae ovate, the lower slender-stalked; ultimate pinnales ovate or obovate, obtuse, lobed, crenate or entire, small, scarcely 1" long, white and powdery on the lower surface.

On calcareous rocks, Missouri and Kansas to Arizona and Texas. June-Sept. The typical form of the species occurs in the Southwestern States and in Central America.


Pinnate or simple ferns with stipes articulated to the creeping rootstocks. Sori circular, dorsal, in one or more rows on either side of the midribs. Indusium none. Sporanges pedicelled, provided with a vertical ring which bursts transversely. Veins variously arranged. [Greek, in allusion to the branched rootstocks of some species.]
About 350 species, of very wide geographic distribution, mostly of tropical regions. Besides the following, 5 occur in Florida, 1 in Arizona and 3 on the Pacific Coast.
Lower surface of the leaf glabrous; plant green.
Lower surface of the leaf densely scaly; plant grayish.

1. Polypodium vulgare L. Common Polypody. (Fig. 71.)

Rootstock slender, widely creeping, densely covered with cinnamon-colored scales. Stipes light colored, glabrous, 2'-6' long; leaves ovate-oblong or narrowly oblong in outline, subcoriaceous, evergreen, glabrous on both surfaces, 3'-10' long, 1'-3' wide, cut nearly to the rachis into entire or slightly toothed, obtuse or subacute, linear or linear-oblong segments; sori large, borne about midway between the midrib and margins of the segments; veins free.

On rocks or rocky banks, almost throughout North America, Asia and Europe. Ascends to 3500 ft. in Virginia. The leaf varies much in serration. Forms with the ends of the segments enlarged, somewhat palmately lobed, and the upper crested are known as var. cristatum. Forms with the segments broad and deeply pinnatifid are called var. Cambricum. Summer.
2. Polypodium polypodioides (L.)
   A. S. Hitchcock.
   Gray Polypody. (Fig. 72.)
   Rootsstock widely creeping, woody, covered with small brown scales. Sporangia densely scaly, 1'-3' long; leaves oblong-lanceolate in outline, acute, coriaceous, evergreen, 1'-6' long, 1'-1½' wide, cut very nearly or quite to the rachis into entire oblong or linear-oblong obtuse segments, glabrous or nearly so on the upper surface, the lower densely covered with gray peltate scales with darker centers, as are also the rachises; veins indistinct, unconnected and usually once forked.

On trees or rarely on rocks, Virginia to Florida, west to Illinois, Missouri and Texas. Ascends to 400 ft. in North Carolina. Widely distributed in tropical America. July-Sept.


Perennial herbaceous plants rooting in mud, with slender creeping rootstocks and 4-foliate or filiform leaves. Asexual propagation consisting of sporocarps borne on peduncles which rise from the rootstock near the leaf-stalk or are consolidated with it, containing both macrospores and microspores. The macrospores germinate into prothallia which bear mostly archegonia, while the microspores grow into prothallia bearing the antheridia.

Two genera and some 45 species of wide geographic distribution:


Marsh or aquatic plants, the leaves commonly floating on the surface of shallow water, slender-petioled, 4-foliate, Peduncles shorter than the petioles, arising from their bases or more or less adnate to them. Sporangia ovoid or bean-shaped, composed of two vertical valves with several transverse compartments (sorids) in each valve. [Name in honor of Giovanni Marsigli, an Italian botanist, who died about 1804.]

About 30 species, widely distributed. Besides the following 2 or 3 others occur in Texas.

Sporocarps glabrous and purple when mature.
Sporocarps densely covered with hair-like scales.

1. Marsilea quadrifólia L.
   European Marsilea. (Fig. 73.)
   Rootsstock slender, buried in the muddy bottoms of shallow lakes or streams. Petioles usually slender, 2'-5' high, or when submerged sometimes elongated to 1° or 2°. Leaflets mostly triangular-obovate, variable in outline, 3'-8' long, 2'-6' wide, glabrous or rarely with scattered hairs when young, the margins entire; sporocarps 2 or rarely 3 on a branching peduncle which is attached to the petiole at its base, covered with short yellowish-brown hairs when young, becoming glabrous and dark purple when mature; soris 8 or 9 in each valve.

Along the shores of Bantam Lake, Litchfield Co., Conn., whence it has been introduced into various parts of the country, notably into eastern Massachusetts. Native of Europe and Asia.
Family 7. **SALVINIACEAE** Reichenb. Conspr. 30. 1828. **Salvinia Family.**

Small floating plants with a more or less elongated and sometimes branching axis bearing apparently 2-ranked leaves. Sporocarps soft, thin-walled, borne 2 or more on a common stalk, 1-celled, with a central often branched receptacle, which bears macrosporangia containing a single macrospore or microsporangia containing numerous microspores. The macrospores germinate into prothallia which bear archegones, the microspores into prothallia which bear antherids.

The family consists of two genera.

1. *Salvinia*.
2. *Azolla*.

1. **Salvinia natans** (L.) Hoffm. Salvinia. (Fig. 75.)

*Marsilea natans* L. Sp. pl. 1099. 1753.


Leaves oblong, rather thick, obtuse or emarginate at the apex, rounded or cordate at the base, entire, spreading, 6'-12' long, pinnately veined, bright green and papilllose above, the lower surface densely matted with brown pellucid hairs; sporocarps 4-8 in a cluster, the upper ones containing about 10 macrosporangia, each containing a few macrospores, the remainder containing numerous microsporangia each with numerous microspores; macrosporangia marked with 3 obtuse lobes which meet at the apex.

Bois Brule Bottoms, Perry Co., Missouri and near Minneapolis, Minn. Introduced into ponds on Staten Island, N. Y. Reported by Pursh in 1814 from central New York, but his exact station is unknown. Widely distributed in Europe and Asia.
2. AZOLLA Lam. Encycl. 1: 343. 1783.

Minute moss-like reddish or green floating plants, with pinnately branched stems covered with minute imbricated 2-lobed leaves, and emitting rootlets beneath. Sporocarps of two kinds borne in the axils of the leaves, the smaller ovoid or acorn-shaped, containing a single macrospore at the base and a few corpuscles above it whose character is not fully known, the larger globose, producing many pedicelled sporanges, each containing several masses of microspores which are often beset with a series of anchor-like processes of unknown function. [Greek, signifying killed by drought.]

About 5 species of wide geographic distribution.

1. Azolla Caroliniana Willd. Carolina Azolla. (Fig. 76.)


Plants greenish or reddish, deltoid or triangular-ovate in outline, pinnately branching, sometimes covering large surfaces of water. Macrospores minutely granulate, with three accessory corpuscles; leaves with ovate lobes, their color varying somewhat with the amount of direct sunlight, the lower usually reddish, the upper green with a reddish border.

Floating on still water, Ontario and western New York to British Columbia, south to Florida, Arizona, and Mexico. Also in South America. Naturalized in lakes on Staten Island, N. Y.


HORSETAIL FAMILY.

Rush-like perennial plants, with mostly hollow jointed simple or often much-branched grooved stems, provided with a double series of cavities and usually with a large central one, the branches verticillate, the nodes provided with diaphragms. Rootstocks subterranean. Leaves reduced to sheaths at the joints, the sheaths toothed. Sporangios 1-celled, clustered underneath the scales of terminal cone-like spikes. Spores all of the same size and shape, furnished with 2 narrow strap-like appendages attached at the middle, coiling around the spore when moist and spreading, when dry and mature, in the form of a cross (elaters). Epidermis impregnated with silica, rough. Prothallium on the surface of the ground, green, usually dioecious.

The family consists of the following genera:


Characters of the family. [Name ancient, signifying horse-tail, in allusion to the copious branching of several species.]

About 25 species, of very wide geographic distribution.

Stems annual, stout. Scales arranged around the stem in two kinds, the fertile appearing in early spring before the sterile.

Fertile stems simple, soon withering; sheaths of branches of sterile stems 4-toothed.

1. E. arvense.

Fertile stems branched when old, only the apex withering.

Branches of the stem simple, their sheaths 3-toothed.

2. E. pratense.

3. E. Sylvaticum.

Branches compound.

Stems all alike; spores mature in summer; branches simple or none.

Sheaths rather loose; branches usually long; stems bushy below, attenuate upwards.

Central cavity very small; spike long.

4. E. palustris.

5. E. Titirive.

Central cavity about one-half the diameter of stem; spike short.

Sheaths appressed; branches usually short.

6. E. fluviatilis.

Stems perennial, evergreen; spikes tipped with a rigid point; stomata in regular rows.

Stems tall, usually many-grooved.

Stems rough and tuberculate, prominently ridged.

Ridges with 1 line of tubercles; ridges of sheath tricarinate; stem stout.

7. E. robusatum.

Ridges of the stem with 2 indistinct lines of tubercles; ridges of sheath obscurely 4-carinate; stem slender.

8. E. hyemalis.


Stems not tuberculate; sheaths enlarged upward.

Stems low, slender, tufted, usually 5-10-grooved.

10. E. variegatum.

Central cavity small; sheaths 5-10-toothed.

11. E. Scopoiodes.
1. *Equisetum arvense* L. Field Horsetail. (Fig. 77.)


Stems annual, provided with scattered stomata, the fertile appearing in early spring before the sterile. Fertile stems 4'-10' high, not branched, soon withering, light brown, their loose scarious sheaths mostly distant, whitish, ending in about 12 brown acuminate teeth; sterile stems green, rather slender, 2'-2° high, 6-19-furrowed, with numerous long mostly simple verticillate 4-angled or rarely 3-angled solid branches, the sheaths of the branches 4-toothed, the horsetail in 2 rows in the furrows; central cavity one-fifth to one-fourth the diameter of the stem.

In sandy soil, especially along roadsides and railways, Newfoundland and Greenland to Alaska, south to Virginia and California. Also in Europe and Asia. Ascends to at least 2500 ft in Virginia. An occasional form in which the fertile stem bears a terminal spike is known as var. *sevaticum*. Sterile stems sometimes very short and with long prostrate or ascending branches. May.

2. *Equisetum pratense* Ehrh. Thicket Horsetail. (Fig. 78.)


Stems annual, 8'-16' high, with scattered stomata, the fertile appearing in spring before the sterile, branched when old, only its apex withering, the two becoming similar in age; stems rough, 8-20 ridged with narrow furrows and cylindric or cup-shaped sheaths; branches straight, rather short, simple, densely whorled, 3-angled or rarely 4-5-angled, solid; sheaths of the stem with about 11 short ovate-lanceolate teeth, those of the branchlets 3-toothed; rootstocks solid, acutely angled.


3. *Equisetum sylvaticum* L. Wood Horsetail. (Fig. 79.)


Stems annual, provided with scattered stomata, the fertile appearing in early spring before the sterile, at first simple, at length much branched and resembling the sterile, only its naked apex withering. Stems usually 12-furrowed, producing verticillate compound branches, the branchlets curved downward; sheaths loose, cylindric or campanulate, those of the stem with 8-14 bluntish teeth, those of the branches with 4 or 5 teeth, those of the branchlets with 3 divergent teeth; central cavity nearly one half the diameter of the stem; branches and branchlets solid.

In moist sandy woods and thickets, Newfoundland and Greenland to Alaska, south to Virginia and Michigan. Also in Europe and Asia. May.
4. Equisetum palustre L. Marsh Horsetail. (Fig. 80.)

Equisetum palustre L. Sp. Pl. 1061. 1753.

Stems annual, slender, all alike, 10'-18' long, very deeply 5-9-grooved, the grooves separated by narrow roughish wing-like ridges, the central canal very small; sheaths rather loose, bearing about 8 subulate-lanceolate whitish-margined teeth; branches simple, few in the whorls, 4-7-angled, always hollow, barely sulcate, more abundant below than above, their sheaths mostly 5-toothed; spike rather long; stomata abundant in the furrows.


5. Equisetum littorale Kuehl. Shore Horsetail. (Fig. 81.)


Stems annual, very slender, all alike, 8'-18' high, slightly roughened, 6-19-grooved, the ridges rounded, the central canal one-half to two-thirds the diameter; sheaths sensibly dilated above, the uppermost inversely campanulate, their teeth herbaceous, membranous at the margins, narrow, lanceolate; branches of two kinds, simple, some 4-angled and hollow, some 3-angled and solid, the first joint shorter or a trifle longer than the sheath of the stem; spike short with abortive spores, these commonly with no elaters.

On sandy river and lake shores, Maine and Ontario to New Jersey and Pennsylvania, west to British Columbia. Also in Europe. Supposed to be a hybrid. Aug.-Sept.

6. Equisetum fluviatile L. Swamp Horsetail. (Fig. 82.)


Stems annual, all alike, 2°-4° high, slightly 10-30-furrowed, very smooth, usually producing upright branches after the spores are formed, the stomata scattered. Sheaths appressed with about 18 dark brown short acute rigid teeth, air cavities wanting under the grooves, small under the ridges; central cavity very large; branches hollow, slender, smaller but otherwise much like the stems, short or elongated; rootstocks hollow.

In swamps and along the borders of ponds, Nova Scotia to Alaska, south to Virginia, Nebraska and Washington. Also in Europe and Asia. May-June.
7. *Equisetum robustum* A. Br. Stout Scouring-rush. (Fig. 83.)


Stems perennial, stout, tall, evergreen, 3°-11° high, sometimes nearly 1° in diameter, 20-48-furrowed, simple or little branched. Ridges of the stem roughened with a single series of transversely oblong siliceous tubercles; sheaths short, cylindrical, appressed, marked with black girdles at the base, and at the bases of the dark caducous teeth; ridges of the sheath 3-carinate; branches when present occasionally fertile; spikes tipped with a rigid point.

In wet places, Ohio to Louisiana and Mexico, west to British Columbia and California. Also in Asia. May-June.

8. *Equisetum hyemale* L. Common Scouring-rush. (Fig. 84.)


Stems slender, rather stiff, evergreen, 2°-4° high, with the stomata arranged in regular rows, rough, 8-34-furrowed, the ridges with two indistinct lines of tubercles, the central cavity large, from one-half to two-thirds the diameter; sheaths rather long, cylindrical, marked with one or two black girdles, their ridges obscurely 4-carinate; teeth brown, membranous, soon deciduous; spikes pointed; stem rarely producing branches which are usually short and occasionally fertile; forms are sometimes found with longer sterile branches.

In wet places and on banks, especially along rivers and lakes, throughout nearly the whole of North America, Europe and Asia. The rough stems of this and related species are used for scouring floors. May-June.

9. *Equisetum laevigatum* A. Br. Smooth Scouring-rush. (Fig. 85.)


Stems 1°-5° high, simple or little branched, pale green, persistent, 14-30-furrowed, the ridges almost smooth. Sheaths elongated and enlarged upward, marked with a black girdle at the base of the mostly deciduous, white-marginated teeth and rarely also at their bases; ridges of the sheath with a faint central carina and sometimes with faint short lateral ones; stomata arranged in single series; central cavity very large, the wall of the stem very thin; spikes pointed.

Along streams and rivers, especially in clay soil, valley of the Delaware River in New Jersey and eastern Pennsylvania to North Carolina and Louisiana, west to British Columbia and the Mexican border. May-June.
Variegated Equisetum. (Fig. 86.)

*Equisetum variegatum* Schleich. Cat. Pl. Helvet. 27. 1807.

Stems slender, perennial, evergreen, 6'-18' long, rough, usually simple from a branched base, commonly tufted, 5-10-furrowed, the stomata borne in regular rows. Sheaths campanulate, distinctly 4-carinate, green, variegated with black above, the median furrow deep and excurrent to the teeth and downward to the ridges of the stem, the teeth 5-10, each tipped with a deciduous bristle; central cavity small, rarely wanting.

Labrador and Greenland to the Northwest Territory, south to New Hampshire, western New York, Nebraska and Nevada. Also in Europe and Asia. May-June.

11. *Equisetum scirpoides* Michx. Sedge-like Equisetum. (Fig. 87.)


Stems perennial, evergreen, very slender or filiform, 3'-6' long, somewhat rough, flexuous and curving, growing in slender tufts, mostly 6-furrowed with acute ridges, simple or branching from near the base. Sheaths 3-toothed, distinctly 4-carinate, the central furrow broad, the lateral narrow, the bristly teeth rather persistent; central cavity entirely wanting.

On moist or wet wooded banks, Labrador to Alaska, south to Pennsylvania, Illinois and British Columbia. Also in Europe and Asia. May-June.

**CLUB-MOSS FAMILY.**

Somewhat moss-like, erect or trailing terrestrial herbs with numerous small lanceolate or subulate simple leaves, sometimes oblong or roundish, arranged in 2-many ranks, the stems often elongated, usually freely branching. Sporanges 1-3-celled, solitary in the axis of the leaves or on their upper surfaces. Spores uniform, minute. Prothallia (as far as known) mostly subterranean, with or without chlorophyll, monocious.

Four genera and about 110 species. Besides the following, *Psilotum* occurs in Florida, the two other genera only in Australia.


Perennial plants with evergreen 1-nerved leaves arranged in 4-16 ranks. Sporanges coriaceous, flattened, reniform, 1-celled, situated in the axis of ordinary leaves or in those of the upper modified, bract-like ones, which are imbricated in sessile or peduncled spikes, opening transversely into 2 valves, usually by a line around the margin. Spores all of one kind, copious, sulphur-yellow, readily inflammable from the abundant oil they contain. [Greek, meaning wolf's-foot, perhaps in allusion to the branching roots of some species.]

About 100 species of wide geographic distribution, the largest occurring in the Andes of South America and in the Himalayas.
LYCOPODIACEAE.

Sporanges borne in the axils of leaves which are similar to those of the stem.
Sporanges mostly wanting in the axils of the upper, mostly 8-ranked leaves.
Stems erect, rigid; leaves uniform, ascending.
Sporanges only in the axils of the upper leaves forming terminal spikes; leaves many-ranked.
Plant small; leaves acute, soft, mostly entire.
Plant stout; leaves narrow, spinulose-pointed, bristle-toothed below the middle.

Sporanges borne in the axils of yellowish ovate or cordate scale-like leaves, which are very unlike those of the sterile stems.
Stems leafy up to the base of the spike or nearly so.
Spikes erect, closely sessile.
Stems erect, tree-like.
Stems creeping with ascending branches.
Leaves uniform, spreading, 4-ranked.
Leaves of 2 forms, erect-imbricate, 4-ranked.
Spikes erect, short-peduncled; leaves small, appressed, 4-ranked.
Fertile branches with minute leaves so that the spikes appear long-peduncled.
Leaves uniform, many-ranked; stems terete.
Leaves of 2 forms, few-ranked; stems flattened.
Sterile stems entirely creeping; spikes solitary.
Sterile stems with fan-like ascending branches; spikes clustered.

1. Lycopodium Selago L. Fir Club-moss. (Fig. 88.)

Lycopodium Selago L. Sp. Pl. 1102. 1753.

Stems 3'–6' high, thick, rigid, erect, 2–5 times forked, the branches fastigate, forming a levelled cluster. Leaves crowded, uniform, ascending, elongated-lanceolate, mucronulate, entire or spinulose-denticate, nerved below, convex above, the upper mostly 8-ranked, sterile, those below bearing the small sporanges in their axils, those of the lower half of the stem again sterile; plant propagated also by bud-like organs which have a lower pointed bract and 2 or 3 upper fleshy and obovate ones.


2. Lycopodium lucidulum Michx. Shining Club-moss. (Fig. 89.)


Stems somewhat lax, ascending or spreading, thick, 2–3 times forked, the branches 6'–12' high. Leaves widely spreading or reflexed, dark green, shining, 1-nerved, acute, minutely toothed, a series of longer ones alternating with a series of shorter, the latter more frequently bearing the sporanges at a short distance below the summit of the stem; sporanges of preceding years often persistent; plant also propagated like the preceding species by gemmae, which fall to the ground and become new plants.

3. **Lycopodium inundatum** L. Bog Club-moss. (Fig. 90.)


Plants small, 1'-5' long, with creeping flaccid forking brittle sterile stems closely appressed to the earth. Fertile stems erect, solitary, 1'-6' high, terminated by a short thick spike; leaves lanceolate or lanceolate-subulate with hyaline margins, those of the spike similar to those below, acute, soft, spreading, mostly entire, those of the sterile stems curved upward; spikes rarely two together, 9'-18' long, yellowish; sporanges tranversely oval, splitting nearly to the base; spores large, reticulated.

In sandy bogs, Newfoundland to western Ontario and Michigan, south to Florida. Ascends to 2000 ft. in eastern Pennsylvania. Also in Europe and Asia. Larger forms with fertile stems 5'-7' high and more pointed serrate leaves have been separated as var. *Bigelovii*. Aug.-Oct.

4. **Lycopodium alopecuroides** L. Fox-tail Club-moss. (Fig. 91.)


Plant stout, densely leafy, the sterile branches flaccid, recurved and creeping, sometimes 10' long. Fertile stems stout, rigid, erect, 6'-20' high, terminated by a spike 9'-1½' long, and, including its leaves 4''-5'' thick; leaves narrowly linear-subulate, those of the spike similar to those below, spinulose-pointed, spreading, conspicuously bristle-toothed below the middle, those of the spike with long setaceous tips; sporanges transversely oval, splitting to near the base.

In pine-barren swamps, New Jersey to Florida, near the coast, west to Mississippi. Aug.-Oct.

5. **Lycopodium obscurum** L. Ground Pine. (Fig. 92.)


Stems erect, 6'-12' high, bushy-branched, the branches fan-like, the rootstocks subterranean, nearly horizontal. Leaves lanceolate-linear, acute, entire, 8-ranked on the main stem, those of the branches 6-ranked, with the two upper and the two lower ranks shorter and appressed, or all alike and equally incurved-spreading, densely clothing the stems up to the bases of the spikes; spikes 1-10 on each plant, ½'-1½' long, composed of many-ranked ovate scarious-margined bracts (scale-like leaves), each with a transversely oval sporange in its axil.

In moist woods, Newfoundland and Labrador to Alaska, south to the mountains of North Carolina and to Indiana. Ascends to 4000 ft. in Virginia. Also in Asia. July-Sept.
6. Lycopodium annotinum L. Stiff Club-moss. (Fig. 93.)


Stems much branched, slender, prostrate and creeping, rather stiff, 1'-4' long, the branches similar, ascending, 5'-8' high, sparingly forked. Leaves uniform, spreading, 5-ranked, rigid, linear-lanceolate, minutely serrulate, nerved below; spikes solitary or several at the ends of the branches, oblong-cylindric, 1'-2½' long, composed of ovate or ovate-cordate, short-acuminate and denticulate bracts, each with a sporangia in its axil; spores smooth or spinulose-reticulated on the basal surface.

In woods and thickets, commonly in dry soil, Labrador to Alaska, south to New Jersey, West Virginia, Michigan, Colorado and Washington. Also in Europe and Asia. Mountain forms with more rigid pointed leaves have been separated as var. pungens. Autumn.

7. Lycopodium alpinum L. Alpine Club-moss. (Fig. 94.)


Stems elongated, creeping, with ascending densely clustered crowded dichotomous branches. Leaves 4-ranked, erect-imbricate, adnate-decurrent, of two forms; those of the lateral rows lanceolate, falcate, acute, carinate, concave within, those of the intermediate rows scarcely one-third as large, lanceolate-subulate, the upper and lower rows alike; spikes solitary at the apices of slightly elongated branches, erect, closely sessile, the stems leafy to their bases; bracts broadly ovate, acuminate, dentate; spores reticulated.

In woods, Labrador to Lake Superior, Washington and Alaska. Sometimes united with *L. complanatum*. Also in Europe and Asia.

8. Lycopodium sabinaefolium Willd.

Cedar-like Club-moss. (Fig. 95.)


Stems elongated, creeping, or more usually subterranean with short erect dichotomous clustered ascending branches, 2'-3' long. Leaves 4-ranked, small, appressed or slightly curved outward, lanceolate, mucronate, entire, apparently terete; spikes short-peduncled, solitary, cylindric, with cordate acuminate crosse-denticulate or entire bracts; sporanges transversely oval or somewhat reniform, deeply splitting.

In cold woods, Labrador to New Jersey and British Columbia.
9. **Lycopodium clavatum** L.  Running Pine. Club-moss. (Fig. 96.)

*Lycopodium clavatum* L. Sp. PI. 1104. 1753.

Stems extensively creeping, 1°-4° long with similar short irregular ascending or decumbent densely leafy branches. Leaves much crowded, many-ranked, incurved, linear-subulate, bristle-tipped, the lower denticulate, the upper nearly entire and slightly decurrent on either side; spikes 1-4 on long 8-striate peduncles; bracts membranous, roundish, erose-denticulate below, bearing in the axil a transversely oval sporangium which splits nearly to the base; spores narrowly reticulate.

In woods, Labrador to Alaska, south to North Carolina, Michigan and Washington. Also in Europe, Asia and Central America. The spores of this species, and those of *L. complanatum*, furnish the inflammable powder known as Lycopodium powder or vegetable sulphur, used in stage effects. Aug.–Oct.

10. **Lycopodium Carolinianum** L. Carolina Club-moss. (Fig. 97.)

*Lycopodium Carolinianum* L. Sp. PI. 1104. 1753.

Sterile stems and their few short branches entirely creeping, closely appressed to the earth, 1°-3’ long, emitting numerous roots on the lower side. Leaves of fertile stems of two forms, the lateral ones broadly lanceolate, acute and somewhat oblique, 1-nerved, widely spreading, in 2 ranks with a shorter, intermediate row appressed on the upper side; peduncles simple, slender, 2’-6’ high, clothed with small bract-like leaves and bearing a single cylindric spike; bracts cordate, short-acuminate, mostly entire with transversely oval sporanges in the upper axils.

In moist pine barrens, New Jersey to Florida and Louisiana near the coast.

11. **Lycopodium complanatum** L. Trail-ing Christmas-green. (Fig. 98.)

*Lycopodium complanatum* L. Sp. PI. 1104. 1753.

Stems extensively creeping, with erect or ascending reniform or fan-shaped branches several times forked above, with crowded flattened branchlets. Leaves minute, imbricate-appressed, 4-ranked, the lateral rows with somewhat spreading tips, the intermediate smaller, narrower and wholly appressed, forming a flat surface; peduncle slender, 2’-6’ high, dichotomous, bearing 2-4 linear-cylindric spikes; bracts broadly ovate, acuminate, the margins pale and erose; sporanges transversely oval, deeply splitting.

In woods and thickets, Newfoundland to Alaska, south to North Carolina, Michigan and British Columbia. Also in Europe and Asia. Forms with less distinctly dimorphic leaves and narrower, more erect and bushy branches have been separated as var. *Chamaecyparissus.*

Terrestrial, annual or perennial, moss-like plants with branching stems and scale-like leaves, which are many-ranked and uniform, or 4-ranked and of two types spreading in two planes. Sporangia 1-celled, solitary in the axils of leaves which are so arranged as to form more or less quadrilateral spikes, some containing 4 macrospores (macrosporangia), others containing numerous microspores (microsporangia), which develop into small prothallia, those from the macrospores bearing archegones, those from the microspores antheridia.

The family consists of the following genus:


Characters of family. [Name diminutive of Selago, an ancient name of some Lycopodium.]

About 335 species of very wide geographic distribution, most abundant and largest in tropical regions. In addition to the following some 5 others occur in western North America.

Stem-leaves all alike, many-ranked.

Stems slender; leaves lax, spreading; spikes enlarged, scarcely quadrangular. 1. S. rupestris.

Stem-leaves of 2 kinds, 4-ranked, spreading in 2 planes.

1. Selaginella rupestris (L.) Sprig.
Rock Selaginella. (Fig. 99.)

Selaginella rupestris Spring in Mart. Fl. Bras. 1: Part 2, 118. 1840.

Stems densely tufted, with occasional sterile runners and sub-pinnate branches, 1'-3' high, commonly curved when dry. Leaves rigid, appressed-imbricated, 1" or less long, linear or linear-lanceolate, convex on the back, more or less ciliate, many-ranked, tipped with a distinct transparent awn; spikes sessile at the ends of the stem or branches, strongly quadrangular, 6'-12' long, about 1' thick; bracts ovate-lanceolate, acute or acuminate, broader than the leaves of the stem; macrosporangia and microsporangia borne in the same spikes, the former more abundant.


2. Selaginella selaginoides (L.) Link. Low Selaginella. (Fig. 100.)


Sterile branches prostrate-creeping, slender, ½'-2' long, the fertile erect or ascending, thicker, 1'-3' high, simple; leaves lanceolate, acute, lax and spreading, sparsely spinulose-ciliate, 1''-2'' long; spikes solitary at the ends of the fertile branches, enlarged, oblong-linear, subacute, 1' or less long, 2''-2½'' thick; bracts of the spike lax, ascending, lanceolate or ovate-lanceolate, strongly ciliate.

On wet rocks, Labrador to Alaska, south to New Hampshire, Michigan and Colorado. Also in northern Europe and Asia. Summer.
Family II. ISOETACEAE. Underw. Native Ferns, 104. 1881.

QUILLWORT FAMILY.

Aquatic or marsh plants rooting in the mud, with a short buried 2-lobed or 3-lobed trunk (stem) sending out abundant roots and sending up a compact tuft of rush-like leaves. Sporanges sessile in the axils of the leaves, some containing macrospores (macroporangenes), others microspores (microsporangenes); the former germinate into prothallia bearing only archegones, the latter into prothallia bearing usually only a single antherid.

The family consists of the following genus only.


Submerged, amphibious or uliginous plants with a cluster of elongated awl-shaped leaves rising from a more or less 2-3-lobed fleshy short stem, the leaves with or without peripheral bast-bundles, with or without stomata, bearing a small membranous organ (ligule) above the base. Sporanges sessile in the excavated bases of the leaves, orbicular or ovoid, the sides more or less covered with a fold of the inner side of the leaf-base (velum). The sporanges of the outer leaves usually contain spherical, mostly sculptured macrospores, those of the inner ones contain minute powdery usually oblong microspores. [Name Greek, taken from Pliny, apparently referring to the persistent green leaves.]

About 50 species, widely distributed. Besides the following 2 are known from the southern United States, 7 from the Pacific Coast and 2 from Mexico. Owing to their aquatic habitat and apparently local distribution, these plants are popularly little known. The spores mature in summer and autumn.

Submerged or rarely emersed in very dry seasons; leaves quadrangular, without peripheral bast-bundles.

Stomata wanting; macrospores cedest.
Leaves stout, rigid, scarcely tapering.
Leaves slender, tapering.
Stomata present; macrospores echinate.

Amphibious or emersed only in earlier stages; stomata always present on the quadrangular leaves.

Peripheral bast-bundles wanting; velum partial.
Leaves 2'-3' long; macrospores with minute warts.
Leaves 4'-8' long; macrospores with jagged crests.
Peripheral bast-bundles present; macrospores honeycombed-reticulate.
Terrestrial; stomata abundant on the triangular leaves.
Leaves 15-60, usually black at the base.
Leaves 8-12, bright green, paler at the base.

1. I. lacustris.
2. I. Tuckermanni.
3. I. echinospora.
4. I. saccharata.
5. I. riparia.
6. I. Engelmanni.
7. I. melanopoda.
8. I. Bulleri.
1. *Isoetes lacustris* L. Lake Quillwort. (Fig. 102.)


Submerged or rarely above water in dry seasons; leaves 10-25, rigid, rather thick, scarcely tapering, dark or olive green, obtusely quadrangular, 2'-6' long; stomata none; peripheral bast-bundles wanting; sporangie orbicular or broadly elliptic, unspotted; velum rather narrow; ligule triangular, short or somewhat elongated; macrospores 500-800 \( \mu \) in diameter, marked all over with distinct or somewhat confluent crests, and bearing three converging ridges; microspores 35-46 \( \mu \) long, smooth.

In 1°-5° of water, Labrador to the Northwest Territory, south to eastern Massachusetts and New Jersey. Also in Europe and Asia.

2. *Isoetes Tuckermáni* A. Br. Tuckerman's Quillwort. (Fig. 103.)

*Isoetes Tuckermáni* A. Br. in A. Gray, Man. Ed. 5, 676. 1867.

Submerged or rarely partly or wholly emersed during very dry seasons; leaves 10-30, very slender, tapering, olive-green, quadrangular, 2'-3' long, without peripheral bast-bundles, the outer recurved; sporangie oblong, mostly white, its upper one-third covered by the velum; macrospores 440-560 \( \mu \) in diameter, with wavy somewhat parallel and branching ridges on the upper half, separated by the three converging ridges, the lower covered with an irregular network; microspores 26-32 \( \mu \) long, nearly smooth.

In ponds, Newfoundland to Middlesex county, Massachusetts, clustered in shallow water.

3. *Isoetes echinospora* Braunii (Durieu) Engelm. Braun's Quillwort. (Fig. 104.)


Submerged or in dry seasons emersed, leaves 12-25, tapering, soft, reddish-green, 3'-6' long, without peripheral bast-bundles, bearing stomata only toward the tip; sporangie orbicular or broadly elliptic, spotted, one-half to three-fourths covered with the velum; macrospores 400-500 \( \mu \) in diameter, covered with broad spinules which are often slightly confluent and incised at the tips; microspores 26-30 \( \mu \) long, smooth.

Labrador and Greenland to Alaska, south to New Jersey, Pennsylvania and Utah.

Much larger than the preceding, leaves 25-70 or even more, 5'-12' long, with abundant stomata throughout. With the preceding.

Isoetes echinospora Boottii Engelm. in A. Gray, Man. Ed. 5. 676. 1867.

Leaves 12-20, soft, erect, bright green, 4'-5' long, with a few stomata near their tips; sporangae narrowly orbicular, with pale spots, two-thirds or more covered by the velum; macrospores 350-500μ in diameter, with longer and more slender simple spinules; microspores 26-30μ long. In ponds, Middlesex county, Massachusetts, usually submerged.

Isoetes echinospora muricata (Durieu) Engelm. in A. Gray, Man. Ed. 5. 676. 1867.


Leaves 15-20, flaccid, bright green, 6'-12' long, bearing few stomata; sporangae broadly oval, with pale spots, about one-half covered by the velum; macrospores 400-580μ in diameter, with shorter and more confluent, almost crest-like spinules; microspores 28-32μ long. Submerged in running water in tributaries of Mystic Pond, Middlesex county, Mass.

4. Isoetes saccharata Engelm. Sugary Quillwort. (Fig. 105.)

Isoetes saccharata Engelm. in A. Gray, Man. Ed. 5. 676. 1867.

Amphibious or uliginous with a flat depressed trunk. Leaves 10-20, olive-green, pale at the base, spreading, 2'-3' long, quadrangular, bearing numerous stomata; sporangae oblong, unspotted, with a narrow velum covering only one-fourth or one-third of its surface; peripheral bast-bundles wanting; ligule triangular, rather short; macrospores 400-470μ in diameter, with very minute distinct or rarely confluent warts as if sprinkled with grains of sugar; microspores papillose, 24-28μ long.

In mud overflowed by the tides, Wicomico and Nan-ticoke Rivers, eastern Maryland.

5. Isoetes riparia Engelm. River-bank Quillwort. (Fig. 106.)


Amphibious or uliginous, usually emersed when mature; leaves 15-30, deep green, rather rigid, 4'-8' long, quadrangular, bearing numerous stomata; peripheral bast-bundles wanting; ligule rather short, triangular; sporangae mostly oblong, distinctly spotted with groups of brown cells, one-fourth or rarely one-half covered with the velum; macrospores 450-650μ in diameter, marked with distinct or anastomosing jagged crests or somewhat reticulate on the lower side; microspores 28-32μ long, more or less tuberculate.

Borders of the lower Delaware River to Maine.
6. *Isoetes Engelmannii* A. Br. Engelmann's Quillwort. (Fig. 107.)


Amphibious, usually partly emersed when mature. Leaves 25–100, light green, quadrangular, tapering, 9'–20' long, bearing abundant stomata; peripheral bast-bundles present; sporange oblong or linear-oblong, unspotted; velum narrow; macrospores 400–520μ in diameter, covered with honeycomb-like reticulations; microspores 24–28μ long, mostly smooth.

In ponds and ditches, rooting in mud. Maine to Delaware and Pennsylvania, Illinois and Missouri.


Leaves 50–200, keeled on the upper side, 18'–25' long; sporange linear-oblong, 1'–9' long, one-third to two-thirds covered by the velum; macrospores 320–480μ in diameter; microspores 24–27μ long, spinulose. Warriorsmark, Cornwall and Smithville, Pa., and Wilmington, Del.


Leaves 8–12, slender, 9'–12' long; bast-bundles often quite small or only two present; spores as in the typical form. Southern New England to New Jersey.

7. *Isoetes melanopoda* J. Gay. Black-based Quillwort. (Fig. 108.)


Terrestrial with a subglobose deeply 2-lobed trunk. Leaves 15–60, slender, erect, bright green, with a blackish shining base, 5'–18' long, triangular, bearing stomata throughout, well developed peripheral bast-bundles, thick disepections and small air cavities within; ligule triangular, awl-shaped; sporange mostly oblong, spotted, with a narrow velum; polygamous; macrospores 250–400μ in diameter, with low more or less confluent tubercles, often united into worm-like wrinkles, or almost smooth; microspores 23–28μ long, spinulose.

In moist prairies and overflowed fields, Illinois to Iowa, Missouri and Texas.

8. *Isoetes Butleri* Engelm. Butler's Quillwort. (Fig. 109.)


Terrestrial from a subglobose trunk. Leaves 8–15, bright green, paler at the base, triangular, 3'–7' long, bearing numerous stomata, and with well developed peripheral bast-bundles, thick disepections and small air cavities within; sporange usually oblong, spotted; velum very narrow or none; ligule small, triangular; dioecious; macrospores 500–630μ in diameter, with distinct or confluent tubercles; "microspores 28–34μ long, dark brown, papillose."

On rocky hillsides, St. Louis, Missouri, and on saline flats, Indian Territory.
Subkingdom SPERMATÓPHYTA.

SEED-BEARING PLANTS.

Plants producing seeds which contain an embryoclone formed of one or more rudimentary leaves (cotyledons), a stem (hypocotyl, radicle), and a terminal bud (plumule), or these parts sometimes undifferentiated before germination. Microspores (pollen-grains) are borne in microsporangies (anther-sacs) on the apex or side of a modified leaf (filament). The macrosporangies (ovules) are borne on the face of a flat or inrolled much modified leaf (carpel) and contain one macrospore (embryo-sac); this develops the minute female prothallium, an archegone of which is fertilized by means of a tube (pollen-tube), a portion of the male prothallium sprouting from the pollen-grain.

The Seed-bearing plants form the most numerous group in existence, not less than 120,000 species being known. The subkingdom was formerly known as Phanerogamia, or Phae-nogamia and more recently as Anthophyta, this term signifying the presence of flowers, which characterizes most of the group. But the consideration that the spore-bearing organs of the Pine Family cannot well be regarded as flowers, and the fact that the production of seeds is the most characteristic difference between these plants and the Pteridophyta, are reasons which have led to the acceptance of the term here adopted.

There are two classes in the subkingdom, which differ from each other as follows: Ovules and seeds borne on the face of a scale; stigmas none. Ovules and seeds contained in a closed cavity (ovary).

Class 1. GYMNOSPERMAE.

Ovules (macrosporangies) naked, not enclosed in an ovary, this represented by a scale or apparently wanting. Pollen-grains (microspores) dividing at maturity into two or more cells, one of which gives rise to the pollen-tube (male prothallium), which directly fertilizes an archegone of the nutritive endosperm (female prothallium) in the ovule.

The Gymnosperms are an ancient group, first known in Silurian time. They became most numerous in the Triassic age. They are now represented by not more than 450 species of trees and shrubs.

There are three orders, Coniferales, Cycadales and Gnetales, the first of which is represented in our area by the Pine and Yew Families.


PINE FAMILY. Conifers.

Resinous trees or shrubs, mostly with evergreen narrow entire or scale-like leaves, the wood uniform in texture, without trachea, the tracheids marked by large depressed disks, the pollen-sacs and ovules borne in separate spikes (aments). Perianth none. Stamens several together, subtended by a scale; filaments more or less united; pollen-sacs (anthers) 2–several-celled, variously dhiscent; pollen-grains often provided with two lateral inflated sacs. Ovules with two integuments, orthotropous or amphitropous, borne solitary or several together on the surface of a scale, which is subtended by a bract in most genera. Fruit a cone with numerous, several or few, woody, papery or fleshy scales; sometimes berry-like. Seeds wingless or winged. Endosperm fleshy or starchy, copious. Embryo straight, slender. Cotyledons 2 or several.

About 25 genera and 240 species of wide distribution, most abundant in temperate regions.

Scales of the cone numerous (except in Larix); leaf-buds scale.

1. Pinus.
2. Larix.
3. Picea.
4. Tsuga.
5. Abies.
6. Taxodium.
7. Thuja.
8. Chamaecyparis.
Evergreen trees with two kinds of leaves, the primary ones linear or scale-like, deciduous, the secondary ones forming the ordinary foliage, narrowly linear, arising from the axils of the former in fascicles of 2–5 (rarely solitary in some western species), subtended by the bud-scales, some of which are united to form a sheath. Staminate aments borne at the bases of shoots of the season, the clusters of stamens spirally arranged, each in the axil of a minute scale; filaments very short; anthers 2-celled, the sacs longitudinally dehiscent. Ovulé-bearing aments solitary or clustered, borne on the twigs of the preceding season, composed of numerous imbricated minute bracts, each with an ovule-bearing scale in its axil, ripening into a large cone, which matures the following autumn, its scales elongating and becoming woody. Seeds 2 on the base of each scale, winged above, the testa crustaceous. [Name Celtic.]

Leaves 5 in a sheath; cone-scales little thickened at the tip. Leaves 2–3 in a sheath; cone-scales much thickened at the tip.

Cone terminal or subterminal.

Leaves 2 in a sheath; cones 1½'–2½' long, their scales pointless. Leaves 3 in a sheath; cones 4'-10' long, their scales prickly-tipped. Cones light, 6'–10' long; leaves 10'–16' long.

Cone-scales very heavy and woody, 4'–6' long; leaves 5'–10' long.

Cone lateral.

Cones with neither spine nor prickle; leaves in 2's.

Cones tipped with a spine or prickle.

Leaves some or all of them in 2's. Cones 1½’–2½’ long, their scales tipped with prickles.

Leaves stout, 1½'–2½' long.

Leaves slender, 3'–5' long.

Cones 3½'–5' long, their scales tipped with very stout short spines.

Leaves in 3's (very rarely some in 2's or 4's).

Leaves 6'–10' long; old sheaths 6'–10' long; cones oblong-conic.

Leaves 3'–5' long; old sheaths 3'–6' long; cones ovoid.

1. Pinus Stróbus L. White Pine. Weymouth Pine. (Fig. 110.)


A large forest tree, reaching a maximum height of 175° and a trunk diameter of 10½°, the bark nearly smooth except when old, the branches horizontal, verticillate. Leaves 5 in a sheath, very slender, pale green and glaucous, 3'–5' long, with a single fibro-vascular bundle, the dorsal side devoid of stomata; sheath loose, deciduous; ovulé-bearing aments terminal, peduncled; cones subterminal, drooping, cylindrical, often slightly curved, 4'–6' long, about 1' thick when the scales are closed, resinous; scales but slightly thickened at the apex, obtuse and rounded or nearly truncate, without a terminal spine or prickle.

In woods, often forming dense forests, Newfoundland to Manitoba, south along the Alleghenies to Georgia and to Illinois and Iowa. Ascends to 4,300 ft. in North Carolina and to 2,900 ft. in the Adiron-dacks. Wood light brown or nearly white, soft, compact, one of the most valuable of timbers; weight per cubic foot, 24 lbs. June.
2. Pinus resinosa Ait. Canadian Pine. Red Pine. (Fig. 111.)


A tall forest tree, reaching a maximum height of about 150° and a trunk diameter of 5°, the bark reddish, rather smooth, flaky when old. Leaves 2 in each sheath, slender, dark green, 4°-6° long, with 2 fibro-vascular bundles; sheaths 6°-12° long when young; staminate aments 6°-9° long; cones subterminal, spreading, oval-conic, 1½°-2½° long, usually less than 1° thick while the scales are closed; scales thickened at the apex, obtuse, rounded and devoid of spine or prickle.

In woods, Newfoundland to Manitoba, south to Massachusetts, Pennsylvania and Minnesota. Wood compact, not strong, light red; weight per cubic foot 30 lbs. May-June.

3. Pinus palustris Mill. Long-leaved Pine. Georgia Pine. (Fig. 112.)


A large tree, sometimes attaining a height of 100° and a trunk diameter of 5°, the bark nearly smooth. Leaves in 3's, slender, dark green, clustered at the ends of the branches, much elongated (10°-16° long), with 2 fibro-vascular bundles; sheaths 1½°-1¼° long; buds long; staminate aments rose-purple, 2°-3½° long, very conspicuous; cones terminal, spreading or erect, conic-cylindric, 6°-10° long, 2°-3° thick before the scales open; scales thickened at the apex, which is provided with a transverse ridge bearing a short central recurved prickle.

In sandy, mostly dry soil, often forming extensive forests, southern Virginia to Florida and Texas, mostly near the coast. Wood hard, strong, compact, light red or orange; weight per cubic foot 44 lbs. This tree is the chief source of our turpentine, tar, rosin, and their derivatives. Also known as Southern Pine, Yellow Pine, Hard Pine and Virginia Pine. March-April.

4. Pinus ponderosa Dougl. Western Yellow Pine. (Fig. 113.)

*Pinus ponderosa* Dougl. Lawson's Man. 354. 1836

One of the largest North American trees, attaining a maximum height of nearly 300° and a trunk diameter of 15°, but commonly much smaller. Branches widely spreading or somewhat drooping; bark light red, scaly; leaves in 3's (rarely some of them in 2's), rather stout, 5°-10° long, slightly scabrous; cones subterminal, very dense and heavy, ovoid-conic, 4°-6° long, 1½°-2½° thick; scales much thickened at the apex, the transverse ridge prominent, with a triangular subulate short stout recurved prickle.

Montana to British Columbia, south to western Nebraska, Texas, Mexico and California; the shorter-leaved eastern form which reaches our area has been distinguished from the western as *var. scopulorum*. Wood hard, strong, light red; weight per cubic foot 29 lbs. One of the most important lumber-trees of the west. April-May.
PINACEAE.

5. *Pinus divaricata* (Ait.) Sudw. Labrador Pine. Gray Pine. (Fig. 114.)


A slender tree, usually 40°-60° high, but sometimes reaching 100°, and a trunk diameter of 3½', the branches spreading, the bark becoming flaky. Leaves in 2's, stout, stiff, more or less curved, spreading or oblique, light green, crowded along the branches, seldom over 1' long; fibro-vascular bundles 2; cones commonly very numerous, lateral, oblong-conic, usually upwardly curved, 1'–2' long, 9½'-15½' thick when mature; scales thickened at the end, the transverse ridge a mere line with a minute central point in place of spine or prickle at maturity; young scales spiny-tipped.

In sandy soil, sometimes forming extensive forests, New Brunswick to Hudson Bay and the Northwest Territory, south to Maine, northern New York, northern Illinois and Minnesota. Wood soft, weak, compact, light brown; weight per cubic foot 27 lbs. Also called Hudson Bay Pine and Northern Scrub Pine. May-June.


*Scrub Pine*. (Fig. 115.)


A slender tree, usually small, but sometimes attaining a height of 110° and a trunk diameter of 3°, the old bark dark colored, flaky, the branches spreading or drooping. Leaves in 2's, dark green, rather stout and stiff, spreading when old, 1½'-2½' long, with 2 fibro-vascular bundles; young sheaths rarely more than 2½' long; cones commonly few, lateral, recurved when young, spreading when old, oblong-conic, 1½'-2½' long, their scales somewhat thickened at the apex, the low transverse ridge with a short central more or less recurved prickle.

In sandy soil, Long Island, New York to South Carolina, west to southern Indiana and Kentucky, sometimes forming forests. Ascends to 330 ft. in Virginia. Wood soft, weak, brittle, light orange; weight per cubic foot 33 lbs. April–May.


*Yellow Pine*. Spruce Pine. (Fig. 116.)


A forest tree, reaching a maximum height of about 100° and a trunk diameter of 4½', the branches spreading, the old bark rough in plates. Leaves some in 2's, some in 3's, slender, not stiff, dark green, 3½'-5½' long, spreading when mature; fibro-vascular bundles 2; young sheaths 5½'-8½' long; cones lateral, oblong-conic, about 2' long, usually less than 1' thick when the scales are closed; scales thickened at the apex, marked with a prominent transverse ridge and armed with a slender small nearly straight early deciduous prickle.

In sandy soil, southern New York to Florida, west to Illinois, Kansas and Texas. Wood heavy, strong, orange; one of the most valuable timbers; weight per cubic foot 28 lbs. Also called Short-leaved Pine and Bull Pine. May-June.
8. Pinus pungens Michx. f. Table-Mountain Pine. Hickory Pine. (Fig. 117.)


A tree with a maximum height of about 60° and trunk diameter of 3½", the branches spreading, the old rough bark in flakes. Leaves mostly in 2's, some in 3's, stout and stiff, light green, 2½'-4' long, crowded on the twigs; fibro-vascular bundles 2; young sheaths 5'-8" long; cones lateral, usually clustered, long-persistent on the branches, ovoid, 3½'-5' long, 2'-3' thick while the scales are closed, nearly globular when these are expanded; scales very thick and woody, their ends with a large elevated transverse ridge, centrally tipped by a stout reflexed or spreading spine 2'-2½'' long.


9. Pinus Taëda L. Loblolly Pine. Old-field Pine. (Fig. 118.)

Pinus Taëda L. Sp. Pl. 1000. 1753.

A large forest tree, reaching under favorable conditions, a height of 150° and a trunk diameter of 5, the branches spreading, the bark thick and rugged, flaky in age. Leaves in 3's (rarely some of them in 2's), slender, not stiff, light green, ascending or at length spreading, 6'-10' long; fibro-vascular bundles 2; sheaths 8'-12' long when young; cones lateral, spreading, oblong-conic, 3'-5' long, 1½-1½' thick before the scales open; scales thickened at the apex, the transverse ridge prominent, acute, tipped with a central short triangular reflexed-spreading spine.

Delaware to Florida and Texas, mostly near the coast, north through the Mississippi Valley to Arkansas. Wood not strong, brittle, coarse grained, light brown; weight per cubic foot 34 lbs. Springs up in old fields or in clearings. Also called Frankincense Pine. April-May.

10. Pinus rigida Mill. Pitch Pine. Torch Pine. (Fig. 119.)


A forest tree reaching a maximum height of about 80° and a trunk diameter of 3°, the branches spreading, the old bark rough, furrowed, flaky in strips. Leaves in 3's (very rarely some in 4's), stout and stiff, rather dark green, 3'-5' long, spreading when mature; fibro-vascular bundles 2; sheaths 4'-6' long when young; cones lateral, ovoid, 1½'-3' long, becoming nearly globular when the scales open, commonly numerous and clustered; scales thickened at the apex, the transverse ridge acute, provided with a stout central triangular recurved-spreading prickle.

In dry, sandy or rocky soil, New Brunswick to Georgia, west to southern Ontario, West Virginia and Kentucky. Ascends to 3000 ft. in Virginia. This forms most of the "pine barrens" of Long Island and New Jersey. Wood soft, brittle, coarse-grained, light reddish-brown; weight per cubic foot 32 lbs. Also called Sap Pine and Candlewood Pine; produces numerous shoots from cut stumps. April-May.
2. **LärIX** Adans. Fam. Pl. 2: 480. 1763.

Tall trees with horizontal or ascending branches and small narrowly linear deciduous leaves, without sheaths, in fascicles on short lateral scaly bud-like branchlets. Aments short, lateral, monocious, the staminate from leafless buds; the ovulate-bearing buds commonly leafy at the base and the anquets red. Anther sacs 2-celled, the sacs transversely or obliquely dehiscent. Pollen-grains simple. Cones ovoid or cylindrical, small, crest, their scales thin, spirally arranged, obtuse, persistent. Ovules 2 on the base of each scale, ripening into 2 reflexed winged seeds. [Name ancient, probably Celtic.]

About 9 species, natives of the north temperate and subarctic zones. Besides the following 2 others occur in the western parts of North America.

1. **LärIX læricina** (Du Roi) Koch. American Larch. Tamarack. (Fig. 120.)

*Pinus läricina* Du Roi, Obs. Bot. 49. 1771.
*LärIX läricina* Koch, Dendrol. 2: Part 2, 263. 1873.

A slender tree, attaining a maximum height of about 100° and a trunk diameter of 3°, the branches spreading, the bark close or at length slightly scaly. Leaves pale green, numerous in the fascicles, 5"-12" long, about 5/4" wide, deciduous in late autumn; fascicles borne on short lateral branchlets about 2" long; cones short-pedicled at the ends of similar branchlets, ovoid, obtuse, 6"-8" long, composed of about 12 suborbicular thin scales, their margins entire or slightly lacerate.

In swampy woods and about margins of lakes, Newfoundland to the Northwest Territory, south to New Jersey, Pennsylvania, Indiana and Minnesota. Wood hard, strong, very durable, resinous, light brown; weight per cubic ft. 35 lbs. Called also Hackmatack. March-April.


Evergreen conical trees, with linear short 4-sided leaves spreading in all directions, jointed at the base to short persistent sterigmata, on which they are sessile, falling away in drying, the bare twigs appearing covered with low truncate projections. Leaf-buds scaly. Staminate aments axillary, nearly sessile; anthers 2-celled, the sacs longitudinally dehiscent, the connective prolonged into an appendage; pollen-grains compound; ovule-bearing aments, terminal, ovoid or oblong; ovules 2 on the base of each scale, reflexed, ripening into 2 more or less winged seeds. Cones ovoid or oblong, obtuse, pendulous, their scales numerous, spirally arranged, thin, obtuse, persistent. [Name ancient.]

About 3 species, natives of the north temperate and subarctic zones. Besides the following, 3 others occur in the northwestern parts of North America.

1. **Picea Canadensis** Mill.) B.S.P.

White Spruce. (Fig. 121.)

*Picea alba* Link, Linnaea, 15: 416. 1841.

A slender tree, attaining a maximum height of about 150° and a trunk diameter of 3°, but usually much smaller. Twigs and sterigmata glabrous, pale and glaucous; leaves light green, slender, 6"-8" long, very acute; cones cylindric or oblong-cylindric, pale, 1½-2° long, 6"-8" thick before the scales open; scales almost membranaceous, their margins usually quite entire; bracts incised.

Newfoundland to Hudson Bay and Alaska, south to Maine, northern New York, Michigan, the Black Hills, Montana and British Columbia. Wood soft, weak, light yellow; weight per cubic foot 25 lbs. April-May.
PINE FAMILY. CONIFERS.

2. *Picea Mariâna* (Mill.) B.S.P. Black Spruce. (Fig. 122.)

*Picea nigra* Link. Linnaea, 15: 520. 1841.
*Picea Mariâna* B.S.P. Prel. Cat. N. Y. 71. 1888.

A slender tree, sometimes 90° high, the trunk reaching a diameter of 2°–3°, the branches spreading, the bark only slightly roughened. Twigs stout, pubescent; sterigma pubescent; leaves thickly covering the twigs, deep green, stout, straight or curved, rarely more than ½' long, obtuse or merely mucronate at the apex; cones oval or ovoid, 1'–1½' long, persistent on the twigs for two or more seasons, their scales with entire or merely erose margins.

Newfoundland to Hudson Bay and the Northwest Territory, south to New Jersey, along the higher Alleghenies to North Carolina and to Michigan and Minnesota. Wood soft, weak, pale red or nearly white; weight per cubic foot 28 lbs. May–June.

3. *Picea rubra* (Lamb.) Link. Red Spruce. (Fig. 123.)


A slender tree, sometimes reaching a height of 100° and a trunk diameter of 4°, the branches spreading, the bark reddish, nearly smooth. Twigs slender, sparingly pubescent; sterigma glabrate; leaves light green, slender, straight or sometimes incurved, very acute at the apex, 5½–8½' long; cones ovoid or oval, seldom more than 1' long, deciduous at the end of the first season or during the winter, their scales undulate, lacerate, or 2-lobed.

Nova Scotia to northern New York and along the higher Alleghenies to southern Virginia. Ascends to 4500 ft. in the Adirondacks. Wood similar to that of the preceding species. May–June.


Evergreen trees with slender horizontal or drooping branches, flat narrowly linear scattered short-petioled leaves, spreading and appearing 2-ranked, jointed to very short sterigmata and falling away in drying. Leaf-buds scaly. Staminate aments axillary, short or subglobose; anthers 2-celled, the sacs transversely dehiscent, the connective slightly produced beyond them; pollen-grains simple. Ovule-bearing aments terminal, the scales about as long as the bracts, each bearing 2 reflexed ovules on its base. Cones small, ovoid or oblong, pendulous, their scales scarcely woody, obtuse, persistent. Seeds somewhat winged. [Name Japanese.]

About 7 species, the following of eastern North America, 2 in northwestern North America, 2 or 3 Asiatic.

Cones 6'–10' long, their scales remaining appressed.
Cones 1'–1½' long, their scales widely spreading at maturity.

1. *T. Canadensis*.
2. *T. Caroliniana*. 

1. **Tsuga Canadensis** (L.) Carr. Hemlock. (Fig. 124.)


A tall forest tree, sometimes 110° high, the trunk reaching 4° in diameter, the lower branches somewhat drooping, the old bark flaky in scales. Foliation dense; leaves obtuse, flat, 6°–9° long, less than 1° wide, dark green above, pale beneath, the petiole less than one-half as long as the width of the blade; cones oblong, obtuse, as long as or slightly longer than the leaves, their scales suborbicular, obtuse, minutely lacerate or entire, not widely spreading at maturity.

Nova Scotia to Minnesota, south to Delaware, along the Alleghanies to Alabama and to Michigan and Wisconsin. Ascends to 2000 ft. in the Adirondacks. One of the most ornamental of evergreens when young. Wood soft, weak, brittle, coarse-grained, light brown or nearly white; weight per cubic foot 26 lbs. Bark much used in tanning. April–May.

2. **Tsuga Caroliniana** Engelm. Carolina Hemlock. (Fig. 125.)


A forest tree attaining a maximum height of about 80° and a trunk diameter of 4°, the lower branches drooping. Leaves narrowly linear, obtuse, rather light green above, nearly white beneath, 7°–10° long, the petiole nearly as long as the width of the blade; cones 1°–1.5° long, the scales firm but scarcely woody, oblong, obtuse, widely spreading at maturity.

Southwestern Virginia to South Carolina in the Alleghanies. Wood soft, weak, brittle, light brown; weight per cubic foot about 27 lbs. A more graceful and beautiful tree than the preceding at maturity. Ascends to 4200 ft. in North Carolina. April.


Evergreen trees with linear flat scattered sessile leaves, spreading so as to appear 2-ranked, but in reality spirally arranged, not jointed to stigmata, and commonly quite persistent in drying, the naked twigs marked by the flat scars of their bases. Staminate aments axillary; anthers 2-celled, the sacs transversely dehiscent, the connective prolonged into a short knob or point; pollen-grains compound. Ovule-bearing aments lateral, erect; ovules 2 on the base of each scale, reflexed, the scale shorter than or exceeding the thin or papery, mucronate or aristate bract. Cones erect, subcilindrical or ovoid, their scales deciduous from the persistent axis, orbicular or broader, obtuse. [Ancient name of the firs.]

About 20 species, natives of the north temperate zone, chiefly in boreal and mountainous regions. Besides the following, some 7 others occur in the western parts of North America and 1 in Mexico.

Bracts serrulate, mucronate, shorter than the scales.
Bracts aristate, reflexed, longer than the scales.

1. *A. balsamea.*

2. *A. Fraseri.*
1. Abies balsâmea (L.) Mill. Balsam Fir. (Fig. 126.)


A slender forest tree attaining a maximum height of about 90° and a trunk diameter of 3", usually much smaller and on mountain tops and in high arctic regions reduced to a low shrub. Bark smooth, warty with resin "blisters." Leaves fragrant in drying, less than 1" wide, 6'-10' long, obtuse, dark green above, paler beneath or the youngest conspicuously whitened on the lower surface; cones cylindric, 2'-4' long, 9'-15' thick, upright, arranged in rows on the upper side of the branches, violet or purplish when young; bracts obovate, serrulate, mucronate, shorter than the broad rounded scales.

Newfoundland and Labrador to Hudson Bay and the Northwest Territory, south to Massachusetts, Pennsylvania, along the Alleghenies to Virginia and to Michigan and Minnesota. Ascends to 5000 ft. in the Adirondacks. Wood soft and weak, light brown; weight per cubic foot 24 lbs. Canada balsam is derived from the resinous exudations of the trunk. May-June.

2. Abies Frâseri (Pursh) Lindl. Fraser's Balsam Fir. (Fig. 127.)

Abies Frâseri Lindl. Penny Cyc. t: 30. 1833.

A forest tree, reaching a maximum size about that of the preceding species, the smooth bark bearing similar resin "blisters." Leaves, especially the younger, conspicuously whitened beneath, 5'-10' long, nearly 1' wide, emarginate or some of them obtuse at the apex; cones oblong-cylindric or ovoid-cylindric, 2'-3' high, about 1' thick, their scales rhomboid, much broader than high, rounded at the apex, much shorter than the papery bracts, which are reflexed, their summits emarginate, serrulate and aristate.

On the high Alleghenies of southwestern Virginia, North Carolina and Tennessee. Wood similar to that of the northern species, but slightly lighter in weight. May.


Tall trees with horizontal or drooping branches, and alternate spirally arranged sessile linear or scale-like leaves, deciduous in our species, spreading so as to appear 2-ranked, some of the twigs commonly deciduous in autumn. Leaf-buds naked. Staminate aments very numerous, globose, in long terminal drooping panicled spikes, appearing before the leaves; anthers 2-5-celled, the sacs 2-valved. Ovule-bearing aments ovoid, in small terminal clusters, their scales few, bractless, each bearing a pair of ovules on its base. Cones globose or nearly so, the scales thick and woody, rhomboid, fitting closely together by their margins, each marked with a triangular scar at its base. Seeds large, sharply triangular-pyramidal. [Name Greek, referring to the yew-like leaves.]

Three known species, the following of southeastern North America, one Mexican, one Chinese.
1. Taxodium distichum (L.) L. C. Rich. Bald Cypress. (Fig. 128.)


A large forest tree, attaining a maximum height of about 150° and a trunk diameter of 14°, the old bark flaky in thin strips. Leaves narrowly linear, flat, thin, 5°-10° long, ½° or less wide, rather light green, acute, those on some of the flowering branches smaller, scale-like; cones globose or slightly longer than thick, pendent at the ends of the branches, very compact, about 1° in diameter; surfaces of the scales irregularly rugose above the inversely triangular scar; seeds 4°-5° long.

In swamps and along rivers. Delaware (possibly in southern New Jersey) to Florida, west to Texas, north in the Mississippi Valley region to southern Indiana, Missouri and Arkansas. Wood soft, not strong, brown, very durable; weight per cubic foot 27 lbs. The roots develop upright conic "knees" sometimes 4° high and 1° thick. March-April.


Evergreen trees or shrubs with frond-like foliage, the leaves small or minute, scale-like, appressed, imbricated, opposite, 4-ranked, those of the ultimate branchlets mostly obtuse, those of some of the larger twigs acute or subulate. Aments monoecious, both kinds terminal, the staminate globose; anthers opposite, 2-4-celled, the sacs globose, 2-valved. Ovule-bearing aments ovoid or oblong, small, their scales opposite, each bearing 2 (rarely 2-5) erect ovules. Cones ovoid or oblong, mostly spreading or recurved, their scales 6-10, coriaceous, opposite, not peltate, dry, spreading when mature. Seeds oblong, broadly or narrowly winged or wingless. [Name ancient.]

About 15 species, natives of North America and eastern Asia. Besides the following, another occurs from Idaho and Oregon to Alaska.

1. Thuja occidentalis L. White Cedar.

_Arbor Vitae._ (Fig. 129.)
_Thuja occidentalis_ L. Sp. Pl. 1002. 1753.

A conical tree, reaching a height of 65° and a trunk diameter of 5°, the old bark deciduous in ragged strips. Scale-like leaves of the ultimate branchlets nearly orbicular, obtuse, 1°-1½° broad, the two lateral rows keeled, the two other rows flat, causing the twigs to appear much flattened; leaves of the older twigs narrower and longer, acute or acuminate; mature cones 4°-6° long, their scales obtuse; seeds broadly winged.

In wet soil and along the banks of streams, forming almost impenetrable forests northward, New Brunswick to James' Bay and Manitoba, south to New Jersey, along the Alleghenies to North Carolina and to Illinois and Minnesota. Ascends to 3500 ft. in the Adirondacks. Wood soft, brittle, weak, coarse-grained, light brown; weight per cubic foot 20 lbs. May-June.


Evergreen trees, similar to the _Thuja_ s, with minute opposite appressed 4-ranked scale-like leaves, or those of older twigs subulate, and small monoecious terminal aments. Staminate aments as in _Thuja_, but the filaments broader and shield-shaped. Ovule-bearing aments globose, their scales opposite, peltate, each bearing 2-5 erect ovules. Cones globose, the scales thick, peltate, each bearing 2-5 erect seeds, closed until mature, each with a central point or knob. Seeds winged. [Greek, meaning a low cypress.]

About 7 species, the following of the eastern United States, 2 in western North America. 3 or 4 Japanese.
1. Chamaecyparis thyoides (L.) B.S.P. Southern White Cedar. (Fig. 130.)

A forest tree, reaching a maximum height of about 90 feet and a trunk diameter of 4 feet. Leaves of the ultimate branchlets ovate, acute, scarcely 3/8" wide, those of the lateral rows keeled, those of the vertical rows slightly convex, each with a minute round discoid marking on the centre of the back, those of the older twigs narrower and longer, subulate; cones about 3" in diameter, blue, each of their closely fitting scales with a small central point; seeds narrowly winged.

In swamps, Massachusetts to northern New Jersey, south to Florida and Mississippi, mostly near the coast. Wood soft, weak, close-grained, light brown; weight per cubic foot 21 lbs. April-May.


Evergreen trees or shrubs with opposite or verticillate, subulate or scale-like, sessile leaves, commonly of 2 kinds, and dioecious or sometimes monoecious, small globose axillary or terminal aments. Leaf-buds naked. Staminate aments oblong or ovoid; anthers 2-6-celled, each sac 2-valved. Ovule-bearing aments of a few opposite somewhat fleshy scales, or these rarely verticillate in 3's, each bearing a single erect ovule or rarely 2. Cones globose, berry-like by the coalescence of the fleshy scales, containing 1-6 wingless bony seeds. [Name Celtic.]

About 30 species, natives of the northern hemisphere, some of them extending into tropical regions. Besides the following, 4 or 5 others occur in the western parts of North America.

Leaves all subulate, prickly pointed, verticillate; aments axillary.

Small erect tree or shrub; leaves slender, mostly straight.

Low depressed shrub; leaves stouter, mostly curved.

Leaves of 2 kinds, scale-like and subulate, mostly opposite; aments terminal.

1. Juniperus communis L. Juniper. (Fig. 131.)

A low tree or erect shrub, sometimes attaining a height of 25 feet and a trunk diameter of 10 feet, usually smaller, the branches spreading or drooping, the bark shreddy. Leaves all subulate, rigid, spreading, or some of the lower reflexed, mostly straight, prickly pointed, verticillate in 3's, often with smaller ones fascicled in their axils, 5'-10" long, less than 1" wide, channelled and commonly whitened on the upper surface; aments axillary; berry-like cones sessile or very nearly so, dark blue, 3'-4" diameter.

2. *Juniperus nana* Willd. Low Juniper. (Fig. 132.)

*Juniperus Sibirica* Burgsd. Anleit. u. 272. 1787.


A depressed rigid shrub, seldom over 15' high, forming circular patches often 10' in diameter. Leaves similar to those of the preceding species, but stouter, similarly channeled and often whitened above, appressed-ascending, rather rigid, spiny tipped, 4"-6' long, mostly incurved, densely clothing the twigs, verticillate in 3's; aments axillary; berry-like cones blue, 4'5' in diameter.

In dry, open places, Labrador to British Columbia, south to Massachusetts, New York, Michigan and in the Rocky Mountains to Colorado and Utah. Also in Europe and Asia. The characteristic growth in a depressed circular patch gives the plant a very different aspect from the true Juniper. April-May.

3. *Juniperus Virginiana* L. Red Cedar. Savin. (Fig. 133.)


A tree, reaching a maximum height of about 100' and a trunk diameter of 5', conic when young, but the branches spreading in age so that the outline becomes nearly cylindric. Leaves mostly opposite, all those of young plants and commonly some of those on the older twigs of older trees subulate, spiny-tipped, 2'4' long, those of the mature foliage scale-like, acute or subacute, closely appressed and imbricated, 4-ranked, causing the twigs to appear quadrangular; aments terminal; berry-like cones light blue, glaucous, about 3' in diameter, borne on straight peduncle-like branchlets of less than their own length, 1-2-seeded.

In dry soil, New Brunswick to British Columbia, south to Florida, Texas, northern Mexico and Arizona. Also in the West Indies. Ascends to 2100 ft in Virginia. Wood soft, not strong, straight-grained, compact, odorous, red, the sap-wood white, weight per cubic foot 31 lbs.; used in large quantities in the manufacture of lead pencils. April-May. Fruit ripe Sept.-Oct.

4. *Juniperus Sabina* L. Shrubby Red Cedar. (Fig. 134.)


A depressed, usually procumbent shrub, seldom more than 4' high. Leaves similar to those of the preceding species, those of young plants and the older twigs of older plants subulate, spiny-tipped, those of the mature foliage scale-like, appressed, 4-ranked, acute or acuminate; aments terminal; berry-like cones light blue, somewhat glaucous, 4'5' in diameter, borne on recurved peduncle-like branchlets of less than their own length, 1-4-seeded.


Trees or shrubs, resin-bearing except *Taxus*. Leaves evergreen or deciduous, linear, or in several exotic genera broad or sometimes fan-shaped, the pollen-sacs and ovules borne in separate clusters or solitary. Perianth wanting. Stamens much as in the Pinaceae. Ovules with either one or two integuments; when two, the outer one fleshy, when only one, its outer part fleshy. Fruit drupe-like or rarely a cone.

About 8 genera and 75 species, of wide geographic distribution, most numerous in the southern hemisphere. The Maiden-hair Tree, *Ginkgo biloba*, of China and Japan, with fan-shaped leaves, is an interesting member of the group, now much planted for ornament.

### 1. TÁXUS L. Sp. Pl. 1040. 1753.

Evergreen trees or shrubs, with spirally arranged short-petioled linear flat mucronate leaves, spreading so as to appear 2-ranked, and axillary and solitary, sessile or subsessile very small aments; staminate aments consisting of a few scaly bracts and 5-8 stamens, their filaments united to the middle; anthers 4-6-celled. Ovules solitary, axillary, erect, subtended by a fleshy, annular disk, which is bracted at the base. Fruit consisting of the fleshy disk which becomes cup-shaped, red, and nearly encloses the bony seed. [Name ancient.]

About 6 species, natives of the north temperate zone. Besides the following, another occurs in Florida, one in Mexico and one on the Pacific Coast.

1. *Taxus minor* (Michx.) Britton. American Yew. Ground Hemlock. (Fig. 135.)

*Taxus baccata* var. minor Michx. Fl. Bor. Am. 2: 245. 1803.


A low straggling shrub, seldom over 3′ high. Leaves dark green on both sides, narrowly linear, mucronate at the apex, narrowed at the base, 6″-10″ long, nearly 1″ wide, persistent on the twigs in drying; the staminate aments globose, r″ long, usually numerous; ovules usually few; fruit red and pulpy, resinous, oblong, nearly 3″ high, the top of the seed not covered by the fleshy integument.

In woods, Newfoundland to Manitoba, south to New Jersey, in the Alleghenies to Virginia, and to Minnesota and Iowa. Ascends to 2900 ft. in the Adirondacks. April-May. Very different from the European Yew, *T. baccata*, in habit, the latter becoming a large forest tree, as does the Oregon Yew, *T. brevifolia*.

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Class 2. **ANGIOSPÉRMÁE**.

Ovules (macrosporangies) enclosed in a cavity (the ovary) formed by the infolding and uniting of the margins of a modified rudimentary leaf (carpel), or of several such leaves joined together, in which the seeds are ripened. The pollen-grains (microspores) on alighting upon the summit of the carpel (stigma) germinate, sending out a pollen-tube which penetrates its tissues and reaching an ovule enters the orifice of the latter (micropyle), and its tip coming in
contact with a germ-cell in the embryo-sac, fertilization is effected. In a few cases the pollen-tube enters the ovule at the chalaza, not at the micropyle.

There are two sub-classes, distinguished as follows:
Cotyledon one; stem endogenous.  
Cotyledons two; stem (with rare exceptions) exogenous.  

Sub-class 1. **MONOCOTYLEDONES.**

Embryo of the seed with but a single cotyledon and the first leaves of the germinating plantlet alternate. Stem composed of a ground-mass of soft tissue (parenchyma) in which bundles of wood-cells are irregularly imbedded; no distinction into wood, pith and bark. Leaves usually parallel-veined, mostly alternate and entire, commonly sheathing the stem at the base and often with no distinction of blade and petiole. Flowers mostly 3-merous or 6-merous.

Monocotyledonous plants are first definitely known in Triassic time. They constitute between one-fourth and one-third of the living angiospermous flora. The families are grouped in about 10 orders (see Introduction).

**Family 1. TYPHACEAE J. St. Hil. Expos. Fam. 1: 60. 1805.**

**CAT-TAIL FAMILY.**

Marsh or aquatic plants with creeping rootstocks, fibrous roots and glabrous erect, terete stems. Leaves linear, flat, ensiform, striate, sheathing at the base. Flowers monoecious, densely crowded in terminal spikes, which are subtended by spathaceous, usually fugacious bracts, and divided at intervals by smaller bracts, which are caducous, the staminate spikes uppermost. Perianth of bristles. Stamens 2–7, the filaments connate. Ovary 1, stipitate, 1–2-celled. Ovules anatropous. Styles as many as the cells of the ovary. Mingled among the stamens and pistils are bristly hairs, and among the pistillate flowers many sterile flowers with clavate tips. Fruit nutlike. Endosperm copious.

The family comprises only the following genus:

1. **TYPHA** L. Sp. Pl. 971. 1753.

**Characters of the family.** [Name ancient.]

About 10 species, widely distributed in temperate and tropical regions. Besides those here described, another occurs in California.

Spikes dark brown or black, the pistillate and staminate usually contiguous, the former without bractlets; stigmas spatulate or rhomboid; pollen 4-grained.

1. **T. latifolia.**

Spikes light brown, the pistillate and staminate usually distant, the former with bractlets; stigmas linear; pollen in simple grains.

**1. Typha latifolia** L. Broad-leaved Cat-tail. (Fig. 136.)

*Typha latifolia* L. Sp. Pl. 971. 1753.

Stems stout, 4°–8° high. Leaves 3′–12′ broad; spikes dark brown or black, the staminate and pistillate portions usually contiguous, each 3′–12′ long and often 1′ or more in diameter, the pistillate without bractlets; stigmas rhomboid or spatulate; pollen-grains in 4′s; fruit furrowed, bursting in water; seeds with a separable outer coat.

In marshes, throughout North America except the extreme north. Ascends to 1600 ft. in the Adirondacks and to 2200 ft. in Virginia. Also in Europe and Asia. June–July. Fruit, Aug.–Sept.

*Text contributed by the late Rev. Thomas Morong.*
2. *Typha angustifolia* L. Narrow-leaved Cat-tail. (Fig. 137.)

*Typha angustifolia* L. Sp. Pl. 971. 1753.

Stems slender, 5°–10° high. Leaves mostly narrower than those of the preceding species, 2"–6" wide; spikes light brown, the staminate and pistillate portions usually distant, the two together sometimes 15' long, the pistillate, when mature, 2"–8" in diameter, and provided with bractlets; stigmas linear or linear-oblong; pollen-grains simple; fruit not furrowed, not bursting in water; outer coat of the seed not separable.

Abundant in marshes along the Atlantic Coast from Nova Scotia to Florida and Cuba, but also occurring rather rarely inland. Also in Europe and Asia. June–July. Fruit, Aug.–Sept.

Family 2. **SPARGANIACEAE** Agardh, Theor. Syst. Pl. 13. 1858.*

Bur-reed Family.

Marsh or pond plants with creeping rootstocks and fibrous roots, erect or floating simple or branched stems, and linear alternate leaves, sheathing at the base. Flowers monoecious, densely crowded in globose heads at the upper part of the stem and branches, the staminate heads uppermost, sessile or peduncled. Spathes linear, immediately beneath or at a distance below the head. Perianth of a few irregular chaffy scales. Stamens commonly 5, their filaments distinct; anthers oblong or cuneate. Ovary sessile, mostly 1-celled. Ovules anatropous. Fruit mostly 1-celled, nutlike. Embryo nearly straight, in copious endosperm.

The family comprises only the following genus.

1. **SPARGANIUM** L. Sp. Pl. 971. 1753.

Characters of the family. [Greek, referring to the ribbon-like leaves.]

About 10 species, of temperate and cold regions. Besides the following, one occurs in California.

- Fruit sessile.
- Fruit stalked.
- Inflorescence branching.
- Inflorescence simple.
- Staminate heads 4–6, pistillate 2–6, 5'–8' in diameter.
- Staminate heads 1–2, pistillate 1–3, 2'–5' in diameter.

**1. Sparganium eurycarpum** Engelm. Broad-fruited Bur-reed. (Fig. 138.)

*Sparganium eurycarpum* Engelm. in A. Gray, Man. Ed. 2. 430. 1856.

Stems stout, 3°–8° high, branching. Leaves linear, fl at, slightly keeled beneath, the lowest 3°–5° long, the upper shorter; staminate heads numerous; pistillate heads 2–4 on the stem or branch, sessile or more commonly peduncled, hard, compact and 10"–16" in diameter when mature; style 1; stigmas 1–2; nutlets sessile, 3'/–5'/ long, obtusely 4–5-angled, narrowed at the base, the top rounded, flattened or depressed, abruptly tipped with the style; scales as long or nearly as long as the fruit and as many as its angles, often with 2 or 3 other exterior ones, somewhat spatulate, the apex rounded, denticulate or eroded.

In marshes and along streams, Newfoundland to British Columbia, south to Virginia, Missouri, Utah and California. Ascends to 2100 ft. in Virginia. May–Aug.

*Text contributed by the late Rev. Thomas Morong.*
2. Sparganium andrócladum (Engelm.) Morong. Branching Bur-reed. (Fig. 139.)

*Sparganium simplicer* var. *androcladum* Engelm. in A. Gray, Man. Ed. 5, 481. 1867.


Stem slender, more or less branching, 10°-2° high. Pistillate heads 3-7, sessile or the lowest peduncled, axillary or the peduncles and branches axillary; style 1; stigma 1 (rarely 2); fruiting heads 6°-12° in diameter; nutlets fusiform, 2°-3° long, 1° thick, usually even, often strongly contracted at the middle, tapering into the style; scales oblong, as long as the nutlets or shorter, the exterior ones narrower; stalk of fruit 1° long or more.

In bogs or shallow water, Nova Scotia to Ontario and British Columbia, south to Florida and Louisiana. June-Aug.


Floating in deep water with long slender stems, and thin leaves 1°-3° wide; inflorescence usually sparingly branched; fruiting heads 4°-6° in diameter. In cold ponds, New Brunswick to Pennsylvania.

3. *Sparganium simplex* Huds. Simple-stemmed Bur-reed. (Fig. 140.)


Stem slender, 1½-2½° high, simple. Leaves more or less triquetrous, 2°-3° wide; inflorescence 10°-8° long; staminate heads 4-6; pistillate 2-6, sessile or the lowest peduncled; fruiting heads 5°-8° in diameter; nutlets fusiform or narrowly oblong, obtusely angled at the apex, more or less contracted in the middle, smaller than those of the preceding species and more tapering at the summit; scales denticulate, about one-half as long as the nutlets; stigma linear, as long as the style or shorter, rarely 2; stalk of fruit about 1° long.


*Sparganium simplicer* augústifólium (Michx.) Engelm. in A. Gray, Man. Ed. 5, 481. 1867.


Floating in deep water. Leaves very long, ½°-1½° wide, their sheaths often inflated at the base; staminate and pistillate heads 1-4; fruiting heads 3°-7° in diameter. In mountain lakes and slow streams, Newfoundland to Oregon, south to New York and California.

4. *Sparganium minimum* Fries. Small Bur-reed. (Fig. 141.)

*Sparganium minimum* Fries, Sum. Veg. 2; 560. 1846.

Floating, stems very slender, 4°-3° long. Leaves thin and lax. ½°-2½° wide; inflorescence 1° or more long; staminate heads 1-2; pistillate, 1-3, sessile, axillary, supra-axillary or the lowest on an axillary peduncle; ripe fruiting heads 2°-5° in diameter; nutlets ovoid, slightly triangular, tapering abruptly into the style, 1°-2° long, twice as long as the denticulate scales; stigma oval, often oblique, about as long as the style; stalk of the nutlet ½°-½° long, often apparently none.

In ponds and streams, New Brunswick to Manitoba and Oregon, south to New Jersey, Michigan and Utah. Also in northern Europe. Dwarf forms, growing out of water, sometimes occur with stems 3°-6° high. June-Aug.

Immersed aquatic plants with slender, often branching, leafy stems, the leaves flat or filiform, and perfect, monoecious or dioecious spicate axillary or spadiceous flowers. Perianth of 4 segments, or a hyaline envelope, or wanting. Stamens 1–4 or occasionally more, distinct and hypogynous in the perfect flowers, solitary or connate in the sterile. Anthersextrorse, 1–2-celled. Ovaries 1–9, mostly distinct, 1-celled, mostly 1-ovuled. Carpels rarely dehiscent. Seedsstraight or curved. Endosperm none.

About 10 genera and 100 species of wide geographic distribution, most abundant in temperate regions. The months noted in the descriptions indicate the fruiting period.

**Flowers Perfect.**

- Perianth of 4 distinct segments.
- Perianth none; flowers naked.
- Flowers monoecious or dioecious.

**Leaves Entire.**

- Leaves 1-nerved, 1⁄3–1⁄2 long, 1⁄2⁄3 or less wide.
- Leaves many-nerved, 1⁄2–3⁄4 long, 1⁄3–1⁄2 wide.
- Leaves spiny-toothed on the margins.

**1. POTAMOGETON** L. Sp. Pl. 126. 1753.

Leaves alternate or the uppermost opposite, often of 2 kinds, submerged and floating, the submerged mostly linear, the floating coriaceous, lanceolate, ovate or ovate. Spathes stipular, often ligulate, free or connate with the base of the leaf or petiole, enclosing the young buds and usually soon persisting after expanding. Peduncles axillary, usually emersed. Flowersmall, spicate, green or red. Perianth-segments 4, short-clawed (Fig. 154), concave, valvate. Stamens 4, inserted on the claws of the perianth-segments. Anthers sessile. Ovaries 4, sessile, distinct, 1-celled, 1-ovuled, attenuated into a short erect or recurved style, or with a sessile stigma. Fruit of 4 ovoid or subglobose drupelets, the pericarp usually thin and hard or spongy. Seeds crustaceous, campylotropous, with an unci-nate embryo thickened at the radicular end. [Greek, in allusion to the aquatic habitat.]

About 65 well-defined species, natives of temperate regions. Besides the following, 3 others occur in the southern parts of North America.

Stipules axillary and free from the leaf.

With floating and submerged leaves,

**Submerged leaves bladeless.**

- Nutlets more or less pitted.
- Nutlets not pitted.
- Submerged leaves with a proper blade.

**Submerged leaves of 2 kinds, lanceolate and oval or oblong.**

- Uppermost broadly oval or elliptical, lowest lanceolate.
- Uppermost lanceolate and pellucid, lowest oblong and opaque.

**Submerged leaves all alike, capillary or linear-setaceous.**

- 1-nerved or nerveless.
- 3-nerved.

**Submerged leaves all alike, linear.**

- Nearly the same breadth throughout, obtusely pointed, coarsely cellular-reticulated in the middle.
- Broader at base, acute, without cellular-reticulation.

**Submerged leaves all alike, lanceolate.**

- Uppermost leaves petioled, lowest sessile.
- All the leaves petioled.
- Floating leaves large, broadly elliptic, rounded or subcordate at base.
- Floating leaves narrowly elliptical, tapering at base.
- Floating leaves mostly obovate or oblongate, tapering at base.
- All the leaves sessile or sub sessile.
- Fruit only 1 line long, obscurely 3-keeled.
- Fruit 1 1⁄2 lines long, distinctly 3-keeled.

With submerged leaves only.

**Without propagating buds and without glands.**

- Leaves with broad blades, mostly lanceolate or ovate, many-nerved.

- Leaves sub sessile or short petioled, mostly acute or cuspidate.

- Leaves semi-amplexicaul, obtuse and cucullate at the apex.
- Leaves meeting around the stem, very obtuse at the apex, not cucullate.
- Leaves with narrow blades, linear or oblong-linear, several-nerved.
- Leaves oblong-linear, 5–7-nerved, obtuse at the apex.
- Leaves narrowly linear, 3-nerved, acute at the apex.
- Leaves with narrow blades, capillary or setaceous, 1-nerved or nerveless.

*Text contributed by the late Rev. THOMAS MORONG.*

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1. *Potamogeton.*
2. *Ruppia.*
3. *Zannichellia.*
4. *Zosteria.*
5. *Natas.*
7. *P. Oakesianus.*
8. *P. amphi folius.*
9. *P. pulcher.*
10. *P. Vasiyi.*
11. *P. lat eralis.*
12. *P. Vasiyi.*
13. *P. bicus.*
15. *P. lonchites.*
16. *P. Faxoni.*
17. *P. spatulata formis.*
18. *P. Zizi.*
NAIADACEAE.

With propagating buds or glands, or both.
With buds, but without glands.
Leaves serrulate, 3-7-nerved.
Leaves entire, with 3 principal and many fine nerves.
Commonly with glands, but no buds.
Stems long-branching from the base; leaves lax, flat, 3-nerved, abruptly acute or cuspidate.
Stems simple; leaves strict, revolute, 3-5-nerved, acuminate.
With both buds and glands.
Glands large and translucent; buds rare.
Glands small, often dull; buds common.
Leaves linear, 5-7-nerved.
Leaves linear, 3-nerved.
Leaves capillary, 1-nerved or nerveless.
Stipules adnate to the leaves or petioles.
With both floating and submerged leaves.
Submerged peduncles as long as the spikes, clavate, often recurved.
Submerged peduncles none, or at most hardly a line long.
With submerged leaves only.
Stigma broad and sessile.
Style apparent; stigma capitulate.
Fruit without keels or obscurely keeled.
Fruit strongly 3-keeled.
Leaves entire, 3-5-nerved.
Leaves minutely serrulate, finely many-nerved.

1. Potamogeton natan s L. Common Floating Pondweed. (Fig. 142.)


Stems 2\(^\circ\)-4\(^\circ\) long, simple or sparingly branched. Floating leaves thick, the blade ovate, oval or elliptic, 2\(-4\)' long, 1\(-2\) wide, usually tipped with a short abrupt point, rounded or subcordate at the base, many-nerved; submerged leaves reduced to phyllodes or bladeless petioles which commonly perish early and are seldom seen at the fruitletting period; stipules sometimes 4' long, acute, 2-keeled; peduncles as thick as the stem, 2\(-4\)' long; spikes cylindric, very dense, about 2' long; fruit turgid, 2\(-2\frac{3}{4}\)' long, about 1\(-\frac{3}{4}\) thick, scarcely keeled, narrowly obovoid, slightly curved on the face; style broad and facial; nutlet hard, more or less pitted or impressed on the sides, 2-grooved on the back; embryo forming an incomplete circle, the apex pointing toward the base.

In ponds and streams, throughout North America except the extreme north, extending into Mexico. Also in Europe and Asia. July-Aug.

2. Potamogeton Oakesianus Robbins. Oakes' Pondweed. (Fig. 143.)

Potamogeton Oakesianus Robbins in A. Gray, Man. Ed. 5. 483. 1867.

Stems very slender, often much branched from below. Floating leaves elliptic, mostly obtuse, rounded or slightly subcordate at the base, 1\(-2\)' long, 5\(-6\)' wide, 12-20-nerved; petioles 2\(-6\)' long; submerged leaves mere capillary phyllodes, often persistent through the flowering season; peduncles 1\(-3\)' long, commonly much thicker than the stem, mostly solitary; spikes cylindric, 1\(-\frac{1}{2}\)' long; stipules acute, hardly keeled; fruit obovoid, about 1\(-\frac{3}{4}\)' long, 1\' thick, nearly straight on the face, 3-keeled, the middle keel sharp; style apical or subapical; sides of the nutlet not pitted, but sometimes slightly impressed; embryo circle incomplete, the apex pointing toward the base.

In still water, Anticosti to northern Pennsylvania and New Jersey. Summer.
3. Potamogeton amplifolius Tucker.  Large-leaved Pondweed. (Fig. 144.)


Stems long, simple or occasionally branched. Floating leaves oval or ovate, abruptly pointed at the apex, rounded at the base, 2'-4' long, 1'/2'-2' wide, many-nerved; petioles 3'-5' long; submerged leaves mostly petioloed, large, the uppermost often elliptic or oval, 3'-6' long, 3'-2'/2' wide, the lowest lanceolate, often 8' long, with about 25 nerves, often with the sides of the blade closed and assuming a falcate shape; stipules tapering to a long sharp point, sometimes 4' long; peduncles thickened upward. 3'-8' long; spikes cylin-dric, 1'-2' long; fruit 2'/2'-2'/2' long, 1'/2'' thick, turgid, the pericarp hard, obliquely obovoid, 3-keeled; face more or less angled; style subapical; embryo slightly incurved.


4. Potamogeton pulcher Tucker.  Spotted Pondweed. (Fig. 145.)


Stems simple, terete, black-spotted, 1°-2° long. Floating leaves usually massed at the top on short lateral branches, alternate, ovate or round-ovate, subcordate, 2'-4'/2' long, 9'/2'-3'/2' wide, many-nerved; peduncles about as thick as the stem, 2'-4' long, spotted; submerged leaves of 2 kinds, the uppermost pellucid, lanceolate, long-acuminate, undulate, 3'-8' long, 6'/2'-18' wide, tapering at the base into a short petiole, 10-20-nerved; the lowest much thicker, opaque, spatulate, oblong or ovate, on petioles 3'/4'-4' long; stipules obtuse or acuminate, 2-carinate; fruit 2'/2'-2'/2' long, 1'/2'' thick, turgid, tapering into a stout apical style, the back sharply 3-keeled; face angled near the middle, with a sinus below; embryo coiled.

In ponds and pools, Maine to Georgia and Missouri. July.

5. Potamogeton Nuttallii Cham. & Sch.  Nuttall's Pondweed. (Fig. 146.)


Stems slender, compressed, mostly simple, 1°-6° long. Floating leaves opposite, elliptic, sometimes obovate, obtuse at the apex, short-petioloed, 3'/4'-3'/4' long, 4'-12' wide, many-nerved; submerged leaves linear, 2-ranked, 2'-7'-long, 1'/2'-3' wide, 5-nerved, the 2 outer nerves nearly marginal, the space between the 2 inner and the midrib coarsely reticulated; stipules obtuse, hyaline, not keeled; peduncles 1'-5' long; spikes 3'/4'-1' long; fruit round-obovoid 1'/4'-2' long, 1'/2'-1'/2'' thick, 3-keeled, the sides flat and indistinctly impressed; style short, apical; embryo coiled one and one-third times.

In ponds and streams, Nova Scotia to Pennsylvania and South Carolina. June–Aug.
6. *Potamogeton alpinus* Balbis. Northern Pondweed. (Fig. 147.)


Plant of a ruddy tinge, stems simple or branch-ed, somewhat compressed. Floating leaves spat-nate or oblanceolate, obtuse, many-nerved, taper-ing into petioles 1'-5' long; submerged leaves semi-pellucid, the lowest scissile, the uppermost petioled, oblong-linear or oblong-lanceolate, obtuse or rarely acute, narrowed at the base, 3'-12' long, 2'-6' wide, 7-17-nerved; stipules broad, faintly 2-carinate, obtuse or rarely acute; peduncles 2'-8' long; spikes 1'-1½' long; fruit obovoid, lenticular, reddish, ½'' long, 1'' thick, 3-keeled, the middle keel sharp, the face arched, beaked by the short recurved style; apex of the embryo pointing directly to the basal end.


7. *Potamogeton lonchites* Tuckerm. Long-leaved Pondweed. (Fig. 148.)

*Potamogeton alpinus* Roth, Fl. Germ. 1: 72. 1788?


Stem terete, much branched, 3°-5° long. Floating leaves rather thin, elliptic, pointed at both ends, 2'-6' long, 6'-14'' wide, many-nerved, on petioles 2'-8' in length; submerged leaves pellucid, 4'-13' long, 2'-12' wide, rounded at the base or tapering into a petiole 1'-4' long; stipules 1'-4' long, acuminate, acute or obtuse, strongly or faintly 2-carinate; peduncles thickening upward, 2'-3' long; spikes cylindric, 1'-2' long; fruit about 2'' long, 1'-1½'' thick, obliquely obovoid, the face nearly straight, the back 3-keeled, the middle keel rounded or often with a projecting wing under the style, not impressed on the sides; embryo slightly incurved, apex pointing slightly inside of the base.

In ponds and slow streams, New Brunswick to Washington, south to Florida and California. July-Oct.


Floating leaves thicker, 3'-5½ long, about 2' wide, 20-24-nerved, abruptly pointed or obtuse at the apex; peduncles sometimes 4'-5' and spikes 3' long. Lakes of central New York.


Faxon's Pondweed. (Fig. 149.)


Floating leaves numerous, mostly obovate or oblanceolate, blunt-pointed or obtuse at the apex, narrowed at the base, often strikingly like those of *P. spathuliformis*, 2'-3½' long, 8'-12'' wide, 13-17-nerved, on petioles 2'-6' long; submerged leaves oblong-lanceolate, acute or sometimes obtuse, 3'-5' long, 6'-12'' wide, 5-13-nerved, often with an irregular areolation on each side of the midrib, borne on petioles ½'-2' in length; peduncles slightly thicker than the stem, 2'-5' long; spikes dense, 1'-2' long; fruit not collected.

Little Otter Creek and Lake Champlain, Ferrisburg, Vermont.
9. Potamogeton heterophyllus Schreb. Various-leaved Pondweed. (Fig. 150.)


Stems slender, compressed, much branched, sometimes 12° long. Floating leaves pointed at the apex, rounded or subcordate at the base, 8°-4° long, 4°-14° wide, 10-18-nerved, on petioles 1°-4° long; submerged leaves pellucid, sessile, linear-lanceolate, acuminate or cuspidate, rather stiff, 1°-6½° long, 1½°-8° wide, 3-9-nerved, the uppermost often petiolate; peduncles often thickened upward, 1½° long, sometimes clustered, stipules spreading, obtuse, 5°-12° long; spikes 9°-14° long; fruit roundish or obliquely obovoid, 1½°-13½° long, ½°-1½° thick, indistinctly 3-keeled; style short, obtuse, apical; apex of the embryo nearly touching the base, pointing slightly inside of it.

A very variable species, occurring in different forms throughout almost all North America except the extreme north. Also in Europe. July-Sept.


Submerged leaves delicate, flaccid, linear, 2°-5° long, 1°-3° wide. With the type.


Stems dichotomously branching, very leafy; submerged leaves delicate, about 1° long and 2° wide, 3-5-nerved, linear or the upper oblancoideate; floating leaves elliptic or lanceolate-oblong; rootstock tuberous. Massachusetts, Rhode Island and Connecticut.


Stems long and almost capillary, the internodes 3°-4° long; submerged leaves densely clustered on short lateral branches, ½°-1° long, scarcely ½° wide, acuminate, 1-nerved; floating leaves ½°-1½° long, 3°-6° wide, lanceolate, oval or ovate, usually clustered at the summit of the stem. Massachusetts and New Hampshire.

10. Potamogeton spatulaceformis (Robbins) Morong. Spatulate-leaved Pondweed. (Fig. 151.)


Stems many, branched, 2°-3° long. Floating leaves obovate or elliptic, abruptly acute at the apex, rather thin, 13-23-nerved, 6°-15° wide, borne on slender petioles; submerged leaves pellucid, spatulate-oblong or linear-lanceolate, 2°-4° long, 3°-9° wide, 5-13-nerved, cuspidate or spinescent, sessile or sub sessile, often reduced to phyllodes with a very narrow blade and a long acumination at the base and apex; peduncles often thickening upward, 1°-2° long; stipules obtuse, faintly keeled, the apex slightly hooded; spikes large; fruit about 1° long, roundish or obliquely ovoid, obscurely 3-keeled, with a curved or slightly angled face; embryo with the apex pointing slightly inside of the base.

In Mystic Pond, Medford, Mass. Also in Europe. Summer.
11. *Potamogeton Illinoensis* Morong. Illinois Pondweed. (Fig. 152.)


Stem stout, much branched above. Floating leaves opposite, numerous, thick, 4'-5½' long, 2'-3½' wide, maury-nerved, oval or broadly elliptic, short-pointed at the apex, rounded, subcordate or narrowed at the base; petioles 1'-4' long; submerged leaves numerous, 4'-8' long, 1'-2' wide, 13-19-nerved, acuminate or the uppermost acute, mostly tapering at the base into a short broad flat petiole, rarely reduced to phyllodes; stipules 2'-3' long, obtuse, strongly 2-carinate; peduncles 2'-4' long; spikes 1'-2' long; fruit roundish or obovoid, 1½'-2' long, 1½'-1½' thick, dorsally 3-keeled; style short, blunt.

In ponds, Illinois to Iowa and Minnesota. Aug.

12. *Potamogeton Zizii* Roth. Ziz's Pondweed. (Fig. 153.)


*Potamogeton Zizii* Roth, Fenn. 1: 531. 1827.

Stems slender, branching. Floating leaves elliptic, 1½'-4' long, 6'-12'' wide, maury-nerved; petioles mostly short; submerged leaves mostly lanceolate or ob lanceolate, thin, acute or cuspidate, 2'-6' long, 3½'-15½' wide, 7-17-nerved; stipules 6½'-18½'' long, obtuse, 2-keeled; peduncles thicker than the stem, 2½'-6½' long; spikes 1'-2' long; fruit obliquely obovoid, 1¾'-'2' long, about 1½' thick, the face dorsally 3-keeled; style short, blunt, facial; apex of the embryo pointing directly to the base.

In lakes and streams, Quebec to Montana, south to Florida and Wyoming. Also in Europe. July-Aug.


Middle leaves narrow; upper leaves oval; stipules long; fruit small. Methy Lake, Canada.

13. *Potamogeton lucens* L. Shining Pondweed. (Fig. 154.)

*Potamogeton lucens* L. Sp. Pl. 126. 1753

Stem thick, braiuching below and often with masses of short leafy branches at the summit. Leaves all submerged, elliptic, lanceolate or the uppermost oval, shining, acute or acuminate and cuspidate, or rounded at both ends and merely mucronulate, sessile or short-petioled, 2½'-8½' long, 8½'-20½'' wide, the tips often serrulate; stipules 1'-3' long, 2-carinate, sometimes very broad; peduncles 3½'-6½' long; spikes 2'-2½' long, cylindric, very thick; fruit about 1½' long and 1½' thick, roundish, the face usually with a slight inward curve at the base; apex of the embryo pointing transversely inward.

In ponds, Nova Scotia to Florida, west to California and Mexico. Local. Also in Europe. Sept.-Oct.

*Potamogeton lucens* Connecticutensis Robbins in A. Gray, Man. Ed. 5: 488. 1867.

Stems flexuous; leaves acuminate; fruit larger than that of the type (about 2'' long), distinctly 3-carinate and with a facial style. Saltonstall's Pond, Conn., and White Plains, N. Y.
14. Potamogeton praelongus Wulf. White-stemmed Pondweed. (Fig. 155.)

Potamogeton praelongus Wulf. in Roem. Arch. 3: 331. 1865.

Stems white, flexuous, flattened, much branched, growing in deep water, sometimes 8" long. Leaves all submerged, oblong or oblong-lanceolate, semi-amplexicaul, bright green, 2"-12" long, 1/2'-13/4" wide, with 3-5 main nerves; stipules white, scarious, obtuse and commonly closely embracing the stem; peduncles 3'-20' long, erect, straight, about as thick as the stem; spikes 1'-2' long, thick, cylindric; fruit dark green, obliquely obovoid, 2'-21/2" long, 13/4'-2" thick, the back much rounded, often with the upper curve nearly as high as the style; the middle keel sharp; style short, obtuse, facial.

Nova Scotia to British Columbia, south to New Jersey, Minnesota and California. Also in Europe. Fruits in June and July, and usually withdraws its stems beneath the water as soon as the fruit is set.

15. Potamogeton perfoliatus L. Clasping-leaved Pondweed. (Fig. 156.)


Stems slender, much branched. Leaves all submerged, orbicular or ovate, sometimes lanceolate, usually obtuse and minutely serrate at the apex, cordate-perfoliate at the base, 5'-15' long, 3'-12' wide; peduncles 13/4' long, usually erect or slightly spreading; spikes 8'-12' long, often flowering and fruiting under water; fruit obliquely obovoid, 13/4'-11/2" long, 1' thick, obscurely 3-carinate on the back, the face slightly curved outwardly toward the top, the sides with a shallow indentation which runs into the face; style nearly facial; embryo slightly incurved or with its apex pointing directly toward the base.

In ponds and streams, Newfoundland to British Columbia, south to Florida and California. Also in Europe and Asia. July-Sept.


Leaves 1'-11/2" long, 4'-8" wide at the broadened amplexicaul base, often curving inward at the apex, 13-23-nerved. Fruit somewhat larger than that of the type, about 2" long and 13/4" thick. Lake Champlain to Oregon, south to Delaware, Nebraska and California.

16. Potamogeton Mysticus Morong. Mystic Pond Pondweed. (Fig. 157.)


Whole plant very slender and delicate, stems irregularly branching above, nearly filiform, terete, 1'-4" long. Leaves all submerged, scattered, oblong-linear, 1'-11/2" long, 1'/3'-3" wide, 5-7-nerved, obtuse and rarely with minute serrulations near the apex, abruptly narrowed at the base and sessile or partly clasping; stipules obtuse, about 6" long, hyaline and with many fine nerves, mostly deciduous, but sometimes persistent and closely sheathing the stem; spikes few, capitate, 4-6-flowered, borne on erect peduncles 1'-2' long; immature fruit obovoid, less than 1'' long, about 1/2 wide, obscurely 3-keeled on the back, slightly beaked by the slender, recurved style.

17. Potamogeton confervoides Reichb. Alga-like Pondweed. (Fig. 158.)


Stems slender, terete, much branched, the upper branches repeatedly forking, 6'-18' long. Leaves very delicate, flat, setaceous, t'-2½' long, the broadest scarcely ¼'' wide, tapering to a long hair-like point, 1-3-nerved and often with a few cross-veins, bright green or yellowish; stipules deliicate, obtuse, 2''-3'' long; peduncles 2'-8' long, erect, somewhat thickened upward; spikes capitate, 3''-4'' long; fruit roundish-ovoid, 1''-1½'' long and about as thick, the back sometimes a little angular or sinuate, 3-keeled, the middle keel sharp, the face notched near the base, the sides impressed with a shallow indentation which runs into the notch of the face; apex of the embryo nearly touching the base a little to one side.

In cold or mountain ponds, Maine and New Hampshire to New Jersey and Pennsylvania. Also in Europe. Aug.-Sept.

18. Potamogeton crispus L. Curled-leaved Pondweed. (Fig. 159.)


Stems branching, compressed. Leaves 2-ranked, linear-oblong or linear-oblanceolate, sessile or semiamplexicaul, obtuse at the apex, serrulate, crisped, ½'-4' long, 3''-7'' wide, 3-7-nerved, the midrib often compound and the outer nerves very near the margin; stipules small, scarious, obtuse, early perishing; peduncles 1'-2' long, frequently recurved in fruit, sometimes very numerous; spikes about ½' long, appearing very bristly with the long-beaked drupelets when in fruit; fruit ovoid, about 1½'' long, 1'' or more wide, 3-keeled on the back, the middle keel with a small projecting tooth near the base, the face slightly curved, the style facial and nearly as long as the drupelet; embryo small, its apex pointing directly toward its base. The plant is mainly propagated by peculiar winter buds.

In fresh, brackish or even salt water, Massachusetts to Pennsylvania and Virginia. Also in Europe. Aug.

19. Potamogeton zosteraefolius Schum. Eel-grass Pondweed. (Fig. 160.)


Stems much flattened, sometimes winged, widely branching. Leaves linear, obtuse and mucronate or short-pointed at the apex, 2'-12' long, 1½''-2'' wide, with 3 principal nerves and many fine ones; stipules scarious, obtuse, finely nerved, soon perishing; peduncles 1½'-4' long; spikes cylindric, about ½' long, 12-15-flowered; fruit obovoid with a broad base, about 2'' long, 1½''-1½'' thick, 3-keeled on the back, the lateral keels rather obscure; face arches, beaked with a short recurved style; embryo slightly incurved. The plant is propagated by the terminal leaf-buds, which sink to the bottom, and rest during the winter.

In still or running water, New Brunswick to New Jersey, west to Oregon. Also in Europe. July-Aug.
20. Potamogeton Hillii Morong. Hill's Pondweed. (Fig. 161.)


Stems slightly compressed, slender, widely branching, 1°-2° long. Leaves linear, acute or cuspidate, or often almost aristate, 1"-2½' long, ½"-1½" wide, 3-nerved, the lateral nerves delicate and nearer the margins than the midrib; stipules whitish, many-nerved, obtuse, 3½'-5½' long; peduncles about ½ long, erect or slightly recurved, more or less clavate; spikes capitate, 3-6-fruited; fruit obliquely obovoid, obtuse at the base, about 2½' long, ½'-1½' thick, 3-carinate on the back, the middle keel sharp and more or less undulate, flat on the sides, face slightly arched; style nearly facial, short; embryo coiled.

In ponds, eastern New York to Michigan. There are two forms of the species, the one 2-glandular at the base of the leaves, the other glandless. July-Sept.

21. Potamogeton foliösus Raf. Leafy Pondweed. (Fig. 162.)


Stems flattened, much branched, 1°-3° long. Leaves 1"-2½' long, ½"-1½" wide, acute, 3-nerved, not glandular at the base; stipules white, hyaline, obtuse or sometimes acute, ½'-1½' long; peduncles more or less clavate, erect, about ½ long; spikes about 4-flowered; fruit lenticular or nearly orbicular, about 1½ in diameter, 3-keeled on the back, the middle keel winged, sinate-dentate, often with projecting shoulders or teeth at each end, the face strongly angled or arched, sharp, often with a projecting tooth at the base; style apical.

In ponds and streams, New Brunswick to British Columbia, south to Florida, New Mexico and California. July-Aug.


Larger. Stems 2'-3° long, leaves sometimes over ½ in length and 1½ wide, 3-5-nerved; stipules larger and occasionally acute; spikes 8-12-flowered. Niagara Falls to Michigan and California.

22. Potamogeton obtusifölius Mert. & Koch. Blunt-leaved Pondweed. (Fig. 163.)


Not L. 1753.

Potamogeton obtusifölius Mert. & Koch, Deutsch. Fl. 1: 855. 1823.

Stems usually slender, compressed, widely branching, especially above. Leaves linear, 2'-3° long, ½"-2½' wide, obtuse, often mucronate, usually 3-nerved with a broad midrib, sometimes 5-7-nerved, 2-glandular at the base, the glands large and translucent; stipules white or scarious, many-nerved, obtuse, 6'-9'-long, often as long as or longer than the internodes; peduncles numerous, 1½'-1½' long, slender, erect; spikes 3'-4' long, ovoid, 5-8-flowered; fruit obliquely obovoid, about 1½' long and 1' thick, 3-keeled; style short, blunt, nearly facial.

In still water, Quebec to Pennsylvania, west to Minnesota and Wyoming. Also in Europe. July-Aug.
23. Potamogeton Friesi Ruprecht. Fries’ Pondweed. (Fig. 164.)

*Potamogeton pusillus* var. major Fries, Novit. Ed. 2, 18. 1828.


Stems compressed, 2°-4° long; branching. Leaves 1½'-2½' long, about 1” wide, acute, obtuse or cuspidate at the apex, mostly 3-nerved, rarely 7-nerved, 2-glandular at the base, the glands small; stipules white, hyaline, finely nerved, obtuse or acute, 6”–12” long; peduncles 1½–1½” long, often thicker than the stem and sometimes thickening upward; spikes, when developed, interrupted; fruit quite similar to that of *P. pusillus*, but with a recurved style, usually with a shallow pit on the sides, and with the apex of the embryo pointing toward the basal end.


24. Potamogeton rutilus Wolfg. Slender Pondweed. (Fig. 165.)


Stems very slender, 8’–24’ long, compressed, simple or nearly so. Leaves 1½–1½’ long, ½’–½’ wide, acute or acuminate, strict, nearly erect, 3–5-nerved, revolute, the nerves prominent beneath, often 2-glandular at base and bright green; stipules acute, 6”–10” long, often longer than the internodes and hiding the bases of the leaves above, persistent, becoming white and fibrous with age; peduncles 6”–18” long; spikes 3”–5” long, usually dense, but sometimes interrupted; fruit obliquely obvoid, about 1½” long and ½” thick, obscurely keeled or the back showing only 2 small grooves; apex of the drupelet tapering into a short facial nearly straight recurved style; embryo circle not complete, the apex pointing a little inside of the base.

Anticosti and James Bay to Michigan and Minnesota. Also in Europe. Propagating buds usually wanting.

25. Potamogeton Vaseyi Robbins. Vasey’s Pondweed. (Fig. 166.)


Stems filiform, widely branching below, and with many short lateral branches above, 1½–1½” long, the emersed fertile forms in shallow water, and the more common sterile submerged forms in water from 6°–8° in depth. Floating leaves on the fertile stems only, coriaceous, in 1–4 opposite pairs, oval oblong or obovate, 4”–5” long, 2½” wide, with 5–9 nerves deeply impressed beneath, tapering at the base into petioles 3½”–4½” long; submerged leaves capitally, 1½–1½’ long; stipules white, delicate, many-nerved, acute or obtuse, 2½–3½” long; peduncles 3½–6½” long, thickening in fruit; spikes 2½–3½” long, 2–6-fruited; fruit roundish-obovoid, about 1½” long and nearly as thick, 3-keeled, the middle keel rounded, tipped with a straight or recurved style.

Eastern Massachusetts to southern Ontario and Ohio. The plant is furnished with propagative buds. July–Aug.
26. Potamogeton lateralis Morong. Opposite-leaved Pondweed. (Fig. 167.)


Stems filiform, much branched. Floating leaves on sterile shoots only, coriaceous, elliptic, obtuse, 4”-5” long, 1”-2” wide, 5-7-nerved, the nerves deeply impressed beneath, usually in 1-3 opposite pairs which stand at right angles to the stem, on petioles 3”-10” long; submerged leaves linear, acute, 1’-3’ long, 4”-5” wide, 1-3-nerved, 2-glandular at the base, but the glands small and often obsolete; stipules small, hyaline, many-nerved, obtuse, deciduous; peduncles and floating leaves lateral, with a peculiar appearance, widely spreading at maturity, sometimes recurved, thickening in fruit, 4’-15’ long; spikes capitate or often interrupted, 3-4-flowered; fruit obliquely obovoid, about 1” long, lenticular, the back much curved and 2-grooved, the face arched and surmounted by the nearly sessile stigma; curve of the embryo oval, its apex nearly touching its base.

In lakes and slow streams, eastern Massachusetts to Michigan. Proliferous shoots at the summit of the stem and on the upper branches appear late in the season, as the plants are beginning to decay. July–Aug.

27. Potamogeton pusillus L. Small Pondweed. (Fig. 168.)


Stems filiform, branching, 6’-2’ long. Leaves all submerged, linear, obtuse and mucronate or acute at the apex, 2-glandular at the base, 1’-3’ long, about ½” wide, 1-3-nerved, the lateral nerves often obscure; stipules short, hyaline, obtuse; peduncles usually 3”-9”’, or rarely 3’ long; spikes 3-10-flowered; fruit obliquely obovoid, about 1” long, lenticular, the back much curved and 2-grooved on the back or sometimes with 3 distinct keels, the face slightly arched, beaked by a straight or recurved style; apex of the embryo slightly incurved and pointing obliquely downward. Propagative buds occur in greater or less abundance.

In ponds and slow streams, New Brunswick to British Columbia; south to Virginia, Texas and California. Also in Europe. July–Aug.


Uppermost leaves subcoriaceous, spatulate, opposite, divaricate, 3-5-nerved, 4’-5’ long, tapering into a broad petiole as long as the blade. Ottawa, Ontario. Also in Europe.


Stem 3’-5’ long, divaricately branching from the base and very leafy throughout; leaves very obtuse, 3-nerved. Plant not known to flower, but abundantly provided with propagating buds which are thickened, hardened and closely invested by imbricated leaves. Eastern Massachusetts.


A rare form with delicate bright green pellucid leaves, 1’-3’ long, obtuse or often apiculate at the apex, less than 1’ wide, sometimes 5-nerved; fruit much smaller than that of the type, short-beaked. Eastern Massachusetts. Also in Europe.
28. *Potamogeton gemmiparus* (Robbins) Morong. Capillary Pondweed. (Fig. 169.)

*Potamogeton pusillus* var. (?) *gemmiparus* Robbins in A. Gray, Man. Ed. 5: 489. 1867.


Stems filiform, terete, branching; 5'-4" long. Leaves capillary, sometimes not as wide as the stem, often with no perceptible midrib, tapering to the finest point; 1'-3' long, 2-glandular at the base; stipules ½'-1' long, acute or obtuse, mostly deciduous; spikes interrupted, 3-6-flowered; peduncles filiform or sometimes slightly thickened, ½'-2' long; fruit seldom formed, similar to that of *P. pusillus*, except that it is flat and somewhat impressed on the sides.

In ponds, eastern Massachusetts and Rhode Island. It is commonly propagated by its abundant buds, the leaves and stems are often alike in thickness so that the plant seems to consist of threads. Aug.–Sept.


Rafinesque’s Pondweed. (Fig. 170.)


Stems flattened or sometimes terete, much branched. Floating leaves coriaceous, the largest 1' long by ½' wide, oval or elliptic and obtuse, or lanceolate-oblong and acute; petioles generally shorter, but sometimes longer than the blades, filiform or dilated; submerged leaves setaceous, seldom over ½" wide, 1'-3" long; stipules obtuse or truncate, 3'-5' long, those of the floating leaves free, those of the submerged leaves sometimes adnate; emersed peduncles 3'-7" long; submersed peduncles 2'-3" long, clavate, as long as the spikes; emersed spikes 3'-5" long, occasionally interrupted; fruit cochleate, rarely over ½" long, 3-keeled, the middle keel narrowly winged and usually with 7 or 8 knob-like teeth on the margin, the lateral keels sharp or rounded; embryo coiled 1½ times.

In still water, Maine to Florida, west to Nebraska and Texas. June–Sept.


Differs from the type in the numerous teeth of the fruit, as many as 12 being sometimes found on the middle keel, and each lateral keel with 6-8 more, the teeth often bristle-like and sometimes 2-pronged. Connecticut to eastern Pennsylvania and Delaware.


Plant about 6' long, without floating leaves, the submerged leaves as fine as floss silk and entirely nerveless. Lake Marcia, New Jersey.
30. Potamogeton Spirillus Tuckern.  

Stems compressed, branched, 6'-20' long, the branches often short and recurved. Floating leaves oval or elliptic, obtuse, the largest about 1' long and ½' wide, with 5-13 nerves deeply impressed beneath, their petioles often 1' long; submerged leaves linear, 1½'-2' long, about ½' wide, mostly 5-nerved; stipules of the upper floating leaves free; those of the submerged leaves adnate to the blade or petiole; spikes above water 3'-5" long, continuous, the lower mostly sessile, capitate and 1-10-fruited; fruit cochlœate, roundish, less than 1" long, flat and deeply impressed on the sides, 3-keeled on the back, the middle keel winged and sometimes 4-5-toothed; style deciduous; embryo spiral, about 1½ turns.

In ponds and ditches, Nova Scotia and Ontario to Minnesota, south to Virginia, Missouri and Nebraska. June-Aug.

![Spiral Pondweed](image)

31. Potamogeton filiformis Pers. Filiform Pondweed. (Fig. 172.)  

Stems from a running rootstock, slender, 3°-20° long, filiform above, stout and thick towards the base. Leaves numerous, 2'-12' long, ½"'-½" wide, 1-nerved with a few cross veins; sheaths about 1" long and the free part of the stipule ½" long, scarious on the edges; flowers on long, often recurved peduncles, 2-12 in each whorl, the whorls ½"-1" apart; fruit 1½"-1½" long, slightly less than 1" wide, the sides even, the back not keeled, the face nearly straight or obtusely angled near the top; stigma nearly or quite sessile, remaining on the fruit as a broad truncate projection.

In ponds and lakes, Anticosti to western New York and Michigan. August.

![Filiform Pondweed](image)

32. Potamogeton pectinatus L. Fennel-leaved Pondweed. (Fig. 173.)  

Stems slender, much branched, 1°-3° long, the branches repeatedly forking. Leaves setaceous, attenuate to the apex, 1-nerved, 1½'-6' long, often capillary and nerveless; stipules half free, ½"'-1' long, their sheaths scarious on the margins; peduncles filiform, 2'-12' long, the flowers in verticils; fruit obliquely obovoid, with a hard thick shell, 1½'-2' long, 1½'-1½" wide, without a middle keel, but with obscure lateral ridges on the back, plump on the sides and curved or occasionally a little angled on the face; style straight or recurved, facial; embryo apex pointing almost directly toward the basal end.

In fresh, brackish or salt water lakes, Prairie region of Canada.

![Fennel-leaved Pondweed](image)
33. Potamogeton interruptus Kitaibel. Interrupted Pondweed. (Fig. 174.)


Stems arising from a running rootstock which often springs from a small tuber, 2°-4° long, branched, the branches spreading like a fan. Leaves linear, obtuse or acute, 3'-5' long, 1'-1½' wide, 3-5-nerved with many transverse veins; narrow, 1-nerved leaves occur on some plants and these are acuminate, much like those of P. pectinatus; stipules partially adnate to the leaf-blade, the adnate part ½'-1' long, sometimes with narrowly scarious margins, the free part shorter and scarious, obtuse; peduncles 1'-2' long; spikes slightly interrupted; fruit broadly and obliquely obovoid, obtuse at the base, the largest 2'' long and nearly as broad, prominently keeled and with rounded lateral ridges on the back, the face nearly or quite straight; style facial, erect.

In ponds and streams, Prince Edward Island to northern Indiana and Michigan. Also in Europe. August.

34. Potamogeton Robbinsii Oakes. Robbins' Pondweed. (Fig. 175.)

Potamogeton Robbinsii Oakes, Hovey's Mag. 7:186. 1841.

Stems stout, widely branching, 2°-4° long, from running rootstocks sometimes 1° long. Leaves linear, 3'-5' long, 2'-3'' wide, acute, finely many-nerved, crowded in 2 ranks, minutely scurrate, auriculate at the point of attachment with the stipule; stipules with the adnate portion and sheathing base of the leaf about ½' long, the free part ½'-1' long, acute, persistent, white, membranous, mostly lacerate; peduncles 1'-3' long, the inflorescence frequently much branched and bearing from 5-20 peduncles; spikes interrupted, ½'-1' long, flowering under water; fruit obovoid, about 2'' broad and 1½'' wide, 3-keeled on the back, the middle keel sharp, the lateral ones rounded, the face arched, the sides with a shallow depression which runs into the face below the arch; style subapical, thick, slightly recurved; apex of the embryo pointing a little inside the basal end.

In ponds and lakes, New Brunswick to Oregon, south to New Jersey, Pennsylvania and Michigan. The plant is freely propagated by fragments of the stems which throw out rootlets from each joint, but this is the rarest of our species to form fruit. Aug.-Sept.


Slender, widely branched aquatic with capillary stems, slender alternate 1-nerved leaves tapering to an acuminate apex, and with membranous sheaths. Flowers on a capillary, spadix-like peduncle, naked, consisting of 2 sessile anthers, each with 2 large separate sacs attached by their backs to the peduncle, having between them several pistillate flowers in 2 sets on opposite sides of the rachis, the whole cluster at first enclosed in the sheathing base of the leaf. Stigmas sessile, peltate. Fruit a small, obliquely pointed drupe, several in each cluster and pedicelled; embryo oval, the cotyledonary end inflexed, and both that and the hypocotyl immersed. [Name in honor of Heinrich Bernhard Rupp, a German botanist.]

In the development of the plants the stamine flowers drop off and the peduncle elongates, bearing the pistillate flowers in 2 clusters at the end, but after fertilization it coils up and the fruit is drawn below the surface of the water.
Three or four species, occurring in salt and brackish waters all over the world. The following are the only ones known to occur in North America:

Sheaths 4'-4.5' long; drupes about 1' long.
Sheaths 3'-3.5' long; drupes 1.5'-2' long.

1. Ruppia maritima
2. R. occidentalis

1. Ruppia maritima L. Maritime Ruppia. (Fig. 176.)


Stems often whitish, 2°-3° long, the internodes irregular, naked, 1'-3' long. Leaves 1'-3' long, 1/4'-1'/2' or less wide; sheaths 3'-4' long, with a short free tip; peduncles in fruit sometimes 1° long; pedicels 4-6 in a cluster, 1/2'-1'/2' long; drupes with a dark hard shell, ovoid, about 1' long, often oblique or gibbous at the base, pointed with the long style, but varying much in shape; forms with very short peduncles and pedicels, and with broad, strongly marked sheaths occur.

Common in brackish or salt water along the Atlantic and Pacific Coasts of North America and in saline districts in the interior. Widely distributed in the Old World and in South America. July-Aug.

2. Ruppia occidentalis S. Wats.
Western Ruppia. (Fig. 177.)


Stems stouter, 1°-2° long, the branching fan-like. Leaves 3'-5' long, their large sheaths 1/2'-1'/2' long; branches and leaves often thickly clustered at the nodes, the sheaths overlapping each other; drupes larger, 1'/2'-2' long, ovoid or pyriform, borne on pedicels about 1' long, the pedicels bright red when fresh and sometimes nearly 2° in length.

In saline ponds, Nebraska to British Columbia. Summer.

3. ZANNICHÉLLIA L. Sp. Pl. 969. 1753.

Stems, flowers and leaf-buds all at first enclosed in a hyaline envelope, corresponding to the stipule in Potamogeton. Staminate and pistillate flowers in the same axil; the stamineate solitary, consisting of a single 2-celled anther, borne on a short pedicel-like filament; the pistillate 2-5. Ovary flask-shaped, tapering into a short style; stigma broad, hyaline, somewhat cup-shaped, its margins angled or dentate. Fruit a flattish falcate nutlet, ribbed or sometimes toothed on the back. Embryo bent and coiled at the cotyledonary end. [In honor of J. H. Zannichelli, 1662-1729, Italian physician and botanist.]

Two or three species of very wide geographic distribution in fresh-water ponds and streams.
NAIADACEAE.

1. Zannichellia palustris L. Zannichellia. (Fig. 178.)

Zannichellia palustris L. Sp. Pl. 969. 1753.

Stems capillary, sparsely branched, the rhizome creeping, the roots fibrous. Leaves 1'-3' long, half or less wide, acute, thin, nerved with a few delicate cross-veins; spathe-like envelope separate from the leaves at maturity; fruits 2-6 in a cluster, 1'-2' long, sometimes sessile, sometimes pedicelled, sometimes the whole cluster peduncled; style persistent, straight or curved, ½'-1' long; plant flowering and ripening its fruit under water.

In fresh or brackish ponds, pools or ditches, nearly throughout North America, except the extreme north, and widely distributed in the Old World. July-Sept.


Slender, branching aquatics, wholly submerged, with fibrous roots. Leaves opposite, alternate or verticillate, sheathing at the base. Flowers monoecious or dioecious, axillary, solitary, sessile or pedicelled. Sterile flower with a double perianth, the exterior one entire or 4-horned at the apex, the interior one hyaline, adhering to the anther; stamen sessile or stalked, 1-4-celled, apiculate or 2-lobed at the summit. Fertile flowers of a single ovary which tapers into a short style; stigmas 2-4, subulate. Mature carpel solitary, sessile, ellipsoid, its pericarp crustaceous. Seed conformed to the pericarp and embryo to the seed, the raphe distinctly marked. [Greek, a water-nymph.]

About 10 species, occurring in fresh water all over the world. The following are the only ones known in North America:

Sheaths broadly rounded, their margins entire or with a few large teeth. 1. N. marina.

Sheaths narrowly and obliquely rounded, each margin with 5-10 minute teeth; leaves linear.

Seeds shining, with 30-50 rows of faint reticulations.

Nódibus, with 16-20 rows of strongly marked reticulations.

Sheaths auriculate; leaves delicately filiform.

1. Naias marina L. Large Naias.

(Fig. 179.)


Náias marina All. Fl. Ped. 2: 221. 1785.

Dioecious, stem stout, compressed, commonly armed with teeth twice as long as their breadth. Leaves opposite or verticillate, 6'-12' long, about 1' wide, with 6-10 spine-pointed teeth on each margin and frequently several along the back; sheaths with rounded lateral edges; fruit large, 2'-2½' long, the pericarp as well as the seed rugosely reticulated, tipped with a long persistent style and 3 thread-like stigmas; seed not shining.

In lakes, Central New York to Florida, west to California. Summer. Also in Europe.


Internodes 1'-2' long, with a few teeth on the upper part; leaves scarcely ½" wide, with 15-24 large teeth on the margins and a few on the back; sheaths with 2 or 3 teeth on each margin; seed sculptured with about 25 rows of nearly square or irregularly oblong reticulations. Central New York and Florida.

Náias marina recurvata Dudley, Cayuga Pl. 104. 1886.

Branches and leaves recurved; leaves 3'-6' long, narrow, with 2-4 large teeth on each margin and none on the back; internodes short, naked, or with 1 or 2 teeth; sheaths 3-toothed on each side. Cayuga Marshes, N. Y.
2. **Naias fléxilis** (Willd.) Rost. & Schmidt. Slender Naias. (Fig. 180.)

*Naias fléxilis* Rost. & Schmidt, Fl. Sed. 384. 1821.

Stem slender, forking. Leaves linear, pellucid, acuminate or abruptly acute, \( \frac{2}{5} - 1' \) long, \( \frac{3}{4}'' - 1' \) wide, numerous and crowded on the upper parts of the branches, with 25–30 minute teeth on each edge; sheaths obliquely rounded with 5–10 teeth on each margin; fruit ellipsoid with very thin pericarp, \( 1'' - 2'' \) long, \( \frac{3}{4}'' - \frac{1}{2}'' \) in diameter; style long, persistent; stigmas short; seed smooth, shining, straw-colored, sculptured, though sometimes quite faintly, with 30–40 rows of nearly square or hexagonal reticulations which are scarcely seen through the dark pericarp.

In ponds and streams throughout nearly all North America. Also in Europe. Summer.


Stem stout, few-leaved, \( 3'' - 6'' \) long; internodes long. Massachusetts to Michigan and Texas.

3. **Naias Guadalupèn$\acute{e}$sis** (Spreng.) Morong. Guadalupe Naias. (Fig. 181.)

*Caulinia Guadalupèn$\acute{e}$sis* Spreng. Syst. 1: 20. 1825.

Stem nearly capillary, \( 1'' - 2'' \) long, widely branched from the base. Leaves numerous, \( 6'' - 9'' \) long, \( \frac{4}{5}'' - \frac{3}{4}'' \) wide, acute, opposite or in fascicles of 2–5, frequently recurved, with sheaths and teeth like those of *N. fléxilis* but generally with 40–50 teeth on each margin of the leaf; fruit about \( 1'' \) long; pericarp dark and strongly marked by 16–20 rows of hexagonal or rectangular reticulations which are transversely oblong; seed straw-colored, not shining.

In ponds and lakes, Nebraska to Oregon and Texas eastern to Florida. Also in tropical America. July–Sept.

4. **Naias gracillima** (A. Br.) Morong. Thread-like Naias. (Fig. 182.)

*Naias Indica* var. *gracillima* A. Br.; Engelm. in A. Gray, Man. Ed. 5, 681. 1867.

Dioecious, stem capillary, \( 6'' - 15'' \) long, much branched, the branches alternate. Leaves numerous, opposite or often fascicled in 3's–5's or more, setaceous, \( \frac{1}{2}'' - 2' \) long, usually with about 20 minute teeth on each margin; sheaths auricled, with 6 or 7 teeth on each auricle, the teeth standing upon setaceous divisions of the sheath; stigmas very short; fruit oblong-cylindric, \( \frac{2}{5}'' \) long, \( \frac{3}{4}'' \) in diameter, slightly curved inwardly or straight, the pericarp straw-colored or purplish, marked by about 25 rows of irregularly oblong reticulations; seed not shining.

In pools and ponds, eastern Massachusetts to Delaware, Pennsylvania and Missouri. July–Sept.

Marine plants with slender rootstocks and branching compressed stems. Leaves 2-ranked, sheathing at the base, the sheaths with inflexed margins. Spadix linear, contained in a spathe. Flowers monoecious, arranged alternately in 2 rows on the spadix. Staminate flower merely an anther attached to the spadix near its apex, 1-celled, opening irregularly on the ventral side; pollen thread-like. Pistillate flower fixed on its back near the middle; ovary 1; style elongated; stigmas 2, capillary; mature carpels flask-shaped, membranous, rupturing irregularly, beaked by the persistent style; seeds ribbed; embryo ellipsoid. [Greek, referring to the ribbon-like leaves.]

About 6 species of marine distribution. Besides the following one occurs in Florida and one on the Pacific Coast.

1. Zostera marina L. Eel-grass. Grass-wrack. (Fig. 183.)


Leaves ribbon-like, obtuse at the apex, 1°-6° long, 1'\textprime -2' wide, with 3-7 principal nerves. Spadix 1'-2'\textprime long; flowers about 3' long, crowded, usually from 10-20 of each kind on the spadix; ovary somewhat vermiform; at anthesis the stigmas are thrust through the opening of the spathe and drop off before the anthers of the same spadix open; the anthers at anthesis work themselves out of the spathe and discharge the glutinous stringy pollen into the water; seeds cylindric, strongly about 20-ribbed, about 1\textfrac{1}{2}° long and \textfrac{3}{4}'' in diameter, truncate at both ends, the ribs showing very clearly on the pericarp.

In bays, streams and ditches along the Atlantic Coast from Greenland to Florida and on the Pacific from Alaska to California. Also on the coasts of Europe and Asia. Summer.

Family 4. SCHEUCHZERIÀCEAE Agardh, Theor. Syst. Pl. 44. 1858.*

ARROW-GRASS FAMILY.

Marsh herbs with rush-like leaves and small spicate or racemose perfect flowers. Perianth 4-6-parted, its segments in two series, persistent or deciduous. Stamens 3-6. Filaments very short or elongated. Anthers mostly 2-celled and extrorse. Carpels 3-6, 1-2-ovuled, more or less united until maturity, dehiscent or indehiscent. Seeds anatropous. Embryo straight.

Four genera and about 10 species of wide geographic distribution. Leaves all basal; flowers numerous on naked spikes, spicate or racemose. Stem leafy; flowers few in a loose raceme.

1. Triglochin.
2. Scheuchzeria.


Marsh herbs with basal half-rounded ligulate leaves with membranous sheaths. Flowers in terminal spikes or racemes on long naked spikes. Perianth-segments 3-6, concave, the 3 inner ones inserted higher up than the outer. Stamens 3-6; anthers 2-celled, sessile or nearly so, inserted at the base of the perianth-segments and attached by their backs. Ovaries 3-6, 1-celled, sometimes abortive; ovules solitary, basal, erect, anatropous. Style short or none. Stigmas as many as the ovaries, plumose. Fruit of 3-6 cylindrical oblong or obovoid carpels, which are distinct or connate, coriaceous, costate, when ripe separating from the base upward from a persistent central axis, their tips straight or recurved, dehiscing by a ventral suture. Seeds erect, cylindrical or ovoid-oblong, compressed or angular. [Greek, in allusion to the three-pointed fruit of some species.]

About 9 species, natives of the temperate and subarctic zones of both hemispheres. Only the following are known to occur in North America:

Carpels 3.

1. Fruit linear or clavate, tapering to a subulate base. Fruit nearly globose.
2. Fruit nearly globose.
Carpels 6: fruit oblong or ovoid, obtuse at the base.
3. T. maritima.

*Text contributed by the late REV. THOMAS MORONG.
1. Triglochin palústris L. Marsh Arrow-grass. (Fig. 184.)


Rootstock short, oblique, with slender fugacious stolons. Leaves linear, shorter than the scapes, 5'-12' long, tapering to a sharp point; ligule very short; scapes 1 or 2, slender, striate, 8'-20' high; racemes 5'-12' long; pedicels capillary, in fruit erect-appressed and 2 1/2'-3 1/2' long; perianth-segments 6, greenish-yellow; anthers 6, sessile; pistil of 3 united carpels, 3-celled, 3-ovuled; stigmas sessile; fruit 3'-3 1/2' long, linear or clavate; ripe carpels separating from the axis and hanging suspended from its apex, the axis 3-winged.

In bogs, New Brunswick to Alaska, south to New York, Indiana and Montana. Also in Europe and Asia. July-Sept.

2. Triglochin striàta R. & P. Three-ribbed Arrow-grass. (Fig. 185.)


Rootstocks upright or oblique. Scapes 1 or 2, more or less angular, usually not over 10' high; leaves slender, slightly fleshy, nearly or quite as long as the scapes, 1/4'-1' wide; flowers very small, light yellow or greenish, in spicate racemes; pedicels 1/2'-1' long, not elongating in fruit; perianth-segments 3, stamens 3; anthers oval, large; pistil of 3 united carpels; fruit sub-globose or somewhat obovoid, about 1' in diameter, appearing 3-winged when dry by the contracting of the carpels; carpels coriaceous, rounded and 3-ribbed on the back; axis broadly 3-winged.

In saline marshes, Maryland to Florida and Louisiana. Also in tropical America. June-Sept.

3. Triglochin maritíma L. Seaside Arrow-grass. (Fig. 186.)

Triglochin maritíma L. Sp. Pl. 139. 1753.

Rootstock without stolons, often subligneus, the caudex thick, mostly covered with the sheaths of old leaves. Scape stout, nearly terete, 6'-8° high; leaves half-cylindric, usually about 1' wide; raceme elongated, often 16' or more long; pedicels deciduous, 1 1/2'-1 1/2' long, slightly longer in fruit; perianth segments 6, each subtending a large sessile anther; pistil of 6 united carpels; fruit oblong or ovoid, 2 1/2'-3' long, 1 1/2'-2' thick, obtuse at the base, with 6 recurved points at the summit; carpels 3-angled, flat or slightly grooved on the back, or the dorsal edges curving upward and winged, separating at maturity from the hexagonal axis.

In salt marshes, along the Atlantic seaboard from Labrador to New Jersey, and in fresh or saline marshes across the continent to Alaska and California. Also in Europe and Asia. July-Sept.

Rush-like bog perennials with creeping rootstocks, and erect leafy stems, the leaves elongated, half-rounded below and flat above, striate, furnished with a pore at the apex and a membranous ligulate sheath at the base. Flowers small, racemose. Perianth 6-parted, regularly 2-serial, persistent. Stamens 6, inserted at the base of the perianth-segments; filaments elongated; anthers linear, basifixed, extrorse. Ovaries 3 or rarely 4-6, distinct or connate at the base, 1-celled, each cell with 1 or 2 collateral ovules. Stigmas sessile, papillose or slightly fimbriate. Carpels divergent, inflated, coriaceous, 1-2-seeded, follicle-like, laterally dehiscent. Seeds straight or slightly curved, without endosperm. [Name in honor of Johann Jacob Scheuchzer, 1672-1733, Swiss scientist.]

A monotypic genus of the north temperate zone.

1. Scheuchzeria palustris L.
Scheuchzeria. (Fig. 187.)


Leaves 4'-16' long, the uppermost reduced to bracts; stems solitary or several, usually clothed at the base with the remains of old leaves, 4'-10' tall; sheaths of the basal leaves often 4' long with a ligule ½' long; pedicels 3'-10' long, spreading in fruit; flowers white, few, in a lax raceme; perianth-segments membranous, 1-nerved, 1½'-2' long, the inner ones the narrower; follicles 2'-4' long, slightly if at all united at the base; seeds oval, brown, 2½'-3' long with a very hard coat.

In bogs. Labrador to Hudson Bay and British Columbia, south to New Jersey, Pennsylvania, Wisconsin and California. Also in Europe and Asia. Summer.

Family 5. ALISMÁCEAE DC. Fl. Frang. 3: 181. 1805.
WATER-PLANTAIN FAMILY.

Aquatic or marsh herbs, mostly glabrous, with fibrous roots, scapose stems and basal long-petioled sheathing leaves. Inflorescence racemose or paniculate. Flowers regular, perfect, monoecious or dioecious, pedicelled, the pedicels verticillate and subtended by bracts. Receptacle flat or convex. Sepals 3, persistent. Petals 3, larger, deciduous, imbricated in the bud. Stamens 6 or more; anthers 2-celled, extrorse or dehiscing by lateral slits. Ovaries numerous or rarely few, 1-celled, usually with a single ovule in each cell. Carpels becoming achenes in fruit in our species. Seeds unicinate-curved. Embryo horse-shoe shaped. Endosperm none. Latex-tubes are found in all the species, according to Micheli.

About 13 genera and 65 species, of wide distribution in fresh water swamps and streams.

Carpels in a ring upon a small, flat receptacle.
Carpels crowded in many series upon a large convex receptacle.

Flowers perfect, stamine or polygamous.

1. Alisma.

Pedicels not recurved; calyx spreading.
Pedicels recurved in fruit; calyx appressed to the carpels.

2. Echinodorus.
3. Lophocarpus.
4. Sagittaria.

Flowers monoecious or dioecious.


Perennial or rarely annual herbs with erect or floating leaves, the blades several-ribbed, the ribs connected by transverse veinlets, or seemingly pinnately veined. Scapes short or elongated. Inflorescence paniculate or umbellate-paniculate. Flowers small, numerous on unequal 3-bracteolate pedicels, the petals white or rose-tinted. Stamens 6 or 9, subperigynous. Ovaries few or many, borne in one or several whorls on a small flat receptacle, ripening into flattened achenes which are 2-3-ribbed on the curved back and 1-2-ribbed on the sides. [Greek, said to be in reference to the occurrence of the typical species in saline situations.]

About 10 species, widely distributed in temperate and tropical regions. Only the following are known to occur in North America.

Stamens 6, strongly compressed; flowers panicked.
Stamens 9, turgid; flowers umbel- 

1. A. Plantago-aquatica.
2. A. tenellum.
1. Alisma Plantâgo-aquática L. Water Plantain. (Fig. 188.)


Leaves ovate, acute at the apex, cordate, rounded or narrowed at the base, the blades 3-10-ribbed, or when floating sometimes lanceolate or even linear; petioles 1'-10' long; scapes occasionally 2 from the same root, usually solitary, ½°-3° high; inflorescence a large loose panicle, 6'-15' long; pedicels verticillate in 3's-10's, subtended by 3 staminate acuminiate bracts; petals ½"-1" long; styles deciduous, the base remaining as a small point or short beak on the inner curve of the achene; stigma small, terminal; achene obliquely obovate, nearly 1" long, arranged in a circle, forming an obtusely triangular truncate head.

In shallow water or mud throughout North America. Also in Europe and Asia. June-Sept.

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2. Alisma tenéllum Mart. Dwarf Water Plantain. (Fig. 189.)

*Alisma tenellum* Mart.; R. & S. Syst. 7: 1667. 1830.


Plant delicate, stoloniferous, 1'-5' high. Leaves lanceolate or linear-lanceolate, the blades acute at both ends, 4'-15'' long, 1'-3' wide; petioles longer or shorter than the blades, narrowly dilated at the base; scapes solitary, often surpassing the leaves, commonly reclined; umbel 2-8-flowered; pedicels very unequal, often recurved in fruit; bracts lanceolate, more or less connate at the base; flowers white; stamens 9; style much shorter than the ovary; ovaries numerous; achene in several whorls, coriaceous, turgid, obovate, not ½" long, enclosed by the erect persistent sepals, the beak short, sharp.

In mud, Massachusetts to western Ontario and Minnesota, south to Florida, Missouri and Texas. April-Aug.

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2. ECHINÓDORUS Rich.; Engelm. in A. Gray, Man. 460. 1848.

Perennial or annual herbs with long-petioled, elliptic, ovate or lanceolate often cordate or sagittate leaves, 3-9-ribbed and mostly punctate with dots or lines. Scapes often longer than the leaves; inflorescence racemose or paniculate, the flowers verticillate, each verticil with 3 outer bracts and numerous inner bracteoles; flowers perfect; sepals 3, distinct, persistent; petals white, deciduous; receptacle large, convex or globose; stamens 12-30; ovaries numerous; style obliquely apical, persistent; stigma simple; fruit achene, more or less compressed, coriaceous, ribbed and beaked, forming spinose heads. [Greek, in allusion to the spinose heads of fruit.]

About 14 species, mostly natives of America. Only the following are known in North America. Scapes reclining or prostrate; style shorter than the ovary; beak of achene short. 1. *E. radicans,* Scapes erect; style longer than the ovary; beak of achene long.

2. *E. cordifolius.*
1. **Echinodorus radicans** (Nutt.) Engelm. Creeping Bur-head. (Fig. 190.)


Leaves coarse, ovate, obtuse, cordate, 2'-8' long, 1 1/2'-7 1/2' wide, marked with short pellucid lines, the nerves 5-9, connected by netted cross-veins. Petioles sometimes 20' long; scapes creeping, 2'-3' long, slightly scabrous, often rooting at the nodes; verticils distant; bracts linear-lanceolate, acuminate, dilated at the base; pedicels 3-12, unequal, 1'-2 1/2' long, slender or filiform; sepals persistent, much shorter than the heads; petals larger, obovate, about 3'' long; stamens about 20; style shorter than the ovary; achenes numerous, about 2'' long, 6-10-ribbed, with 2-8 several oval glands on each side and beaks about one-fourth their length; fruiting heads 4'' in diameter.


2. **Echinodorus cordifolius** (L.) Griseb. Upright Bur-head. (Fig. 191.)

*Alisma cordifolia* L. Sp. Pl. 343. 1753.

*Echinodorus rostratus* Engelm. in A. Gray, Man. Ed. 2, 538. 1856.


Leaves variable in form, often broadly ovate, obtuse, cordate at the base, 6'-8' long and wide, but in smaller plants sometimes nearly lanceolate, acute at each end and but 1'-2' long; petioles angular, striate, 1'-10' high; scapes 1 or more, erect, 5'-16' tall; flowers 3-6 in the verticils; pedicels 1/4'-1/2' long, erect after flowering; bracts linear-lanceolate, acuminate, dilated at the base; sepals shorter than the heads; petals 2'-3' long; stamens often 12; styles longer than the ovary; fruiting heads very bur-like, 2'-3' in diameter; achenes about 1 1/2'' long, narrowly obovate or falcate, 6-8-ribbed; beak apical, oblique, about one-half the length of the achene.

In swamps and ditches, Illinois to Florida, west to Missouri and Texas. Also in tropical America. June-July.


Perennial, bog or aquatic herbs with basal long-petioled sagittate or cordate leaves, simple erect scapes bearing flowers in several verticils of 2-3 at the summit, the lower perfect, the upper staminate. Sepals 3, distinct, persistent, erect after flowering and enclosing or enwrapping the fruit. Petals white, deciduous. Receptacle strongly convex. Stamens 9-15, hypogynous, inserted at the base of the receptacle. Filaments flat-tipped. Pistils numerous; ovule solitary, erect, anatropous; style elongated, oblique, persistent. Achenes winged or crested. Embryo horseshoe-shaped. [Greek, signifying crested fruit.]

About 3 species, the following of eastern North America, the others of tropical America.
1. *Lophocarpus calycinus* (Engelm.) J. G. Smith. *Lophocarpus.* (Fig. 192.)


Annual, leaves floating or ascending, entire, hastate or sagittate, the basal lobes spreading, ovate, acute or acuminate, the apex acute or obtuse, the blade varying from 1'-8' long, sometimes 12' wide at the base. Scape simple, weak and at length decumbent, mostly shorter than the leaves; verticils of flowers 1-5; bracts membranous, orbicular or ovate and obtuse, or those of staminate flowers lanceolate and acute; fertile pedicels very thick, recurved in fruit, equaling or longer than the slender sterile ones; petals 3'-4' long; stamens hypogynous; filaments flattened, papillose, about as long as the anthers; achene obovate, 1'-4' long, narrowly winged on the margins, tipped with a short horizontal triangular beak.

In swamps, New Brunswick to Virginia and Louisiana, across the continent to California, thus occurring nearly throughout the United States. Foliage wonderfully variable in form. July-Sept.


Perennial aquatic or bog herbs, mostly with tuber-bearing or nodose rootstocks, fibrous roots, basal long petioled nerveless leaves, the nerves connected by numerous veinlets, and erect, decumbent or floating scapes, or the leaves reduced to bladeless phyllodia (figs. 197, 203). Flowers monoecious or dioecious, borne near the summits of the scapes in verticils of 3's, pedicelled, the staminate usually uppermost. Verticils 3-bracted. Calyx of 3 persistent sepals, those of the pistillate flowers reflexed or spreading in our species. Petals 3, white, deciduous. Stamens usually numerous, inserted on the convex receptacle; anthers 2-celled, dehiscent by lateral slits; staminate flowers sometimes with imperfect ovaries. Pistillate flowers with numerous distinct ovaries, sometimes with imperfect stamens; ovule solitary; stigma small, persistent. Achenes numerous, densely aggregated in globose or subglobose heads, compressed. Seed erect, curved; embryo horseshoe-shaped. [Latin, referring to the arrow-shaped leaves of some species.]

About 25 species, natives of temperate and tropical regions. Besides the following, some 10 others occur in the southern and western parts of North America.

Fertile pedicels slender, ascending, not reflexed in fruit.

Leaf-blades sagittate.

Basal lobes one-fourth to one-half the length of the blade.

Beak of the achene more than one-fourth its length.

Beak of the achene erect.

Fruiting pedicels shorter than the bracts; leaves broad.

Fruiting pedicels longer than the bracts; leaves narrow.

Beak of the achene horizontal or oblique.

Beak of the achene less than one-fourth its length.

Petioles rather short, curving; bracts long; bog species.

Petioles elongated; bracts short; aquatic species.

Basal lobes two-thirds to three-fourths the length of the blade.

Leaves entire, or rarely hastate or cordate.

Filaments slender, tapering upward; leaves seemingly pinnately veined.

Filaments glabrous; bracts connate.

Filaments cobwebby-pubescent; bracts mostly distinct.

Filaments abruptly dilated, pubescent; veins distinct to the base of the blade.

Fruiting heads sessile or very nearly so.

Both staminate and pistillate flowers pedicelled.

Leaves reduced to terete nodose phyllodia, rarely blade-bearing.

Leaves rigid, blades elliptic-linear.

Leaves not rigid; blades lanceolate or linear-oblong.

Fertile pedicels stout, reflexed in fruit; filaments dilated.

Filaments pubescent; leaf-blades ovate or ovate-elliptic.

Filaments glabrous; leaves linear-lanceolate or reduced to phyllodia.

1. *S. longirostra.*
2. *S. Engelmannii.*
3. *S. latifolia.*
4. *S. arifolia.*
5. *S. cuneata.*
6. *S. longiloba.*
7. *S. ambiguia.*
8. *S. lancifolia.*
9. *S. rigida.*
10. *S. teres.*
11. *S. cristata.*
12. *S. granithea.*
1. Sagittaria longirostra (Micheli) J. G. Smith. Long-beaked Arrow-head. (Fig. 193.)

*Sagittaria sagittifolia* var. *longirostra* Micheli in DC. Monog. Phan. 3: 60. 1881.


Monoecious, glabrous, scape erect, rather stout, 1½'-3' tall. Leaves broad, sagittate, 4'-12' long, abruptly acute at the apex, the basal lobes ovate or ovate-lanceolate, acute, one-third to one-half the length of the blade; scape usually longer than the leaves, 6-angled below; bracts triangular-lanceolate, acuminate, 7''-15'' long, longer than the fertile pedicels; petals 8''-14'' long; filaments glabrous; styles curved, twice as long as the ovaries; achene obovate, about 2'' long, winged on both margins, the ventral margin entire or undulate, the dorsal eroded, its sides with a short crest, its beak stout, erect or somewhat recurved.


2. Sagittaria Engelmanniana J. G. Smith. Engelmann’s Arrow-head. (Fig. 194.)

*Sagittaria variabilis* var. (?) *gracilis* S. Wats. in A. Gray, Man. Ed. 5, 555. 1889. Not Engelm.


Monoecious, glabrous, scape erect or ascending, slender, 8'-20' high. Leaves narrow, 1½'-8' long, 1½'-4½' wide, acute or obtuse at the apex, the basal lobes narrowly linear, acuminate, one-third to one-half the length of the blade; scape striate, about as long as the leaves; bracts lanceolate, acute, shorter than the slender fertile pedicels, 4½'-6½' long; flowers 7½'-12½' broad; filaments glabrous; style about twice as long as the ovaries; achene obovate, 2½' long, winged on both margins and with 1-3 lateral wing-like crests on each face, the beak short, stout, erect, about ½' long.

In shallow water, Massachusetts to Delaware, near the coast, probably extending further south. Aug.-Sept.

3. Sagittaria latifolia Willd. Broad-leaved Arrow-head. (Fig. 195.)


*Sagittaria variabilis* Engelm. in A. Gray, Man. 461. 1848.

Monoecious or sometimes dioecious, glabrous or nearly so, scape stout or slender, 4½'-8½' tall, simple or branched. Leaves exceeding variable in form and size, sometimes linear-lanceolate and acuminate at the apex, sometimes wider than long and obtuse; basal lobes from ½ to 2½ as long as the blade; bracts acute, acuminate or obtuse, the upper ones sometimes united; flowers 1½'-1½½' wide; filaments slender, glabrous; achene 1½'-2½' long, broadly winged on both margins, its sides even or 1-ribbed, the beak about one-third its length, horizontal or nearly so.


*Sagittaria pubescens* Muhl. Cat. 86. 1813.

Whole plant pubescent, varying from merely puberulent to densely hirsute. Ontario to New Jersey, Florida and Alabama.
4. *Sagittaria arifolia* Nutt. Arum-leaved Arrow-head. (Fig. 196.)

*Sagittaria sagittataefolia* var. *minor* Pursh, Fl. Am. Sept. 395. 1814?


Glabrous or nearly so, terrestrial or partially submerged, scape weak, ascending, 8'–20' long. Leaves sagittate, broad, acute at the apex, about as long as the scape, their margins slightly curved, their basal lobes acute or acuminate, one-fourth to one-third the length of the blade; petioles usually curving outwardly; bracts lanceolate, acute, usually equalling or longer than the fertile pedicels, often reflexed; filaments glabrous; petals long! achene cuneate-obovate, about 1/4" long, winged on both margins, the sides smooth, the beak short, erect.

Quebec to Minnesota and British Columbia, south to Michigan, western Kansas, New Mexico and California. Resembling in foliage the European *S. sagittataefolia* L., but distinguished from that species by its achenes.

5. *Sagittaria cuneata* Sheldon. Floating Arrow-head. (Fig. 197.)


Aquatic, submerged, rooting in sand, scape very slender, simple, terete, 1°–2° long, bearing the flowers at the surface of the water. Leaves long-petioled, the blade floating, sagittate, linear-lanceolate, acuminate, 2'–4' long, the basal lobes acuminate, about one-fourth its length; phyllodia of two kinds, one petiole-like and as long as the leaves, the other lanceolate, and clustered at the base of the plant; bracts ovate-lanceolate, acute, 2'–3' long, much shorter than the slender fertile pedicels; flowers 6'–8' broad; achene only 1/4" long, obovate-cuneate, its beak very short, erect.

In shallow water, Minnesota to Washington and British Columbia. Aug.–Sept.

6. *Sagittaria longiloba* Engelm. Long-lobed Arrow-head. (Fig. 198.)


Monoecious, glabrous, scape slender, simple or rarely branched, 1°–2° tall. Leaves long-petioled, the apex acute, the basal lobes linear-lanceolate, acuminate, about three-fourths the length of the blade; bracts lanceolate, acuminate, 3'–4' long, much shorter than the very slender fertile pedicels which are longer than the sterile ones; stamens numerous, the filaments longer than the anthers; achene about 1/4" long, quadrate-ovobate, somewhat broader above than below, winged on both margins, its beak exceedingly short.

In shallow water, Nebraska to Colorado, south to Texas and Mexico.
7. *Sagittaria ambigu*a J. G. Smith. Kansas Sagittaria. (Fig. 199)


Monoecious, glabrous, scape erect or ascending, simple or sparingly branched, 10–20" high. Leaves lanceolate, entire, long-petioled, acute or acuminate at both ends, seemingly pinnately veined, really 5–7-nerved, 5'–8' long, equalling or shorter than the scape; bracts lanceolate, acuminate, 5'–8' long, much shorter than the slender fruiting pedicels, connate at the base, papillose; stamens 20–25; filaments glabrous, longer than the anthers; achene about 1" long, oblong, curved, narrowly winged on both margins, its sides smooth and even, its beak short, oblique.

In ponds, Kansas and the Indian Territory.

8. *Sagittaria lancifolia* L. Lance-leaved Sagittaria. (Fig. 200)

_Sagittaria lancifolia_ L. Amoen. Acad. 5: 409. 1760.

Monoecious, glabrous, scape rigid, erect, stout or rather slender, striate, branched or simple, longer than the leaves. Leaves lanceolate or oblong-lanceolate, acute or acuminate at both ends, firm, entire, the blades 5–9-nerved, 8'–1½' long, gradually narrowed into the long petioles, apparently pinnately veined; flowers numerous, 5"–12" broad; bracts ovate or ovate-lanceolate, usually not united at the base, glabrous or nearly so, equalling or shorter than the fruiting pedicels; stamens numerous; filaments cobwebby-pubescent, equaling or longer than the anthers; achene narrowly obovate-cuneate, 1½"–1½' long, winged on both margins, its sides smooth, its beak tapering, oblique.

In swamps and shallow water, Delaware, to Florida and Texas, near the coast. Widely distributed in tropical America.

9. *Sagittaria rigida* Pursh. Sessile-fruitting Arrow-head. (Fig. 201)


Monoecious, glabrous, scape simple, weak, curving, ascending or decumbent, shorter than the leaves. Leaves very variable, linear, lanceolate, elliptic or broadly ovate, acute or obtuse at the apex, entire or with 1 or 2 short or slender basal lobes; bracts obtuse, 2'–4' long, united at the base or sometimes distinct; heads of fruit sessile or very nearly so; pedicels of the sterile flowers ½'–1' long; filaments dilated, mostly longer than the anthers, pubescent; achene narrowly obovate, 1½"–2" long, winged on both margins, crested above, tipped with a stout nearly erect beak of about one-fourth its length.

In swamps and shallow water, Quebec to Minnesota, south to New Jersey, Tennessee, Missouri and Nebraska. Petioles rigid when growing in running water. July–Sept.
10. *Sagittaria têres* S. Wats.  Slender Sagittaria.  (Fig. 202.)

_Sagittaria têres_ S. Wats. in A. Gray, _Man. Ed. 6_, 555.  1890.

Monoecious, glabrous, scape slender, erect, simple, 6'-18' long, bearing only 1-3 verticils of flowers. Leaves usually reduced to elongated terete node phyllodia or some of them short and bract-like, one or two of the longer ones occasionally bearing a linear blade; bracts ovate, obtuse, about 1½' long, much shorter than the filament fruiting pedicels which are longer than the sterile ones; flowers 6'-8' broad; stamens about 12, their dilated filaments pubescent, shorter than the anthers; achene broadly obovate, 1' long, the ventral margin winged, the dorsal 7-11-crested, the sides bearing several crenate crests, the beak short, erect.

In ponds, Massachusetts to South Carolina.  Aug.–Sept.

11. *Sagittaria cristàta* Engelm.  Crested Sagittaria.  (Fig. 203.)


Monoecious, scape slender, erect, 1o–2½o high, simple, bearing 4 or 5 verticils of flowers at or above the surface of the water. Leaves long-petioled, spongy and rigid, reduced to slender phyllodia or bearing linear-lanceolate or elliptic blades 2’-4’ long and 3’-12’ wide; bracts acute, 2”-4” long, much shorter than the slender fertile pedicels; flowers 8”-10” broad; stamens about 24; filaments dilated, pubescent, at least at the middle, longer than the anthers; achene obliquely obovate, the dorsal margin with a broad crenate wing, the ventral straight-winged, each side bearing 2 crenate crests, the beak short, oblique.

In shallow water, Iowa and Minnesota.  Phyllodia are commonly developed from the nodes of the rootstock.  July–Aug.

12. *Sagittaria graminea* Michx.  Grass-leaved Sagittaria.  (Fig. 204.)


Monoecious or dioecious, glabrous, scape simple, erect, 4'-2° tall. Leaves long-petioled, the blades linear, lanceolate or elliptic, acute at both ends, 2'-6' long, ½''-3'' wide, 3-5-nerved, the nerves distinct to the base, some of them occasionally reduced to flattened phyllodia; bracts ovate, acute, 1½''-3'' long, much shorter than the slender or filament fruiting pedicels, connate to the middle or beyond; flowers 4’'-6’' broad; stamens about 18; filaments dilated, pubescent, longer than or equaling the anthers; achene obovate, ½’'-1’' long, slightly wing-crested on the margins and ribbed on the sides, the beak very short.

In mud or shallow water, Newfoundland to Ontario and South Dakota, south to Florida and Texas.  Early leaves often purplish.  July–Sept.
13. Sagittaria platyphylla (Engelm.) J. G. Smith. Ovate-leaved Sagittaria. (Fig. 205.)

*Sagittaria graminea* var. *platyphylla* Engelm. in A. Gray, Man. Ed. 5, 494. 1867.

Monoecious, glabrous, scape erect, simple, rather weak, mostly shorter than the leaves. Leaves rigid, the blades ovate, ovate-lanceolate or ovate-elliptic, short-acuminate or acute at the apex, rounded, gradually narrowed or rarely cordate or hastate at the base, seemingly pinnately veined, *2'-6'* long; bracts broadly ovate, acute, connate at the base, *2'-4'* long; flowers *8'-14'* broad; fertile pedicles stout, divergent in flower, reflexed in fruit, *1/2'-2 1/2'* long; filaments dilated, pubescent, rather longer than the anthers; achene obliquely obovate, winged on both margins, the dorsal margin somewhat crested, the sides with a sharp wing-like ridge.

In swamps and shallow water, southern Missouri to Mississippi and Texas. Phyllodia, when present, oblong or oblanceolate. July-Sept.

14. Sagittaria subulata (L.) Buchenau. Subulate Sagittaria. (Fig. 206.)

*Alisma subulata* L. Sp. Pl. 343. 1753.

Monoecious or rarely dioecious, scape very slender, *2'-6'* high, few-flowered, about equalling the leaves. Leaves all reduced to rigid phyllodia or sometimes bearing linear or linear-lanceolate blades, *1'-1 1/2'* long; bracts united to the apex or becoming partly separated; flowers *5'-8'* broad; fertile pedicles reflexed and much longer than the bracts in fruit; stamens about 8; filaments about equalling the anthers, dilated, glabrous; achenes rather less than *1'* long, obovate, narrowly winged, with 2 or 3 crests on each side, the wings and crests sometimes crenate; beak short.


*Sagittaria natans* var. (?) *gracillima* S. Wats, in A. Gray, Man. Ed. 6, 556. 1890.

Submerged; leaves *2'-5'* long, bladeless or bearing small 3-nerved lanceolate blades, *1'-2'* long, *3'-4'* wide; scape simple, terete or compressed, about as long as the leaves; flowers few, *8'-10'* broad. Eastern Massachusetts and Rhode Island. Perhaps a distinct species. Fruit not seen.


**TAPE-GRASS FAMILY.**

Submerged or floating aquatic herbs, the leaves various. Flowers regular, mostly dioecious, appearing from an involucre or spathe of 1-3 bracts or leaves. Perianth 3-6-parted, the segments either all petaloid or the 3 outer ones small and herbaceous, the tube adherent to the ovary at its base in the pistillate flowers. Stamens 3-12, distinct or monadelphous. Anthers 2-celled. Ovary 1-celled with 3 parietal placenta or 6-9-celled. Styles 3-9, with entire or 2-cleft stigmas. Ovules anatropous or orthotropous. Fruit ripening under water, indehiscent. Seeds numerous, without endosperm.

About 14 genera and 40 species of wide distribution in warm and temperate regions. Besides the following, another genus, *Halophila*, occurs on the coast of Florida. Stem branched; leaves whorled or opposite. Aculeescent; stoloniferous; leaves grass-like, elongated. Stem stoloniferous; leaves broad, rounded, cordate, petioled.

1. *Philotria*.
2. *Vallisneria*.
3. *Limnobium*.
1. **Philòtria** Canadènsis (Michx.) Britton. Water-weed. Ditch-moss. Water Thyme. (Fig. 207.)

Aquatic dioecious submerged perennials, with long grass-like floating leaves. Staminate flowers with a 2-3-parted spathe on a short scape, numerous, nearly sessile on a conic receptacle; perianth 3-parted; stamens generally 2 (1-3). Pistillate flowers on a very long flexuous or spiral scape, with a tubular, 2-cleft, 1-flowered spathe; perianth-tube adnate to the ovary, 3-lobed and with 3 small petals; ovary 1-celled with 3 parietal placentae; stigmas 3, nearly sessile, short, broad, 2-toothed with a minute process just below each sinus; ovaries unmerous, borne all over the ovary-wall, orthotropous. Fruit elongated, cylindric, crowned with the perianth. [Named for Antonio Vallisneri, 1661-1730, Italian naturalist.]

A monotypic genus of wide distribution both in the Old World and the New.


Vallisneria spiràlis L. Tape-grass. Eel-grass. (Fig. 208.)

Plant rooting in the mud or sand, stoloniferous. Leaves thin, narrowly linear, 5-nerved, obtuse, sometimes serrate near the apex, \( \frac{5}{2} \)°-6° long; \( \frac{2}{2} \)'-9'' wide, the 2 marginal nerves faint; the staminate bud separates from the scape at the time of flowering and expands upon the surface of the water; pistillate flowers upon a long thread-like scape, the spathe \( \frac{5}{2} \)'-1' long, enclosing a single white flower; ovary as long as the spathe; after receiving the pollen from the staminate flowers the scape of the pistillate contracts spirally; ripe fruit 2'-7'' long.

In quiet waters, New Brunswick to Florida, west to Minnesota, Iowa and Texas. The "wild celery" of Chesapeake Bay, and a favorite food of the canvas-back duck. Aug.-Sept.

Aquatic, stoloniferous herbs, the leaves fascicled at the nodes, petioled, broad, coriaceous. Flowers monoecious, white, arising from sessile or stipitate, 2-leaved, membranous spathes. Perianth 6-parted, the segments petaloid, the 3 outer oblong-oval, the 3 inner oblong-linear. Staminate flowers 2–4 in a spathe, long-peduncled, the stamens united in a column bearing 6–12 anthers at different heights, sometimes producing only 9–12 staminaodia, the filaments tipped with abortive anthers. Pistillate flowers sessile or short-peduncled with 3–6 vestigial stamens; ovary 6–9-celled with as many central placenta; stigmas as many as the cells, each 2-parted. Fruit a many-seeded berry. [Greek referring to the aquatic habitat.]

Three or four species, natives of America.

1. Limnobium Spongia (Bosc.) L. C. Richard. Frog's-bit. (Fig. 209.)


Hydrocharis cordifolia Nutt. Gen. 2: 211. 1818.


Blades of the leaves orbicular or broadly ovate, coriaceous; central, or reifiform, faintly 5–7-nerved and cross-veined, purplish and spongy beneath, 10'–2' broad, on petioles 1'–10' in length. Stolons rooting and sending up flowers and leaves at the nodes; peduncles of the staminate flowers 3'–4' long, those of the pistillate flowers stout, 1'–2' long, nodding in fruit.

In shallow, stagnant water, Lake Ontario, to Florida, west to Illinois, Missouri and Louisiana. July–Aug.


GRASS FAMILY.

Annual or perennial herbs, of various habit, rarely shrubs or trees. Culms (stems) generally hollow, but occasionally solid, the nodes closed. Leaves sheathing, the sheaths usually split to the base on the side opposite the blade; a scarious or cartilaginous ring, naked or hairy, rarely wanting, called the ligule, is borne at the orifice of the sheath. Inflorescence spicate, racemose or paniculate, consisting of spikelets composed of two to many 2-ranked imbricated bracts, called scales (glumes), the two lowest in the complete spikelet always empty, one or both of these sometimes wanting. One or more of the upper scales, except sometimes the terminal ones, contains in the axil a flower, which is usually enclosed by a bract-like awnless organ called the palet, placed opposite the scale and with its back toward the axis (rachilla) of the spikelet, generally 2-keeled; sometimes the palet is present without the flower, and vice versa. Flowers perfect or staminate, sometimes monoecious or dioecious, subtended by 1–3 minute hyaline scales called the lodicules. Stamens 1–6, usually 3. Anthers 2-celled, versatile. Ovary 1-celled, 1-ovuled. Styles 1–3, commonly 2 and lateral. Stigmas hairy or plumose. Fruit a seedlike grain (caryopsis). Endosperm starchy.

About 3500 species, widely distributed throughout the world, growing in water and on all kinds of soil. Those yielding food-grains are called cereals. The species are more numerous in tropical countries, while the number of individuals is much greater in temperate regions, often forming extended areas of turf. The time of year noted is that of ripening seed.

KEY TO THE TRIBES AND GENERA.

A. Spikelets 1 or 2-flowered, when 2-flowered the upper fertile, lower staminate; rachilla articulated below the scales or the subtending involucrc, and not extending beyond the flowers.

Spikelets not flattened laterally.

Flowering scale and palet hyaline; none of the scales spiny.

Spikelets monoecious; staminate and pistillate in the same panicle. I. MAYDEAE.

Spikelets perfect, or one staminate or rudimentary, mostly silky. II. ANDROPOGONEAE.

Flowering scale and palet membranous; second scale spiny (in ours). III. ZIZYFEEAE.

Flowering scale and palet coriaceous or chartaceous; spikelets mostly glabrous, involucrate in Nos. 13 and 14; scales 3 or 4. IV. PANICEAE.

Spikelets flattened laterally, 1-flowered; scales 2. V. ORYEAE.

*This family has been elaborated with the assistance of Mr. Geo. V. Nash.
B. Spikelets i-many-flowered; rachilla generally articulated above the two lower scales (below them in Nos. 32, 40, 48 and 54) and frequently extending beyond the flower in i-flowered spikelets.

Culms herbaceous.

Spikelets upon pedicels in panicles, spike-like panicles or racemes, not in rows.

Spikelets with but 1 perfect flower, which is terminal except in 37 and part of 36.

Empty scales 4 (except in No. 20); palet i-nerved.

Empty scales 2; palet 2-nerved.

Spikelets with 2 or more perfect flowers (except that one is staminate in Nos. 40 and 43); upper flower often imperfect.

Flowering scales generally shorter than the empty lower ones, usually with a bent awn on the back.

Flowering scales generally longer than the empty lower ones, awned or without a straight awn from the apex.

Spikelets in two rows, forming a one-sided spike or raceme.

Spikelets in opposite two rows, forming an equilateral spike (unilateral in Nardus).

Culms woody, at least at the base; tall reeds.

Tribe I. Maydeae.

Fertile spikelets imbedded in the joints of the thick rachis.

1. Tripsacum.

Tribe II. Andropogoneae.

Joints of the rachis not much thickened nor excavated for the reception of the spikelets.

Spikelets alike, perfect, one sessile, one pedicelled.

Spikelets not alike, the sessile perfect, the pedicelled staminate, empty or wanting.

Inflorescence composed of spike-like silky racemes.

Inflorescence paniculate; spikelets silky.

Pedicelled spikelet wanting (in our species).

Pedicelled spikelet present and usually staminate.

Joints of the rachis greatly thickened and excavated for the reception of the spikelets.

1. Erianthus.

2. Andropogon.

4. Chrysocephalus.

5. Sorghum.


Tribe III. Zoysieae.

Spikelets in a terminal spike; second scale spiny.

7. Nazia.

Tribe IV. Paniceae.

Spikelets without a subterminale involucre of bristles or valves.

Scales 3.

Spikelets all alike in close i-sided spikes.

Spikelets with a swollen ring-like calyx at the base.

Spikelets without a calyx.

Spikelets of two kinds, one borne in loose linear panicles, the other solitary on subterranean pedicels and maturing seed.


Scales 4, rarely 3 by suppression of the lowest one.

Spikelets in 2's or 3's on one side of a long and slender flat or 3-angled rachis; spikes digitate or approximate in whorls.

11. Synatheris.

Spikelets single, pedicelled, in panicles or raceme-like sessile and pedicelled spikes; first scale short, third empty or staminate, fourth fertile.


Spikelets subtended by an involucre consisting of:

13. Ixophorus.

2 spine-bearing valves forming a bar enclosing the spikelets and deciduous with them.

14. Cenchrus.

Tribe V. Oryzeae.

Spikelets monoeious; tall aquatic grasses.

Pistillate spikelets ovate, borne at the base of each branch of the panicle.

15. Zizaniopsis.

Pistillate spikelets linear, borne on the upper branches of the panicle.


Spikelets not monoeious; grasses of swamps or wet grounds.

17. Homalocenchrus.

Tribe VI. Phalarideae.

Third and fourth scales

small and empty or rudimentary, not awned; stamens 3.

empty, awned upon the back; stamens 2.

subterminating flowers with 3 stamens; fertile flowers with 2 stamens.

Tribe VII. Agrostideae.

Flowering scale indurated at maturity, of firmer texture than the empty scales, and closely enveloping the grain.

Rachilla not prolonged beyond the palet.

Flowering scale with a three-branched awn; stamens mostly 3.

Flowering scale with a simple awn.

Flowering scale narrow; awn persistent.

Awn tortuous or twisted, stout; callus evident.

Awn straight, very slender; callus minute.

Flowering scale broad; awn slender, straight, deciduous; callus obtuse.

Flowering scale awnless.

Rachilla with a pedicel-like extension beyond the palet; stamens 2.


22. Setaria.

25. Muhlenbergia.

23. Oryzopsis.

24. Milium.

Flowering scale hyaline or membranous at maturity; empty scales coarser; grain loose.

Spikelets in a dense spike-like panicle. (Some species of No. 31 may be looked for here.)

Flowering spikes 3'-6' long.

Spikelets deciduous at maturity.
- Empty scales not awned.
- Empty scales awned.
- Spikelets not deciduous; empty scales persistent.
- Flowering scales slightly exceeding the empty ones.
- Flowering scales much shorter than the empty ones.  

Spikelets 6' long; tall seashore grasses.

Spikelets variously pinnate; panicle not spike-like, except in a few species of No. 31.

Spikelets loosely enclosed in the pericarp, which opens readily at maturity.
- Empty scales minute; low Arctic grass.
- Empty scales not minute; no calyx, awns or hairs.
- Seed adherent to the pericarp.
- Palet 1-nerved; stamen 1; flower plainly stalked; scales not hairy.
- Palet 2-nerved; stamens 3; flower not plainly stalked.
- Flowering scale bifid, with a delicate awn on its back; rachilla prolonged into a short bristle.
- Flowering scale entire; rachilla not prolonged into a bristle.
- Callus with a tuft of long hairs at the base (except in species of genus 36).
- Rachilla extended beyond the palet.
- Rachilla not extended beyond the palet.
- Callus naked, or with very short hairs.
- Empty scales somewhat shorter than the flowering ones; Arctic grass.
- Empty scales longer than the flowering ones; panicle open; spikelets small.

 Tribe VIII. AVENAEAE.

Spikelets deciduous; lower flower perfect, upper staminate, awned; plant velvety. 40. Holcus.

Spikelets not deciduous; empty scales persistent, flowering scales deciduous.

Spikelets of 2 perfect flowers; rachilla not prolonged beyond the upper one. 41. Aima.

Spikelets 2-many flowered; rachilla prolonged beyond the upper flower.

Awn of flowering scale upon the back, inserted below the teeth.

Flowers all perfect, or the upper ones staminate or wanting.

Spikelets less than 6' long; grain free, unfurrowed.

Flowering scale finely ciliate or 2-lobed.

Flowering scale cleft or 2-toothed, with the teeth sometimes produced into awns.

Spikelets over 6' long; grain furrowed, usually adherent to the scales.

Upper flower perfect, lower staminate, its scale strongly armed. 45. Arrhenatherum.

Awn from between the lobes or teeth of the flowering scale, generally twisted.

 Tribe IX. CHLORIDEAE.

Flowers perfect or some of them rudimentary.

1 perfect flower in each spikelet; sometimes 2 in Nos. 53 and 54.

No empty scales above the flower.

Spikelets decussate.
- Rachis produced beyond the upper spikelet; spikelets narrow.
- Rachis not so produced; spikelets globose, sometimes 2-flowered.
- Spikelets not deciduous; empty scales persistent; low slender grasses.
- Spikes 2-6, slender, digitate, 1'-2' long.
- Spikes many along a common axis, 2'-4' long.

One or several empty scales above the flower.

Lower empty scales 2.

Spikes in false whorls or closely approximate; scales long-awned.

Spikes remote, or the lowest only approximate.

Spikes scattered or remote on filiform spikes.

Spikes crowded, sometimes 2-flowered.

2-3 perfect flowers in each spikelet.

Spikelets densely crowded; spikes usually digitate.

Spikelets with terminal spikelets.

Spikelets without terminal spikelets, the rachis extending beyond them into a point.

Spikelets distinctly alternating; spikelets remote.

Spikelets diocious, very unlike; spike short; low prairie grass.

 Tribe X. FESTUCAEAE.

Rachilla with long hairs enveloping the flowering scale; tall aquatic grass.

Rachilla and flowering scales naked or hairy, hairs much shorter than the scales.

Stigmas biseriate; spikelets in clusters of 3-6 in the axils of stiff spineless leaves.

50. Munroa.

Stigmas plumose; spikelets not in the axils of leaves; inflorescence various.

Spikelets of two forms, the fertile 1-3-flowered, surrounded by the sterile, consisting of many empty pectinate scales.

Spikelets alike.

Flowering scale 2-3-toothed or pointed, usually 3-toothed; lateral nerves and callus (an enlargement of the rachilla just below the flowering scale) generally hairy.

Spikelets with 5-many fertile flowers.

Spikelets 1-3-flowered; flowering scales keeled; branches of the diffuse panicle long and capillary.

56. Dactyloctenium.

57. Leptochloa.

58. Bulbilis.

60. Phragmites.

Rachilla and flowering scales naked or hairy, hairs much shorter than the scales.

Stigmas biseriate; spikelets in clusters of 3-6 in the axils of stiff spineless leaves.

50. Munroa.

Stigmas plumose; spikelets not in the axils of leaves; inflorescence various.

Spikelets of two forms, the fertile 1-3-flowered, surrounded by the sterile, consisting of many empty pectinate scales.

Spikelets alike.

Flowering scale 2-3-toothed or pointed, usually 3-toothed; lateral nerves and callus (an enlargement of the rachilla just below the flowering scale) generally hairy.

Spikelets with 5-many fertile flowers.

Spikelets 1-3-flowered; flowering scales keeled; branches of the diffuse panicle long and capillary.

62. Redfieldia.
Flowering scales of some other structure.
Flowering scales 1-2-nerved, with perfect flowers, or the uppermost with a staminiate flower only or empty.
Panicle branches spirally arranged.
Panicle branches simple, in spike-like racemes.
Branches of the panicle mostly again divided.
Spikelets loosely 2-4-flowered; conical rachilla articulated.
Spikelets densely 2-70-flowered; rachilla not articulated; ligule or throat of sheath bearded.
Primary branches of the panicle distinct, usually branched again at the base.
Panicle spike-like or much contracted.
Second scale broader than the 2 flowering ones.
Second scale not broader than the 3-7 flowering ones.
Panicle diffuse, with long slender branches.
Flowering scales 3-many-nerved, with 2 or more of the upper scales empty, appressed, convolute around each other.
Stamens 3; upper sterile scales usually club-shaped.
Stamens 1-2; sterile scales not club-shaped.
Flowering scales 5-many-nerved, each with a perfect flower, or the upper sometimes abortive.
Keel of the perianth winged or with a linear appendage.
Keel of the perianth not appended.
Scales more or less strongly compressed and keeled.
Empty basal scales 3-6; spikelets flat, 2-edged.
Empty basal scales 2; spikelets flattened.
Panicle contracted; spikelets dioecious.
Panicle open; spikelets perfect.
Flowering scales herbaceous, awn-pointed; spikelets collected in one-sided clusters.
Flowering scales scarious-margined; rachis glabrous or with webby hairs.
Spikelets large, cordate.
Spikelets mostly smaller, not cordate.
Empty scales projecting beyond the uppermost flowering ones; arctic grass.
Uppermost scales exceeding the empty ones; flowering scales 2-10, mostly webby at base.
Flowering scales membranous; rachis hisrute with stiff hairs, extended into a hairy appendage.
Scales rounded on the back, at least below.
Stigmas placed at or near the apex of the ovary.
Flowering scales with a basal ring of hairs, prominently 7-nerved, articulated at apex; water grass.
Flowering scales naked at the base:
Obtuse or subacute and scarious at the apex, usually toothed.
Plainly 3-7-nerved; styles present.
Obscurely 5-nerved; no style or awus.
Acute, pointed or awned at apex; not webby.
Stigmas plainly arising below the apex of the ovary; spikelets large, usually drooping; scales mostly awned.

Tribe XI. Hordeae.

Stigma 1; spike unilateral; spikelets 1-flowered, narrow.
Stigmas 2; spike symmetrical.
Spikelets solitary at the notches of the rachis.
Flowering scales with their backs turned to the rachis.
Flowering scales with their sides turned to the rachis.
Spikelets 1-2-flowered in slender articulate spikes.
Spikelets 2-many-flowered in stout inarticulate spikes.
Spikelets 2-6 at each joint of the rachis; scales mostly long-awned.
Spikelets 1-flowered or with the rudiment of a second flower.
Spikelets 2-many-flowered.
Empty scales a little smaller than the flowering ones.
Empty scales very small or none.

Tribe XII. Bambuseae.

Tall canes with large flat spikelets in panicles or racemes.

1. TRIPSCACUM L. Syst. Ed. 10; 2: 1261. 1759.

[Digitaria Heist.; Adams. Fam. Pl. 2: 38. 1763.]

Tall perennial grasses with thick rootstocks, rather broad flat leaves and monocious flowers. Spikelets 1-2-flowered, in terminal or axillary, solitary or clustered, elongated spikes. Stamine spikelets in 2's at each node of the axis, 2-flowered, consisting of four scales, the two outer coriaceous, the two inner thinner, the palet hyaline; stamens 3. Fissillate spikelets in excavations at the lower joints of the spike, 1-flowered; stigmas exerted; style slender. Grain partly enclosed in the excavations of the spikes, covered in front by the horny exterior lower scale. [Name from the Greek, in allusion to the polished outer scales.]

About 3 species, natives of tropical and temperate America. Besides the following, another occurs in the southern United States.
1. Tripsacum dactyloides L. Gama Grass. (Fig. 210.)

Tripsacum dactyloides var. monostachyum A. Gray, Man. 616. 1848.

Rootstock $\frac{1}{2}^2-1'$ thick, culms stout, erect, $4^°-8^°$ tall. Leaves smooth and glabrous, $1^°$ or more long, $\frac{1}{2}^2-1\frac{1}{2}'$ wide, long-acuminated, truncate or subcordate at the base; spikes terminal and in the upper axils, solitary or 2-3 together, $4^°-9^°$ long, the lower spikelets pistillate, the upper staminate and very numerous; outer scales of the staminate spikelets linear and obtuse, $4''$ long, about $1''$ wide, faintly many-nerved; the interior scale of the pistillate spikelets hairy, shining, closely appressed in fruit.

In swamps or along streams, Connecticut to Florida, Texas and Mexico, north to Illinois, Missouri and Kansas. Also in South America. One of our largest grasses, sometimes used for fodder. June-Sept.

2. ERIÁNTHUS Michx. Fl. Bor. Am. 1: 54. 1803.

Tall generally robust perennial grasses, with thick creeping rootstocks, long flat leaves, and perfect flowers in terminal panicles. Spikelets generally with a ring of hairs at the base, 2 at each node of the jointed rachis, one sessile, the other with a pedicel, generally 1-flowered. Scales 4, the two outer indurated, the inner hyaline, the fourth bearing a terminal straight or contorted awn; palet small, hyaline; stamens 3. Grain oblong, free, enclosed in the scales. [Greek, referring to the woolly spikelets.]

About 17 species, natives of the temperate and tropical regions of both hemispheres. Besides the following, two others occur in the Southern States.

Awn spiral.
Awn straight.
Panicle lax; branches long and spreading; basal hairs longer than the outer scale of the spikelet.
Panicle compact or strict; branches short and erect or appressed; basal hairs equaling or shorter than the outer scale of the spikelet.
Outer scale about $2\frac{1}{2}''$ long.
Outer scale about $4''$ long.

1. E. alopecuroides.

2. E. saccharoides.

3. E. compactus.

4. E. brevibrabvis.

1. Erianthus alopecuroides (L.) Ell. Spiral-awned Beard-grass. (Fig. 211.)

Andropogon alopecuroides L. Sp. Pl. 1045. 1753.

Culms stout, erect, $6^°-10^°$ tall; nodes naked or barbed, the summit and the axis of the panicle densely pubescent with appressed long rigid silky hairs. Sheaths glabrous; leaves usually glabrous, $6^°-2^°$ long, $\frac{1}{2}^2-1'$ wide, acuminate, narrowed and sometimes hairy on the upper surface near the base; panicle oblong, $7'-12'$ long, $2^°-3'$ wide, branches spreading, $3'-5'$ long, slender, loose, internodes about $2''$ long; outer scales of the spikelet about $3''$ long, exceeding the pedicel and about two-thirds as long as the basal hairs, lanceolate, acuminate; inner scales shorter, the awn $6''-8''$ long, scabrous, the portion included in the outer scales tightly spiral, bent at point of exsertion, and thence loosely spiral.

In damp soil, North Carolina to Kentucky and Missouri, south to Georgia and Alabama. Comparison with the original specimens of Linnaeus proves that the name alopecuroides belongs to this species. Sept.
2. *Erianthus saccharoides* Michx. Plume Grass. (Fig. 212.)


Culms robust, erect, 5°-10° tall, barbed at the nodes, the summit and the axis of the panicle densely pubescent with appressed long rigid silky hairs. Sheaths glabrous or sparingly hairy below, densely pubescent at the throat with long more or less spreading silky hairs; leaves scabrous or appressed-pubescent, 6'-2° long, ¼'-1' wide, long-acuminate, somewhat narrowed towards the base; panicle lax, broadly oblong, 5'-15' long, 2'-4' wide, its branches spreading, 2'-4' long, slender, internodes about 2'' long; outer scales of the spikelet about 2'' long, a little exceeding the pedicel and about one-half as long as the basal hairs, lanceolate, acuminate; inner scales shorter, the awn 10''-12'' long, straight, scabrous.

In moist sandy soil, southeastern Virginia to Florida and Louisiana. Also in Cuba. Aug.–Sept.

3. *Erianthus compactus* Nash. Contracted Plume-grass. (Fig. 213.)


Culms erect, 4°-8° tall, stout, the nodes barbed, the summit and axis of the panicle densely pubescent with appressed long rigid silky hairs. Sheaths glabrous, or pubescent at the top; leaves scabrous above, sparingly appressed-pubescent beneath, 6'-2° long, 3'-6'' wide, long-acuminate, narrowed toward the base; panicle narrowly oblong, 4'-6' long, about 1½'' wide; branches erect, 1'-2' long; spikelets crowded; internodes about 1'' long; outer scales of the spikelet about 2½'' long, exceeding the pedicels and about equalling the basal hairs, lanceolate, acuminate; inner scales shorter, the awn 5''-10'' long, straight, scabrous.


4. *Erianthus brevibarbis* Michx. Short-bearded Plume-grass. (Fig. 214.)


Culms stout, erect, 4°-5° tall, nodes naked or scantily barbed, the summit and axis of the panicle smooth or scabrous. Sheaths glabrous; leaves rough, 12'-18' long, 3'-5'' wide, acuminate; panicle linear-oblong, 8'-10' in length, 1'-1½' wide, branches erect, 2'-5' long, internodes about 2½'' long; outer scales of the spikelet about 4'' long, twice the length of the pedicel and equalling or twice as long as the basal hairs, lanceolate, long-acuminate; inner scales shorter; awn 9''-12'' long, straight, scabrous.

In moist soil, Virginia (according to Watson) to North Carolina and Louisiana. Autumn.
3. MANISURIS L. Mant. 2: 164. 1771.


Mostly tall perennials, with running rootstocks, narrow flat leaves and cylindrical jointed spikes, terminal and from the upper axes. Spikelets in pairs at each node of the excavated rachis, one sessile and perfect, the other with a pedicel and either stamine or empty. Scales of the perfect spikelet 4, the outermost thick and coriaceous, covering, together with the pedicel of the sterile spikelet, the excavation in the rachis; second scale chartaceous; third and fourth hyaline, the latter subtending a palet and perfect flower. Stamens 3. Styles distinct. Grain free. [Greek, in allusion to the tail-like spikes.]

About 25 species, widely distributed in tropical and temperate countries.

1. Manisuris rugosa (Nutt.) Kuntze. Wrinkled Manisuris. (Fig. 215.)

Manisuris rugosa Kuntze, Rev. Gen. Pl. 780. 1891.

Smooth and glabrous, culms erect, 2°-4° tall, compressed, much branched above, branches spreading. Sheaths compressed; leaves flat, acuminate, 6'-8' long, 1'-3' wide; spikes partially included in the sheath or more or less exserted, 1½'-2½' long; outermost scale of the spikelets oblong-ovate to ovate, about 2' long, strongly transversely rugose, the wrinkles continuous or interrupted.

In wet soil along the coast, Delaware to Florida, west to Louisiana and Texas. June-Sept.


Perennial grasses with usually long narrow leaves, and terminal and axillary spikes, Spikelets in pairs at each node of the jointed hairy rachis, one sessile and perfect, the other with a pedicel and either stamine, empty or reduced to a single scale. Perfect spikelet consisting of 4 scales, the outermost coriaceous, the second keeled and acute, the two inner hyaline, the fourth more or less awned and subtending a palet and perfect flower. Stamens 1-3. Grain free. [Greek, in allusion to the bearded rachis.]

About 150 species, widely distributed in tropical and temperate regions. Besides the following, some 12 others occur in the southern and western parts of North America.

Internodes of the rachis clavate-thickened:
1. A. scoparius.

Attenuate at base; spikes solitary, distant.
Broad at base; spikes in pairs or digitate, occasionally paniedled.
Hairs as long as the pedicel or longer.
Spikes in pairs; outer scales of sessile spikelet about 2½' long. 2. A. argyraeus.
Spikes 2-5 together; outer scales of sessile spikelet about 4' long.
3. A. Hallii.
4. A. furcatus.
Hairs less than one-half the length of the pedicel.
Internodes of the rachis not clavate-thickened, slender, more or less flexuous.
Spikes protruding from the side of the inflated spathe, never on long-exserted peduncles.
Branches of the culm short, distant, forming a loose elongated inflorescence.
5. A. Virginicus.
Branches of the culm elongated, forming at summit a compact bushy inflorescence.
6. A. glomeratus.
Spikes terminal on finally long-exserted peduncles; spathe narrow; upper sheaths elongated and much inflated, imbricated; upper nodes densely bearded.
7. A. Etlidiottii.
Internodes of the rachis much thickened on the margins, the intervening portion thin and translucent; nodes of the culm not bearded.
8. A. Torreyanus.
1. Andropogon scoparius Michx.  Broom Beard-grass. (Fig. 216.)


Culms from a creeping rootstock, smooth, simple or much branched, 2'-4' tall. Sheaths smooth or scabrous, sometimes glaucous; leaves 6'-12' long, 1'-3' wide, acuminate, scabrous; spikes 1'-2' long, loose, solitary, or long-exserted slender peduncles; rachis slender, flexuous, joints and pedicels ciliate with long spreading hairs; outermost scale of sessile spikelet about 3' long, acuminate, scabrous; awn spiral, more or less bent at point of exsertion, 5'-6' long, scabrous; pedicelled spikelet reduced to a single awn-pointed scale.

In dry sandy fields, New Brunswick to Alberta, south to Florida, Louisiana and Texas. Ascends to 3000 ft. in Georgia. Specimens determined as A. maritimus Chapm., from Cape May, N. J., appear to be referable to this species. Aug.-Oct.

2. Andropogon argyraeus Schultes.  Silvery Beard-grass. (Fig. 217.)


Culms erect, smooth, 2'-4' tall, simple at base, generally much branched above. Sheaths somewhat compressed, glabrous or pubescent; basal leaves 6'-1''; upper 2'-5' by 1'' wide, acuminate, smooth to scabrous above, glabrous or pubescent beneath; spikes in pairs, 1'-2' long, on more or less exserted slender peduncles; joints of the rachis and pedicels pubescent with long silky white spreading hairs; outermost scale of sessile spikelet about 2 1/2'' long, acuminate, scabrous; awn loosely spiral, 5'-6' long, scabrous; pedicelled spikelet reduced to a minute lanceolate acuminate scabrous scale, which is early deciduous.

In dry sandy soil, Delaware to Missouri, south to Florida and Texas. Culm leaves shorter and broader than the basal ones. Sept.

3. Andropogon Hallii Hack.  Hall's Beard-grass. (Fig. 218.)


Culms robust from a creeping rootstock, 3'-6' tall, simple at base, branched above, smooth, more or less glaucous. Sheaths somewhat glaucous; leaves 1' or less long, 3'-4' wide, smooth; spikes 2-5 together, 2'-4' long, the lateral ones often included in the spathes; joints of rachis and pedicels pubescent with spreading silky white or yellow hairs of about their own length; outermost scale of sessile spikelet about 4'' long, acuminate, glabrous at base, from sparingly to copiously silky-pubescent toward the apex; awn 2'-5' long, or sometimes wanting; pedicelled spikelet consisting of 4 scales, the outermost generally larger than the corresponding scale of the sessile spikelet and subtending a palet and three stamens.

Dry sandy soil, Kansas and Montana to Mexico. Aug.-Sept.
4. Andropogon furcatus Muhl. Forked Beard-grass. (Fig. 219.)


Andropogon provincialis var. furcatus Hack. in DC. Mon. Phan. 5: 442. 1889.

Culms erect, stout, smooth and glabrous, 3°-6° tall, simple at base, branched above. Sheaths smooth and glabrous; leaves smooth or rough, 6'-18' long, 2''-7'' wide, acuminate; spikes 2-5, in pairs or approximate at the summit, 2'-5' long; joints of rachis and pedicels ciliate with short hairs; outermost scale of sessile spikelet 3''-4'' long, twice the length of the rachis-joints, scabrous; awn 5''-7'' long, loosely spiral; pedicelled spikelet consisting of 4 scales.

In dry or moist soil, Maine and Ontario to Manitoba, south to Florida, Kansas and Texas. Aug.–Sept.

5. Andropogon Virginicus L. Virginia Beard-grass. (Fig. 220.)


Cinna lateralis Walt. Fl. Car. 49. 1788.


Culms erect, smooth, 2°-4° tall, simple at base, branching above. Sheaths smooth; leaves 6'-10' long, 1''-3'' wide, long-acuminate, scabrous on the margins; branches of culm short, forming a loose and elongated inflorescence; spikes in pairs, occasionally 3 or 4, about 1' long, loose, protruding from the sides of the spathes; rachis flexuous, slender, the joints and pedicels pubescent with long spreading silky hairs; lowest scale of sessile spikelet about 1 1/2'' long; awn 4''-9'' long, straight, scabrous; pedicelled spikelet generally wanting, occasionally a rudimentary scale present.

In dry or moist fields, Massachusetts to Pennsylvania and Illinois, south to Florida and Texas. Also in Cuba. Aug.–Sept.

6. Andropogon glomeratus (Walt.) B. S. P. Bushy Beard-grass. (Fig. 221.)


Culms erect, 1 1/2°-3° tall, smooth, simple below, much branched above, upper nodes of branches barbed. Sheaths compressed, smooth to strongly scabrous, glabrous or pubescent; leaves 1''-2'' wide, scabrous, long-acuminate, the basal two-thirds as long as or equalling the culm, those of the culm 6'-18' long; branches elongated, forming a compact terminal inflorescence; spikes in pairs, about 1' long, loose, protruding from the sides of the scabrous spathes; rachis flexuous, the joints and pedicels pubescent with long spreading silky hairs; outermost scale of sessile spikelet about 1 1/2'' long; awn 6''-9'' long, scabrous; pedicelled spikelet reduced to a single scale or wanting.

7. *Andropogon Elliottii* Chapm. Elliott’s Beard-grass. (Fig. 222.)


Culms erect, 1°-3° tall, smooth, simple or sparingly branched above, branches strongly bearded at the upper nodes. Sheaths glabrous or loosely villous, the lower narrow, the upper elongated, inflated, imbricated; basal leaves about one-half as long as the culm, smooth, \(\frac{1}{2}''-1\frac{1}{2}''\) wide, those of the culm filiform or narrowly linear, 2'-10' long, \(\frac{1}{2}''-1''\) wide; in pairs, 1'-2' long, loose, finally long-exserted on filiform peduncles; rachis slender, flexuous, its joints and the pedicels pubescent with long spreading silky hairs; outermost scale of the sessile spikelet \(1\frac{1}{2}''-2''\) long, scabrous on the keel; awn \(6''-9''\) long, scabrous; pedicelled spikelet a minute scale or wanting.

In dry or moist places, Pennsylvania to Florida and Texas. Aug.–Sept.

8. *Andropogon Torreyanus* Steud. Torrey’s Beard-grass. (Fig. 223.)


Culms erect, 1\(\frac{1}{2}''\)-3\(\frac{1}{2}''\) tall, simple or branched, glabrous, the nodes naked. Sheaths smooth and glabrous, more or less glaucous; leaves 3'-7' long, 2'-3' wide, long-acuminate, smooth and glabrous towards the base, scabrous on margins and at the apex, glaucous; spikes 1'-1\(\frac{1}{2}''\) long in a terminal long-exserted panicle 2'-4' long; joints of the rachis with a thin translucent median line; outermost scale of sessile spikelet \(1\frac{1}{2}''-2''\) long, about equaling the terminal hairs of the rachis-joints, lanceolate, acute, pubescent at base with long silky hairs; awn \(4''-8''\) long, spiral, bent, scabrous; pedicelled spikelet reduced to a single narrow scale.

In dry soil, Kansas to Arizona and Mexico. Aug.–Sept.


Generally tall grasses, ours perennials, with long narrow flat leaves and terminal panicles. Spikelets in pairs or 3's, one sessile and perfect, the lateral pedicelled, staminate, empty, or reduced to the pedicel only. Perfect spikelet consisting of 4 scales, the two outer indurated and shining, the inner hyaline, the fourth awned and subtending a palet and perfect flower, or the palet sometimes wanting. Stamens 3. Styles distinct; stigmas plumose. Grain free. [Greek, referring to the golden-yellow hairs on the spikelets.]

About 20 species, in temperate and tropical countries.
1. Chrysopogon avenaceus (Michx.) Benth. Indian Grass. (Fig. 224.)

Sorghum nutans A. Gray, Man. 617. 1848.


Culms erect, 3°-8° tall, from creeping root-stocks, smooth, the nodes pubescent. Scales smooth; lower leaves 1° or more in length, 2'-8' wide, long-acuminate, scabrous; panicle 4'-12' long; branches 2'-4' long, slender, erect, spreading; spikelets in pairs, or in 3's at the ends of the branches, erect or somewhat spreading; first scale of sessile spikelet 3''-4'' long, acute, pubescent with long hairs; second scale glabrous; awn 5''-10'' long, the column very little if at all bent; lateral spikelets reduced to plumose pedicels.


Chrysopogon nutans (L.) Benth., distinguished from this species by its longer awn (12'-15' long), supported on a column distinctly bent at about the middle, occurs in Tennessee and is said to have been recently found in Kentucky.


Annual or perennial grasses with long broad flat leaves and terminal ample panicles. Spikelets in pairs at the nodes, or in 3's at the ends of the branches, one sessile and perfect, the lateral pedicelled, staminate or empty. Sessile spikelet consisting of 4 scales, the outer indurated and shining, obscurely nervèd, inner hyaline, the fourth awned and subtending a small palet and perfect flower, or palet sometimes wanting. Stamens 3. Styles distinct. Grain free. [Name Indian.]

About 13 species, of wide distribution in tropical and warm-temperate regions.

1. Sorghum Halepense (L.) Pers. Johnson-grass. (Fig. 225.)

Andropogon Halepensis Brot. Fl. Luzit. 1: 89. 1804.

Culms erect, 3°-5° tall, simple or sometimes much branched, smooth and glabrous. Sheaths smooth; leaves 1° or more long, ½'-1' wide, long-acuminate; panicle open, from ½°-1½° long, the generally whorled branches spreading and naked towards the base; outer scales of sessile spikelet 2''-3'' long, ovate-lanceolate, usually purplish, pubescent with long appressed hairs; awn when present 4''-8'' long, more or less bent; pedicelled spikelets of 4 scales, the outer two about 3'' long, membranous, 7-9-nerved, their involuted margins ciliate, the inner two shorter and narrower, hyaline, sometimes with staminate flowers.

In fields and waste places, southern Pennsylvania to Missouri, south to Florida and Texas. Widely distributed by cultivation in tropical America. Native of southern Europe and Asia. July-Sept.
[Lappago Schreb. Gen. 55. 1789.]

An annual grass, diffusely branched, with flat leaves and 1-flowered deciduous spikelets, either solitary or in clusters of 3-5 in a terminal spike. Scales of spikelet 2 or 3, the outermost small or wanting, the second rigid and covered with hooked prickles, the third membranous, subtending a palet and perfect flower. [Name unexplained.]

A monotypic genus, native of tropical and temperate regions of the Old World.

1. Názia racemosa (L.) Kuntze.
Prickle-grass. (Fig. 226.)

Cenchrus racemosa L. Sp. Pl. 103. 1753.
Názia racemosa Kuntze, Rev. Gen. Pl. 780. 1891.

Culms 2'-14' tall, erect, simple to diffusely branched, smooth below, pubescent above. Sheaths smooth and glabrous; leaves 1'-3' long, 1''-2' wide, acuminate, rather strongly ciliate; spike 1'-4' long, sometimes partially included in the somewhat inflated upper sheath; spikelets 1-flowered: first scale very small, almost hyaline; second scale coriaceous, 1½'' long, acute, 5-nerved, each nerve armed with a row of hooked prickles; third scale 1'' long, keeled, sharp-pointed, 1-nerved, membranous, enclosing a palet of like texture and a perfect flower.


Perennial grasses of various habit, with generally flat leaves and 1-flowered spikelets borne in 2-4 rows on 1-sided spikes, which are single, in pairs, or panicked. Spikelets oblong to orbicular, flat on the inner surface, convex on the outer. Scales 3, rarely 2 by the absence of the outermost, the outer ones membranous, the inner one indurated and subtending a palet and perfect flower. Stamens 3. Styles separate; stigmas plumeous. Grain ovoid or oblong, free. [An ancient Greek name for some grass, used by Hippocrates.]

About 160 species, of wide distribution in tropical and temperate regions, most abundant in America.

Spikelets second, with the back of the flowering scale turned toward the rachis.
Rachis membranous, dilated, its wings almost enclosing the spikelets at maturity.
Extending beyond the spikelets, long acuminate; spikelets about ½'' long.
1. P. muricatum.
Not extending beyond the spikelets, acute; spikelets about 1'' long.
2. P. membranaceum.
Rachis not membranous nor enclosing the spikelets at maturity.
Spikelets oval or elliptic, acute.
Spikelets glabrous or somewhat pubescent; spikelets in pairs or occasionally in 3's.
3. P. distichum.
4. P. dilatatum.
Spikelets villous on margins; spikes 4-12.
Spikelets from oval to orbicular, very obtuse.
Spikelets 1, or sometimes 2, on the 1-3 slender peduncles exserted from the upper sheath; spikelets 1⁄4' or less long.
Leaves and sheaths pubescent, the former generally long, narrow and erect; spikelets about ½'' long.
5. P. setaceum.
Leaves and sheaths glabrous or somewhat pubescent, the former long and broad, lax, ciliate; spikelets about 1'' long.
6. P. ciliatifolium.
Leaves and sheaths glabrous, the former short and broad, ciliate on the margins; spikelets about ½'' long.
7. P. longipedunculatum.
Spikelets 2 or more on the single stout peduncle.
Spikelets 1½''-1½'' long; spikes generally spreading.
8. P. laeve.
Spikelets exceeding 1½'' in length; spikes generally erect.
Spikelets not strictly secund, the back of the flowering scale turned away from the rachis.
Spikelets less than 1'' long, oblong.
10. P. compressum.
Spikelets about 2'' long, broadly lanceolate.
11. P. paspaloides.
1. *Paspalum mucronatum* Muhl. Water Paspalum. (Fig. 227.)

*Paspalum mucronatum* Muhl. Cat. 8. 1813.

Culms ascending, 6'-3' long, from a floating or creeping base, branched. Sheaths very loose or inflated, smooth or scabrous, glabrous or pubescent; leaves 3'-12' long, 1/4'-1' wide, acuminate, scabrous; spikes 20-100, 1/2'-3' long, alternate or whorled, slender; rachis flat, thin, exceeding the spikelets, long-acuminate, scabrous, its margins nearly enclosing the spikelets; spikelets in two rows, about 1/2" long, elliptic, pubescent; outer scales very thin, 2-nerved, the first one usually a little the longer.

*P. mucronatum* is found in water, Virginia to southern Illinois and Missouri, south to Florida and Texas. Also in tropical America. Sept.

2. *Paspalum membranaceum* Walt. Walter’s Paspalum. (Fig. 228.)

*Paspalum membranaceum* Walt. Fl. Car. 75. 1788.
*Paspalum Walterianum* Schultes, Mant. 2: 166. 1824.

Culms erect or ascending, much branched, smooth, creeping at the base. Sheaths a little inflated, smooth; leaves 11/2'-31/2' long, 2'-3' wide, flat, smooth, acute; spikes 3-7, alternate, about 1' long, the lower ones usually included in the upper sheath; rachis not exceeding the spikelets, flat, thin, 1''-11/2" wide, acute, smooth, many-nerved, its incurved margins partly enclosing the spikelets; spikelets about 1'' long, crowded in 2 rows, oval, obtuse, smooth; outer scales 5-nerved; third scale lenticular, slightly shorter than the outer ones.

*P. membranaceum* is found in moist or wet grounds, New Jersey and Delaware to southern Ohio, south to Florida and Texas. Sept.

3. *Paspalum distichum* L. Joint-grass. (Fig. 229.)

*Paspalum distichum* L. Amoen. Acad. 5: 391. 1759.

Culms erect, 6'-2' tall, extensively creeping at base. Sheaths smooth, sometimes ciliate on the margins, or sparsely pubescent; leaves flat, 11/2'-5' long, 1''-2'' wide, acuminate, smooth; spikes 1'-21/2' long, in pairs, or occasionally with a third, exserted; rachis flat, 1/2''-1' wide, smooth; spikelets 1'/4''-11/2'' long, elliptic, somewhat pubescent or glabrous, acute, nearly sessile in 2 rows; outer scales 3-5-nerved, slightly exceeding the acute third one which is sparingly bearded at the apex.

*P. distichum* is found in Virginia to Missouri and California, south to Florida, Texas and Mexico. Also in the West Indies, central and South America. Aug.-Sept.
4. *Paspalum dilatatum* Poir. Tall Paspalum  (Fig. 230.)

*Culms* erect, 3°-6° tall, smooth and glabrous. Sheaths compressed, smooth and glabrous; leaves 1° or more long, 2°-3° wide, long-acuminate, rather scabrous on the margins, sometimes with a tuft of hairs at the base; spikes 4-12, 2°-5° long, spreading, alternate, ¾'-2° distant on the main axis; rachis of the spikes narrow, less than 1° wide, somewhat flexuous, scabrous; spikelets about ½" long, in 3 or 4 rows, acute; outer scales 5-nerved, the first villous on the margins, the second glabrous or sparsely pubescent, the third nearly orbicular, minutely punctate-striate.

In moist soil, Virginia to Florida, west to Texas. Ascends to 1000 ft. in Georgia. Aug.–Sept.

5. *Paspalum setaceum* Michx. Slender Paspalum.  (Fig. 231.)

*Culms* mostly erect, 1°-2° tall, slender, smooth. Sheaths and leaves generally very pubescent, the latter 3°-8° long, 1°-3° wide, erect, acuminate; spikes 1½"-3½" long, more or less curved, generally solitary, occasionally 2, on a long-exserted slender peduncle, with usually 1 or 2 additional shorter peduncles from the same upper sheath; spikelets about ½" long, in 2 narrow rows, broadly obovate, very obtuse; empty scales 3-nerved, glabrous or pubescent; third scale obovate, shining.

In dry fields, Massachusetts to Illinois, south to Florida and Texas. Ascends to 2200 ft. in Virginia. Aug.–Sept.

6. *Paspalum ciliatifolium* Michx. Ciliate-leaved Paspalum.  (Fig. 232.)

*Culms* erect, 1½°-2½° tall, smooth. Sheaths varying from glabrous to pubescent; leaves 4°-9° long, 3°-7° wide acuminate, pubescent or glabrous, ciliate, the upper one usually broad and cordate at base; spikes 1 or 2, occasionally 3, 2°-4° long; peduncles 1-3, exserted from the upper sheath; rachis very narrow, slightly flexuous and triangular, scabrous; spikelets 1½'-1½" long, in 2-4 rows, crowded, oval, the first or convex scale sometimes sparingly pubescent, the third scale with a distinct depression on the back near the base.

In dry soil, New Jersey and Pennsylvania to Kansas, south to Florida and Texas. June–Aug.
7. Paspalum longipedunculatum Le Conte. Long-stalked Paspalum. (Fig. 233.)

Paspalum debile Michx. Fl. Bor. Am. i: 44. 1803.
Paspalum arenarium Schrad.; Schultes, Mant. 2: 172. 1824?

Culms reclining or decumbent, 1°–1½° long, smooth, leafy at base. Sheaths glabrous or ciliate on the margins, pilose at the throat; leaves 1½–3½' long, 2½–3½' wide, glabrous or a little pilose, acuminate, ciliate on the margins and along the mid-vein; peduncles 1–2 from the upper sheath; spikes 1–2, 1½–2½' long, more or less curved; rachis very narrow, more or less flexuous; spikelets about 3½' long, nearly globular; outer scales 3-nerved, the first one glabrous or sometimes sparingly pubescent; third scale slightly exceeding the outer ones.


8. Paspalum laeve Michx. Field Paspalum. (Fig. 234.)

Paspalum laeve Michx. Fl. Bor. Am. i: 44. 1803.

Bright green, culms rather stout, erect or ascending, 1°–3° tall, glabrous. Sheaths compressed, glabrous or pubescent; leaves 3½–12½' long, 2½–4½' wide, acuminate, glabrous or pubescent, scabrous on the margins; spikes 2–6, 1½–3½' long, more or less spreading, alternate, about 1½ apart on the single stout peduncle, pilose in the axils; spikelets 1½–2½' long, oval to orbicular, close, crowded in 2 rows, glabrous.

In moist fields, Rhode Island to Kentucky and Missouri, south to Florida and Texas. Ascends to 1700 ft. in North Carolina. Aug.–Sept.

9. Paspalum Floridanum Michx. Florida Paspalum. (Fig. 235.)

Paspalum Floridanum Michx. Fl. Bor. Am. i: 44. 1803.
Paspalum macrospernum Flugge, Monog. 172. 1810.

Culms stout, erect, 3°–6° tall, from a creeping rootstock, glabrous. Sheaths glabrous, or the lower pubescent, sometimes glaucous; leaves 8–15½' long, 3½–7½' wide, acuminate, glabrous or pubescent; spikes 2–5 on the single stout peduncle, 2½–5½' long, erect or ascending, bearded in the axis; rachis about 1½' wide, flat on the back, scabrous on the margins; spikelets 1½–2½' long, broadly oval, glabrous, sometimes glaucous, crowded in 2 rows; outer scales 5-nerved; third scale striate.

Moist places, Delaware to Kentucky, south to Florida and Texas. Sept.
10. *Paspalum compressum* (Sw.) Nees. Flat Paspalum. (Fig. 236.)

*Paspalum trislachvum* Lam. Tabl. Encycl. 1: 176. 1791
*Milium compressum* Sw. Fl. Ind. Occ. 1: 183. 1797.
*Paspalum platycanum* Poir. in Lam. Encycl. 5: 34. 1804.
*Paspalum compressum* Nees, in Mart. Fl. Bras. 2: 23. 1829.

Stolons numerous, leafy, sometimes 2° long. Culms 6'-2° tall, slender, compressed, glabrous; sheaths loose; leaves glabrous, sometimes sparsely ciliate, obtuse, those of the culm 2'-4' long, 2''-3'' wide, those of the stolons about 1' long, 1''-2'' wide; spikes 2-5, 1'-2' long, approximate at the summit of the long and slender stalk; spikelets not crowded nor secund, about 1'' long, acute, the back of the flowering scale turned oblong, away from the rachis.


11. *Paspalum paspaloides* (Michx.) Scribner. Crab-grass Paspalum. (Fig. 237.)

*Paspalum Elliottii* S. Wats. in A. Gray, Man. Ed. 6, 629. 1890.

Culms 1°-2½° tall, erect, from an extensively creeping base, slender, glabrous. Sheaths and leaves glabrous or pubescent, the latter 2'-9' long, 3''-6'' wide, obtuse; spikes 1½'-3½'' long, in pairs, or sometimes with an additional one, near the summit of the 1-2 slender stalks, which are long-exserted from the upper sheath; rachis flat, about ½'' wide, scabrous on the margins, the internodes about equaling the spikelets in length; spikelets about 2'' long, broadly lanceolate, acute, not crowded; outer scales 5-nerved, glabrous, the back of the third scale turned away from the rachis.

Moist ground, Maryland to Florida, west to Texas. July–Aug.


Erect perennial grasses, with flat leaves and spikelets of two kinds; one kind borne in terminal panicles, deciduous without perfecting fruit; the other solitary, terminating subterranean peduncles, and maturing seed. Scales 3, membranous, the innermost subtending a palet and a perfect flower; the scales of the subterranean spikelets become indurated and enclose the grain. Stamens 3. Stigmas plumose. [Greek, in allusion to the two kinds of spikelets.]

Species 2, inhabiting the southeastern United States, one of them restricted to Florida.
1. **Amphicarpon** Amphicarpon (Pursh) Nash. Amphicarpon. (Fig. 238.)


*Amphicarpon Purshii* Kunth, Rev. Gram. 28. 1829-35.


Culms erect, 12'-18' tall, slender, glabrous. Sheaths papillose-hirsute; ligule pilose; leaves 1'-6' long, 2'-6' wide, erect, acuminate, hirsute and ciliate; panicle linear, 4'-6' long, branches 3-4, erect, bearing few spikelets; spikelets about 2' long, elliptic; outer scales 5-nerved, membranous, glabrous; subterranean spikelets ovoid in fruit, about 3' long, acute, the scales all becoming much indurated.

In moist pine barrens, New Jersey to Florida near the coast, Aug.-Sept.


[Helopus Trin. Fund. Agrost. 163. 1820.]

Perennial grasses with flat leaves, and short-pedicelled spikelets borne in second spikes, which form a terminal panicle. Spikelets with an annular callus at the base and articulated to the pedicel. Scales 3, the two outer membranous, acute, the inner one shorter, indurated and subtending a palet and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose, Grain free. [Greek, signifying wool-grass.]

Species about 5, in tropical and temperate countries.

1. **Eriochloa punctata** (L.) W. Hamilt. Dotted Millet. (Fig. 239.)

*Milium punctatum* L. Amoen. Acad. 5: 392. 1759.


*Eriochloa punctata* W. Hamilt. Prodr. Pl. Ind. Occ. 5. 1825.

Culms erect or ascending, 1'-3' tall, glabrous. Sheaths glabrous or sometimes pubescent; ligule a fringe of short white hairs; leaves 2'-30' long, 2'-3' wide, acuminate, glabrous or pubescent; spikes 4-25, 1'-2' long, sessile or nearly so; rachis pubescent; spikelets about 2' long, ovate-lanceolate, acuminate; outer scales pubescent with appressed silky hairs, the first a little exceeding the second, the third about 1' long, rounded at the apex and bearing a pubescent awn about ½' long.

Kansas to Texas and Mexico. Widely distributed in tropical America.

11. **Syntherísm* A. Walt. Fl. Car. 76. 1788.


Annual grasses with flat leaves, and spikelets borne in pairs or sometimes in 3's, in second spikes which are digitate or approximate at the summit of the culm. Spikelets often purplish. Scales of the spikelet 4, sometimes 3 by the suppression of the lowest one; the fourth or innermost scale chartaceous, subtending a palet of similar texture and a perfect flower. Stamens 3. Stigmas plumose. [Greek, crop-making, in allusion to its abundance.]

About 20 species, widely distributed in temperate and tropical regions.

Rachis flat, broadly winged; spikes narrowly linear.

Spikelets 1¾'-1½' long; second scale about one-half as long; first minute, rarely wanting.

Spikelets about 1' long; second scale about as long; first scale wanting, rarely present.

1. **S. sanguinalis**.

2. **S. linearis**.

3. **S. filiformis**.

Rachis 3-angled, not winged; spikes filiform.
(Fig. 240.)

*Panicum sanguinale* L. Sp. Pl. 57. 1753.
*Syntherisma præcox* Walt. Fl. Car. 76. 1788.


Culms erect or decumbent, often rooting at the lower nodes, 1°-3° long, smooth. Sheaths glabrous or pubescent; leaves 2'-6' long, 2°'-4° wide, acuminate, glabrous or more or less pubescent; spikes 3-10, narrowly linear, 2'-6' long, digitate or in approximate whorls at the summit of the culm; rachis flat, winged; spikelets 1 1/4"-1 1/2" long, in pairs, one sessile or nearly so, acute, lanceolate; first scale minute, rarely wanting, second one-third to one-half as long as the spikelet.

In cultivated or waste places, throughout North America, except the extreme north. Naturalized from Europe. Widely distributed as a weed in all cultivated regions. July–Aug.

2. Syntherisma lineäris (Krock.) Nash. Small Crab-grass.  (Fig. 241.)

*Panicum lineare* Krock. Fl. Sil. 1: 95. 1787.
*Syntherisma sert seit* Walt. Fl. Car. 76. 1788.
*Paspalum ambiguum* DC. Fl. Gall. 123. 1806.


Culms erect or decumbent, 1/2°-2° long, smooth and glabrous. Sheaths and leaves glabrous, the latter 1'-3' long, 1''-2'' wide, acuminate; spikes 2-4, 2°'-4° long, narrowly linear, digitate or proximate at the summit of the culm; rachis flat, winged; spikelets about 1'' long, in pairs, sometimes in 3's, one of them sessile or nearly so, elliptic, acute; first scale rarely present, second and third as long as the fourth.


3. Syntherisma filiformis (L.) Nash. Slender Finger-grass.  (Fig. 242.)

*Panicum filiforme* L. Sp. Pl. 57. 1753.
*Paspalum filiforme* Sw. Prodr. 22. 1788.

*Syntherisma villosa* Walt. Fl. Car. 77. 1788.


Culms erect, 1°-4° tall, slender, smooth. Sheaths hirsuta; leaves 1'-8' long, 1/2°'-2° wide, erect, smooth or scabrous; spikes 2-5, filiform, 1°'-5°' long, approximate at the summit of the culm, erect or nearly so; rachis 3-angled, very slender, not winged; spikelets 3/4"'-1" long, elliptic, pubescent, in pairs, occasionally in 3's, one sessile or short-pedicelled; first scale rarely present; second three-fourths as long as or equaling the third, which is equal in length to the fourth.

Dry sandy soil, Massachusetts to Michigan, south to Florida, Nebraska and Texas. July–Sept.

Annuals or perennials of various habit, foliage and inflorescence. Spikelets 1–2-flowered, when 2-flowered the lower one staminate only. Scales 4, the 3 lower membranous, empty, or the third with a staminate flower, differing in the same species; the inner or fourth scale chartaceous, shining, enclosing a palet of similar texture and a perfect flower. Awns none, except in Nos. 1 and 2. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the hardened fruiting scale and palet. [Old Latin name for some grass, probably the cultivated Sorghum, referring to its panicle, taken from Fliny.]

About 300 species, in temperate and tropical regions. The geographic distribution of many of our species is not well ascertained. The Old English name Panic or Panic-grass, is often applied to any of the species.

Panicle oblong to ovoid; spike-like branches sessile, more or less spreading; spikelets in 2–4 rows, second; third scale, and sometimes the second and first, awn-pointed or awned.

Spikelets less than 1½" long, straight or but slightly curved.

Spikelets less than 1½" long, straight or but slightly curved.

Culms stout; lateral panicles numerous; ligule short, naked or sparingly short-ciliate.

Spikelets about ½" long, acute; secondary branches of mature panicle generally appressed.

Spikelets ovate, acute, about 1½" long.

Spikelets ovate, acute, about 1½" long.

Spikelets ovate or obovoid, obtuse, turgid, about 1½" long.

Panicle ovoid or oblong; primary branches spreading or ascending, generally appressed, occasionally divaricate, bearing numerous pointed spikelets not exceeding 1½" in length. Palet in the axil of the third scale conspicuous, enlarged, much exceeding the fourth scale; spikelets open.

Palet in the axil of the third scale inconspicuous; spikelets closed.

Spikelets ½" long, curved.

Spikelets ½" or more long.

Spikelets ½" or more long.

Sheaths smooth, glabrous or softly pubescent.

Nodes strongly barbed; sheaths and leaves generally softly pubescent; spikelets elliptic, 2½–3½" long.

Nodes, at least the upper ones, naked; sheaths glabrous.

Spikelets about 1½" long, elliptic.

Spikelets 1½–2½" long, oval to obovoid; leaves generally ciliate.

Spikelets about 1½" long, acuminate; secondary branches of the mature panicle generally spreading or divaricatis.

Spikelets papillosa-hispid; spikelets about 1½" long; panicle generally much included, sometimes long-exserted.

Culm leaves lanceolate, rounded, truncate or subulate at base, sometimes narrowed.

Spikelets 1½–2½" long.

Panicle linear, loose; branches appressed.

Panicle ovoid to oblong, compact; branches more or less spreading.

Leaves spreading, 1½–2½" wide; spikelets obovoid.

Leaves erect, less than 2½" wide, long acuminate; spikelets elliptic.

Spikelets less than 1½" long.

Culm leaves 1–4, erect; culms mostly simple, never profusely branched late in the season.

Sheaths and leaves glabrous.

Sheaths and leaves pubescent.

Culm leaves generally numerous, usually spreading; culms simple early in the season, later profusely branched.

Spikelets about ½" long.

Spikelets about 1½" long.

Sheaths glabrous.

Nodes naked, or the lower sometimes sparingly barbed; spikelets about 1½" long.

Nodes barbed; spikelets about ½" long.

Sheaths pubescent.

Primary spikelet 3½–6½" long; spikelets fully 1½" long, primary culm leaves 4½" long.

Primary spikelet 3½ or less long; spikelets hardly 1½" long; primary culm leaves less than 4½ long.

Culm leaves long and very narrow, sometimes involute.

Leaves elongated, crowded at base, half as long as or equaling the culm; secondary panicles borne on short basal branches.

Leaves long and narrow, distributed along the culms, which are profusely branched above late in the season.

Basal leaves and those of the culm the same, generally elongated; spikelets acute or acuminate.

Spikelets 2'" long or more.
Sheaths glabrous.
Panicle usually 1° long or more; branches spreading; leaves 1° long or more, flat.
28. *P. virgatum.*
Panicle 1° long or less; branches erect or appressed; leaves 6'-1° long, involute on the margins, at least at the apex, thick, glaucous.
29. *P. amarum.*
30. *P. miliaecum.*
Sheaths papillosa-pubescent.
Spikelets 1½" long or less.
Culms stout, finally decumbent and much branched, with lateral panicles from all the upper sheaths.
Sheaths glabrous.
Sheaths pubescent.
Culms slender, erect or decumbent, branched only at base.
Spikelets 1½"-1½" long, generally single on the ultimate divisions of the panicle.
Panicle narrow; branches erect, the lower ones about 3" long; axis naked.
31. *P. flexile.*
32. *P. capillare.*
Panicle at length diffuse; branches 4'-8' long; axis bearded.
Spikelets less than 1" long, in pairs.
Spikelets smooth, cliptic, acute.
33. *P. minus.*
34. *P. autumnale.*
Spikelets warty, obvoid, acutish.
Panicle linear; branches appressed; second scale of spikelet obtuse, gibbous at base.
35. *P. verrucosum.*
36. *P. gibbun.*

1. *Panicum Crús-gállí L.* Barnyard Grass. Cockspur Grass. (Fig. 243.)


Culms 2°-4° tall, often branching at base. Sheaths smooth and glabrous; leaves 6'-2° long, ½'-1" wide, glabrous, smooth or scabrous; panicle composed of 5-15 sessile erect or ascending branches, or the lower branches spreading or reflexed; spikelets ovate, green or purple, densely crowded in 2-4 rows on one side of the rachis; second and third scales about 1½" long, scabrous or hispid, the third scale more or less awned, empty, the fourth ovate, abruptly pointed.

In cultivated and waste places, throughout North America except the extreme north. Widely distributed as a weed in all cultivated regions. Naturalized from Europe. Aug.-Oct.

*P. colonum* L., a southern species, related to this, but with awless scales, has been found in southeastern Virginia, too late for illustration here. (See Appendix.)

2. *Panicum Walteri* Pursh. Salt-marsh Cockspur Grass. (Fig. 244.)


Culms 3°-6° tall, robust, smooth. Sheaths, at least the lower ones, papillosa-hispid; leaves 1° or more long, ½'-1" wide, generally smooth beneath, strongly scabrous above; panicle 6'-18' long, consisting of 10-30 ascending or spreading branches; spikelets ovate-lanceolate, densely crowded in 2-4 rows on one side of the scabrous and hispid rachis, brownish purple; second and third scales about 1½" long, scabrous and hispid, tipped with upwardly barbed awns, sometimes 10-20 times their length; fourth scale ovate-lanceolate, acuminate.

In marshes and ditches, principally within the influence of salt water, Ontario to Rhode Island, Florida and Louisiana. Aug.-Oct.
3. Panicum digitarioides Carpenter. Narrow Panicum. (Fig. 245.)

Glabrous, culms erect from a long and stout creeping rootstock, 3°–5° tall, simple, stout, smooth. Sheaths smooth; leaves 4'–10' long, 4''–8'' wide, long-acuminate; panicle linear, 6'–12' long, its branches 1'–3' long, erect; spikelets about 1½'' long, ovate, acute; first scale about one-half as long as the spikelet, acute, 3-nerved; second about ½'' long, 5-nerved and a little exceeded by the 3-nerved third one; the fourth 3-nerved, slightly shorter than the third.

In water, Delaware to Florida and Texas. July–Aug.

4. Panicum obtusum H.B.K. Blunt Panicum. (Fig. 246.)

Glabrous, culms erect, 1°–2° tall, simple or branching at base, smooth. Sheaths smooth; leaves 2½'–9' long, 1''–3'' wide, usually erect, long-acuminate; panicle linear, 2'–6' long; branches 3½'–1½' long, appressed; spikelets about 1½'' long, ovate, acute; first scale about one-half as long as the spikelet, acute, 3-nerved; second about 1'' long, 5-nerved and a little exceeded by the 3-nerved third one; the fourth 3-nerved, the fourth chartaceous.

Kansas to Arizona, south to Texas and Mexico. July–Sept.

5. Panicum hians Ell. Gaping Panicum. (Fig. 247.)

Glabrous, culms erect, 1½°–2½° tall, generally simple, sometimes creeping at base, smooth. Leaves 3'–5' long, 1½''–3'' wide, acuminate, generally erect; panicle 3'–8' long; branches few, generally spreading, the longer ones often drooping, the lower naked below the middle; spikelets about 1½' long; fourth scale exceeded by the third and its usually empty palet which is much enlarged, generally forcing the spikelet wide open.

6. *Panicum rostratum* Muhl. Beaked Panicum. (Fig. 248.)

*Panicum anceps* Michx. Fl. Bor. Am. 1: 48. 1803?

*Panicum rostratum* Muhl. Gram. 121. 1817.

Culms erect from a creeping scaly branched root-stock, 1½°–5° tall, much branched, compressed, stout, smooth. Sheaths compressed, glabrous, or the lower ones pubescent; leaves 1° long or more, 2'/-5'/ wide, acuminate; ligule very short; panicles pyramidal, 6′-12′ long; axis and ascending branches scabrous; spikelets 1½′ long, crowded, lanceolate, acuminate, curved, longer than the scabrous pedicels; first scale less than one-half as long as the spikelet; second scale about 1½′ long, curved at the apex, scabrous above on the middle nerve; third scale usually subtending a small empty palet.


7. *Panicum agrostidiforme* Lam. Agrostis-like Panicum. (Fig. 249.)


Culms erect, 1½°–2° tall, much branched, compressed, smooth. Sheaths compressed, glabrous, or sometimes hairy at the throat; ligule very short, naked; leaves 1° long or more, 2'/-4'/ wide, acuminate; panicles pyramidal, 4′-12′ long, terminating the culm and branches; primary branches of the panicle spreading, secondary generally appressed; spikelets ½′ long, acute, straight; first scale 3-nerved, acute; second and third scales 5-nerved, about twice as long as the first and longer than the oval fourth scale, which is slightly stalked; small palet of third scale usually empty.

Wet ground, Maine to Minnesota, south to Florida and Texas. July–Sept.

8. *Panicum elongatum* Pursh. Long Panicum. (Fig. 250.)

*Panicum elongatum* Pursh, Fl. Am. Sept. 69. 1814.


Culms erect, 3°-5° tall, much branched, stout, compressed, smooth. Sheaths smooth and glabrous, compressed; leaves 1° long or more, 2'/-4'/ wide, acuminate, scabrous; panicles pyramidal, terminating the culm and branches, 4′-12′ long; primary branches spreading or ascending, the secondary usually divaricate; spikelets about 1¼′ long, crowded, acuminate; first scale acute or acuminate, one-third the length of the equal and acuminate second and third; fourth scale narrowly elliptic, about one-half as long as the third and raised on a delicate stalk about ½′ long.

9. Panicum longifolium Torr. Long-leaved Panicum. (Fig. 251.)


Culms erect, 1°-2° tall, slender, simple, or occasionally with a single lateral panicle, flattened, smooth and glabrous. Sheaths smooth and glabrous; leaves 8'-12' long, 1'-2' wide, acuminate into a long, slender point, rough, glabrous; ligule short, pilose; panicles 5'-6' long; primary branches long and slender, spreading, secondary very short, appressed, generally bearing 1-3 spikelets; spikelets 1'' long, acuminate; first scale acute about one-half as long as the acuminate second one; third scale equalling the second, acuminate, one-third longer than the elliptic obtuse fourth one.

This seems to be a well-marked species. Its slender simple very much flattened culms, the long and narrow leaves, and the long slender branches of the panicle bearing the spikelets almost racemously, abundantly distinguish it from any others of this group. Moist soil, New Jersey and Pennsylvania. Aug.-Sept.

10. Panicum sphaerocarpum Ell. Round-fruited Panicum. (Fig. 252.)


Culms generally erect, simple or somewhat branched at base, 10°-2° tall, smooth, or the nodes sometimes pubescent. Sheaths usually shorter than the internodes, glabrous, the margins ciliate; leaves 2'-4' long, 2''-7'' wide, acuminate, cordate-clasping at base, scabrous above, smooth beneath, the margins cartilaginous and minutely serrulate, ciliate towards the base; panicle ovoid, 2'-4' long; spikelets less than 1'' long, nearly spherical or somewhat longer than thick, obtuse, purple; first scale broadly ovate, obtuse; third and fourth scales three to four times as long as the first, suborbicular, 7-nerved; fourth scale oval, obtuse, ½'' long; palet of third scale usually empty.


11. Panicum microcarpon Muhl. Small-fruited Panicum. (Fig. 253.)


Culms generally erect, 2°-3° tall, simple, smooth. Sheaths smooth, glabrous, longer than the internodes; ligule none; leaves 5'-8' long, ½'-1' wide, long-acuminate, smooth, cordate-clasping and sparingly ciliate at the base; panicle 3'-8' long, ovoid to oblong in outline; branches slender, ascending; spikelets ½'' long, obovoid to nearly spherical, numerous; first scale minute, second and third about equal, 7-nerved, puberulent, the fourth white and shining; palet of third scale usually empty.

Woods and along thickets, southern New York to Pennsylvania and Michigan, south to Florida, Louisiana, Nebraska and Texas. July-Sept.
12. Panicum Porterianum Nash. Porter's Panicum. (Fig. 254.)

Panicum latifolium Walt. Fl. Car. 73. 1788. Not L.
1753.


Culms erect, 1°-2° tall, simple or somewhat dichotomously branched above, the nodes densely barbed. Sheaths generally softly pubescent; leaves ovate to broadly lanceolate, 2'-4' long, ½'-1½' wide, cordate-clasping at base, acute, usually softly pubescent; panicle included or somewhat exserted; branches spreading or ascending, bearing few elliptic short-pedicelled appressed spikelets 2'-2½' long; first scale one-third to one-half as long as the pubescent and equal second and third ones; fourth scale about as long as the third.

In woods, Maine and Ontario to Minnesota, south to Florida and Texas. June-Aug.

13. Panicum commutatum Schultes. Variable Panicum. (Fig. 255.)


Panicum commutatum Schultes, Mant. 2: 242. 1824.

Culms erect, 1°-2° tall, rather slender, glabrous, or pubescent especially at the nodes, simple, finally dichotomously branched above. Sheaths glabrous or puberulent, generally ciliate; leaves 2'-4' long, ¾'-1½' wide, sparingly ciliate at the base, acute, glabrous or puberulent, those of the branches generally broader and more crowded than those of the main stem; panicle 2'-5' long, lax, the branches spreading; spikelets 1'-1½' long, ellipsoid; first scale about one-fourth as long as the spikelet, 7-nerved; second and third scales equal, 7-nerved, pubescent; fourth scale oval, obtuse, apiculate, about 1½' long; palet of third scale usually empty.

In dry woods and thickets, New York to Kentucky, south to Florida and Texas. June-Aug.

14. Panicum macrocarpon Le Conte.

Large-fruited Panicum. (Fig. 256.)

Panicum macrocarpon Le Conte; Torr. Cat. 91. 1819.

Culms 1°-3° tall, erect, simple or somewhat branched above, smooth; the nodes, at least the upper ones, naked. Sheaths smooth and glabrous, ciliate; leaves 3'-7' long, 9½'-1½' wide, cordate-clasping at base, acuminate, smooth and glabrous or nearly so on both surfaces, ciliate; panicle 3'-6' long, generally long-exserted, rarely included, its branches more or less ascending; spikelets 1½'-'-2' long, turgid, oval to obovoid; second and third scales broadly oval, obtuse, 9-nerved, pubescent, the fourth oval, rather acute, 1½' long.

The more simple culms, glabrous sheaths, leaves and nodes and the turgid spikelets readily distinguish this species from either P. Porterianum or P. clandes-zi-nun. Moist places, Vermont to New York, New Jersey and Pennsylvania. July-Aug.
15. *Panicum clandestinum* L. Hispid Panicum. (Fig. 257.)

*Culms erect or ascending, $1\frac{1}{2}^\circ$-4° tall, rather stout, simple at first, much branched later in the season. Sheaths longer than the internodes, much crowded on the branches, papillose-hispid, especially the upper ones; leaves 2'-8' long, $\frac{1}{2}'$-$1\frac{1}{4}'$ wide, cordate-clasping at base, acuminate, smooth and glabrous; panicles long-exserted; spikelets 1'-1$\frac{1}{2}'$ long, ellipsoid; first scale about one-third as long as the spikelet; second and third oval, acutish, 9-nerved, the fourth oval, obtuse, apiculate, whitish, shining.

*In thickets, Quebec to Michigan, south to Georgia, Missouri and Texas. June-July.*

16. *Panicum xanthophyllum* A. Gray. Sleuder Panicum. (Fig. 258.)

*Culms erect, 1°-2° tall, simple. Sheaths sparingly papillose-pubescent; ligule very short; leaves 3'-6' long, $\frac{3}{4}'-\frac{7}{8}'$ wide, rounded at base, long-acuminate, erect, smooth and glabrous; panicle long-exserted, linear, 1$\frac{3}{4}'$-4° long, its branches appressed; spikelets few, about $1\frac{1}{4}$" long, obovoid, pubescent or glabrate; first scale about one-half as long as the nearly equal obtuse second and third; fourth scale indurated and shining, elliptic or oval.


17. *Panicum Scribneriànum* Nash. Scribner's Panicum. (Fig. 259.)

*Culms erect, 6'-20° tall, simple or late in the season dichotomously branched above, sparingly pubescent. Sheaths strongly papillose-hispid, sometimes glabrate; leaves 2'-4' long, 3'-6' wide, rounded or truncate at base, acuminate, more or less spreading, smooth above, scabrous beneath; panicles small, the primary one exserted, ovoid, 1$\frac{1}{2}'$-3' long, the secondary ones much smaller and more or less included; branches of the primary panicle spreading, 8'-1$\frac{1}{2}'$ long, often flexuous; spikelets turgid, obovoid, about 1$\frac{1}{2}$" long.

*In dry or moist soil, Maine and Ontario to Minnesota, south to Virginia, Kansas and Arizona. June-Aug.*
18. Panicum Wilcoxianum Vasey. Wilcox's Panicum. (Fig. 260.)


Culms erect, 6'-10' tall, sparingly pubescent. Sheaths papillose-pubescent; ligule a ring of hairs; leaves 1½'-3' long, less than 2' wide, long-acuminate, strongly pubescent with long hairs; panicle about 1½' long, oblong to ovoid, compact; branches less than 1' long, spreading or ascending, flexuous; spikelets about 1½'' long, ellipsoid; first scale about one-quarter as long as the spikelet; second and third scales about equal, pubescent; fourth scale about as long as the third, obtuse.

In dry soil, Nebraska. July-Aug.

19. Panicum boreale Nash. Northern Panicum. (Fig. 261.)


Culms at first erect and simple, 1°-2° tall, later decumbent and somewhat branched, smooth and glabrous. Sheaths shorter than the internodes, usually smooth, ciliate; ligule short, ciliate; leaves 3'-5' long, ½'-1½' wide, erect, truncate or rounded at the sparsely ciliate base, acuminate; panicle 2'-4' long, ovoid, its branches 1'-2' long, spreading or ascending; spikelets 1'' long, about equalling the pedicles, ellipsoid, somewhat pubescent; first scale ovate, obtuse, about one-third as long as the spikelet; second and third scales oblong-ovate, 7-nerved, pubescent, equalling the fourth, which is oval, acute, and slightly more than ¾'' long; palet of third scale usually empty.

Moist soil, Newfoundland and Ontario to New York, Vermont and Minnesota. Summer.

20. Panicum laxiflorum Lam. Lax-flowered Panicum. (Fig. 262.)

Panicum laxiflorum Lam. Encycl. 4: 748. 1797.

Culms erect, 8'-16' tall, simple, pubescent or glabrate. Sheaths shorter than the internodes, hirsute; leaves 2½'-5' long, 2½'-5'' wide, erect, generally narrowed at base, long-acuminate, pubescent or glabrate; panicle 2'-4' long, its axis and erect or spreading branches sometimes hirsute; spikelets about 1'' long, ellipsoid or narrowly obovoid, strongly pubescent; first scale minute, 1-nerved; second and third about equal, 9-nerved, very pubescent, as long as the shining obtuse minutely apiculate fourth one; third scale usually with an empty palet.

Moist soil, Virginia to Kentucky, south to Florida. Also reported from much further north. It has been confused with the preceding species. June-Aug.
21. Panicum nitidum Lam. Shining Panicum. (Fig. 263.)

*Panicum nitidum* Lam. Encycl. 4: 748. 1797.

Culms at first simple, 12'-18' tall, later profusely dichotomously branched, 2'-3' long. Sheaths glabrous to pubescent; ligule pilose; leaves glabrous to sparingly hirsute, truncate or slightly rounded at base, the primary ones 1'-3' long, 1 1/2'-3' wide, erect, those of the branches 1/2'-1' long, 1' wide or less; primary panicle long-exserted, 1'-2' long, ovoid, those of the branches smaller and exceeded by the leaves; spikelets about 1/2' long, obvoid, pubescent, usually purple; first scale about one-third as long as the spikelet, 1-nerved; second and third scales broadly oval or orbicular, 7-nerved, shining; fourth scale minutely apiculate, 1/2' long.

Common in dry sandy soil, in the Eastern and Middle States, and probably much more widely distributed. June-Aug.

22. Panicum dichotomum L. Forked Panicum. (Fig. 264.)

*Panicum dichotomum* L. Sp. Pl. 85. 1753.


Smooth and glabrous, or the lower nodes barbed, culms erect, 1/2'-2' tall, at first simple, later profusely dichotomously branched at about the middle. Leaves light green, widely spreading, generally much narrowed toward the base, the primary ones distant, 2'-3' long, 2'-3' wide, those of the branches 1' long or less, 1 1/2'-1' wide, sometimes involute; primary panicle usually long-exserted, 1'-2' long; branches lax, spreading, bearing few spikelets; secondary panicles smaller, not exceeding the leaves, their branches with very few spikelets; spikelets about 1' long, ellipsoid, glabrous.

In woodlands and thickets, New York to Kentucky, Missouri and southward. June-July.

23. Panicum barbulatum Michx. Barbed Panicum. (Fig. 265.)


Culms at first simple, erect, 2'-3' tall, later profusely branched for their whole length, 3'-4' long, prostrate or leaning, the nodes strongly barbed. Leaves smooth and glabrous, generally truncate or rounded at the base, the primary ones 3'-5' long, about 1/2' wide, widely spreading, the lower ones usually reflexed, those of the branches 1/2'-2' long, 1'-2' wide; primary panicle 3'-5' long, exserted, ovoid, its branches ascending, rigid; secondary panicles smaller, lax, not exceeding the leaves, the branches bearing few spikelets; spikelets about 1/4' long, ellipsoid, purple, glabrous; first scale about one-third as long as the spikelet, acute.

Moist soil, New York to Tennessee, south to Florida and Texas. June-Aug.
24. Panicum viscidum Ell. Velvety Panicum. (Fig. 266.)


Culms erect, 2°-4° tall, simple or at length much branched above, villous. Sheaths shorter than the internodes, villous; leaves generally narrowed, sometimes rounded or truncate at base, softly pubescent, those of the culm 4'-7' long, 5''-8'' wide, distant, those of the branches 1'-2 1/2' long, 2'-3'' wide, crowded; primary panicle 3'-6' long, ovoid, branches ascending; secondary panicles much smaller, not exceeding the leaves; spikelets ovoid to oval, about 1/4'' long, pubescent; first scale broadly ovate, about one-fourth as long as the spikelet; second and third scales nearly orbicular, 9-nerved, pubescent, the fourth oval, apiculate, 1'' long.


25. Panicum pubescens Lam. Hairy Panicum. (Fig. 267.)

Panicum pubescens Lam. Encycl. 4: 748. 1797.


Culms at first erect and simple, later profusely branched and leaning or ascending, glabrous or pubescent. Sheaths hirsute to villous, often papillose; leaves rounded, truncate or often narrowed at the base, pubescent or glabrate, generally more or less spreading, those of the culm 2'-3' long, those of the branches much shorter; primary panicles less than 3' long, ovoid, their branches ascending; lateral panicles much smaller, not exceeding the leaves; spikelets hardly 1'' long, pubescent.

In dry soil, common in the Eastern and Middle States, its western and southern range undetermined. June-Aug.

Panicum lanuginosum Ell., here regarded as referable to this species, may prove to be distinct.

26. Panicum depauperatum Muhl. Starved Panicum. (Fig. 268.)


Panicum depauperatum Muhl. Gram. 112. 1817.


Culms erect, 1° tall or less, simple or branched at base. Sheaths glabrous to hirsute; leaves erect, elongated, 1 1/2'-2' wide, mostly crowded at base and equalling or one-half as long as the culm, the upper culm leaf often much exceeding the panicle; primary panicle generally much exserted from the upper sheath, 1'-3' long, usually linear, its branches mostly erect; secondary panicles on very short basal branches and often concealed by the lower leaves; spikelets about 1 1/2'' long.

In dry places, Nova Scotia to Manitoba, south to Florida and Texas. June-Sept.
27. *Panicum angustifolium* Ell. Narrow-leaved Panicum. (Fig. 269.)

*Culms* erect, 1°-2° tall, glabrous, at first simple, later profusely branched above. Sheaths glabrous or the basal ones pubescent, those on the culm shorter than the internodes, those on the branches crowded; leaves elongated, 1°-3' wide, narrowed to the base, firm, glabrous, those of the culm distant, those of the branches shorter and crowded; primary panicle long-exserted, 1°-3' long, its branches ascending or erect; lateral panicles smaller, shorter than the leaves; spikelets few, about 1½' long, elliptic to obovoid; first scale one-fourth to one-third as long as the spikelet; second and third oval, 9-nerved, pubescent; fourth oval, minutely pubescent at the apex.

Dry soil, North Carolina to Missouri, south to Florida and Texas. June-Aug.

28. *Panicum virgatum* L. Tall Smooth Panicum. (Fig. 270.)

*Culms* erect from a creeping rootstock, 3°-5° tall, glabrous. Sheaths smooth and glabrous; leaves elongated, 1° or more long, 3°-6' wide, flat, long-acuminated, narrowed toward the base, glabrous, rough on the margins; *panicle* 6'-20' long, the lower branches 4'-10' long, more or less widely spreading or sometimes nearly erect; spikelets ovate, acuminate, 2½'-2½' long; first scale acuminate, about one-half as long as the spikelet, 3-5-nerved; second scale generally longer than the others, 5-7-nerved, the third similar and usually subtending a palet and staminate flower; fourth scale shining, shorter than the others.

In moist or dry soil, Maine and Ontario to Minnesota, south to Florida, Kansas and Texas. Aug.-Sept.

29. *Panicum amarum* Ell. Sea-beach Panicum. (Fig. 271.)

*Smooth* and glabrous, glaucous, culms arising from long branching rootstocks, 1°-3° tall, decumbent. Sheaths overlapping; leaves 6'-1° long, 3°-6' wide, long-acuminated, thick and leathery, involute on the margins, at least toward the apex, the uppermost leaf generally exceeding the panicle; panicle linear, less than 1° long, its branches erect; spikelets 2½'-3' long; first, second and third scales acuminate, the first one-half to two-thirds as long as the spikelet, the third somewhat longer than the second, usually with a palet and staminate flower, the fourth elliptic, about 1½' long.

30. Panicum miliaceum L. Millet.  
(Fig. 272.)


Culms erect or decumbent, rather stout, 1° or more tall, glabrous or hirsute. Sheaths papillose-hirsute; leaves 5'-10' long, 1/2'-1' wide, more or less pubescent; panicle rather dense, 4'-10' long; branches erect or ascending; spikelets 2'-21/2' long, acuminate; first scale about two-thirds as long as the spikelet, acuminate, 5-7-nerved; second scale 2'-21/2' long, acuminate, 13-nerved, somewhat exceeding the 7-13-nerved acuminate third one, which subtends an empty palet; fourth scale shorter than the third, becoming indurated, obtuse.


_Culms_ erect or decumbent and geniculate, 4'-6' long, branched at all the upper nodes. Sheaths loose, glabrous, somewhat flattened; ligule ciliate; leaves 6'-2' long, 2'-10' wide, long-acuminate, scabrous on the margins and occasionally on the nerves; panicle pyramidal, 4'-16' long, lower branches 3'-6' long, at length widely spreading; spikelets 1'-11/2' long, crowded, lanceolate, acute, glabrous, sometimes purplish; first scale about one-fourth as long as the spikelet, enclosing its base; second and third scales about equal, acute, 5-7-nerved; fourth scale elliptic, shining, somewhat shorter than or equalling the third.

In wet soil, Maine to Pennsylvania and Nebraska, south to Florida and Texas. July–Sept.

32. Panicum capillare L. Witch Grass.  
(Fig. 274.)


_Panicum capillare_ var. caespitum Gatting, Tenn. Pl. 38. 18:34. Not _P. caespitum_ L. 1753.

_Culms_ more slender than in the type; terminal panicle rarely over 6' long, the lateral ones very numerous. Moist places, New Jersey to Tennessee, Missouri and southward.
33. **Panicum flexile** (Gattinger) Scribn. **Wiry Panicum.** (Fig. 275.)

*Panicum capillare* var. *flexile* Gattinger, Tenn. Fl. 94. 1887.


Culms erect, 6'-18' tall, slender, simple or somewhat branched at base, bearded at the nodes. Sheaths papillose-hirsute; leaves 4'-9' long, 2'-3'' wide, erect, long-acuminate, more or less pubescent; panicle 4'-9' long, narrowly ovoid to oblong in outline, its branches ascending, the lower ones 2'-3½'' long; spikelets ½'' long, much shorter than the pedicels, acuminate; first scale about one-fourth as long as the spikelet; second and third scales about equal, 5-7 nerved; fourth scale elliptic, somewhat shorter than the third.

In moist or dry soil, Pennsylvania to Tennessee and Missouri. Aug.–Oct.

34. **Panicum autunnale** Bosc. **Diffuse Panicum.** (Fig. 276.)

*Panicum nudum* Walt. Fl. Car. 73. 1788?

*Panicum divergens* Muhl. Gram. 120. 1817. Not H.B.K. 1815.

*Panicum autunnale* Bosc; Spreng. Syst. 1: 320. 1825.

Culms erect or decumbent, 1'-3' tall, generally much branched at the base, slender. Sheaths shorter than the internodes, the upper glabrous, the lower sometimes densely pubescent; leaves 1½'-4' long, 1''-3'' wide, ascending, acuminate, glabrous; panicle 5'-12' long, bearded in the axils, the lower branches 4'-8' long, at first erect with the lower portion included in the upper sheath, finally exerted and widely spreading at maturity; spikelets lanceolate, about 1½'' long, acuminate, glabrous or pubescent, on capillary pedicels of many times their length; first scale minute; second and third equal, acute, glabrous or sometimes villous, the fourth lanceolate, 1½'' long.


35. **Panicum minus** (Muhl.) Nash. **Wood Panicum.** (Fig. 277.)


*Panicum capillare* var. *sylvaticum* Torr. Fl. 149. 1824.

Not *P. sylvaticum* Lam. 1797.


Not Sw. 1788.


Culms erect, or occasionally decumbent, 8'-2° long, slender, somewhat branched at base. Sheaths hirsute; leaves 2'-4' long, 1''-3'' wide, erect, more or less pubescent; panicle 4'-9' long, its lower branches 3'-4' long, spreading or ascending; spikelets about ¾'' long, elliptic, acute, smooth, borne in pairs at the extremities of the ultimate divisions of the panicle; first scale about one-third as long as the equal acute second and third ones, the fourth somewhat shorter than the third.

In dry woods and thickets, New Brunswick to Georgia, west to Missouri. Aug.–Sept.
36. Panicum verrucosum Muhl. Warty Panicum. (Fig. 278.)


Culms erect or decumbent, slender, generally much branched at base. Sheaths glabrous, much shorter than the internodes; ligule short, ciliate; leaves 2'-7' long, 1'/-4' wide, erect or ascending, glabrous, rough on the margins; panicle 3'-12' long, its lower branches 2'-5' long, naked below, strict and ascending, or lax and spreading; spikelets about 3/4' long, elliptic, acutish, borne in pairs along the branches, the first scale about one-quarter as long as the warty second and third, the fourth scale apiculate.

Moist soil, Massachusetts to Florida, west to Louisiana, mostly near the coast. July-Sept.

37. Panicum gibbum Ell. Gibbous Panicum. (Fig. 279.)


Culms erect from a creeping base, 2'-6' tall, dichotomously branched below. Lower sheaths densely hirsute, the upper generally glabrous; leaves 3'-7' long, 2''-10'' wide, usually spreading, more or less pubescent; panicle 3'-9' long, dense and contracted; branches 1/2'-1' long, erect; spikelets 1'/-2'' long, elliptic, somewhat acute; first scale about one-quarter as long as the spikelet; second scale gibbous at base, 11-nerved; third scale about equalling the second, 7-nerved, empty, the fourth one shorter than the second.

Swamps, Virginia to Tennessee, south to Florida and Louisiana. Also in Cuba. July-Sept.


Mostly annual grasses with erect culms, flat leaves, the inflorescence in spike-like panicles. Spikelets 1-flowered, or rarely with a second staminate flower, the basal bristles single or in clusters below the articulation of the rachilla, and therefore persistent. Scales of the spikelet 4, the three outer membranous, the third often subtending a panel and rarely a staminate flower; the inner or fourth scale chartaceous, subtending a palet of similar texture and a perfect flower. Stamens 3. Styles distinct, elongated. Stigmas plumose. Grain free, enclosed in the scales. [Greek, in reference to the viscid spikelets of some species.]

Species about 10, in temperate and tropical regions. Those occurring in our range are introduced from the Old World.

Bristles downwardly barbed.
Bristles upwardly barbed.
Mature fourth scale of spikelet oval in outline, very convex, almost hemispheric, coarsely transversely rugose.
Mature fourth scale generally elliptic in outline, only moderately convex, finely transversely rugose or pitted, striate.
Spikes 1'-3'/ long, 1/2' or less thick; spikelets about 1' long, always much exceeded by the green bristles.
Spikes 4'-9' long, 3'/-2' thick; spikelets about 1'/ long, equalled or exceeded by the usually purplish bristles.

1. I. verticillatus.
2. I. glauces.
3. I. viridis.
4. I. italicus.
1. *Ixophorus verticillatus* (L.) Nash. Foxtail-grass. (Fig. 280.)


*Setaria verticillata* Beauv. Agrost. 51. 1812.


Culms erect or decumbent, 1'-2' tall, more or less branched. Sheaths glabrous; leaves 2'-6' long, 1/2'-3/2' wide, scabrous above; spikes 2'-3' long; spikelets about 1'' long, equalled or exceeded by the downwardly barbed bristles; first scale less than one-half as long as the spikelet, 1-nerved; second and third scales 5-7-nerved, equaling the oval fourth one; palet of third scale empty.


2. *Ixophorus glaucus* (L.) Nash. Yellow Foxtail. Pigeon-grass. (Fig. 281.)

*Panicum glaucum* L. Sp. Pl. 56. 1753.

*Setaria glauca* Beauv. Agrost. 51. 1812.

*Chamaeraphis glauca* Kuntze, Rev. Gen. Pl. 767. 1891.


Culms erect or sometimes decumbent, 1'-4' tall, more or less branched. Sheaths glabrous; leaves 2'-6' long, 2'-3' wide; spikes 1'-4' long; spikelets 1'2''-1'' long, oval, much shorter than the upwardly barbed yellowish brown bristles; first scale 1-3-nerved, somewhat shorter than the 5-nerved second one; third scale 5-nerved, equaling the fourth which is coarsely transversely rugose, very convex, V-shaped in cross-section, about twice as long as the second; palet of third scale usually empty.


3. *Ixophorus viridis* (L.) Nash. Green Foxtail-grass. (Fig. 282.)


*Setaria viridis* Beauv. Agrost. 51. 1812.


Culms erect or ascending, 1'-3' tall, simple or branched. Sheaths glabrous; leaves 3'-10' long, 2'-6' wide, usually scabrous above; spikes 1'-4' long; spikelets about 1'' long, elliptic, much shorter than the green, or sometimes yellowish, upwardly barbed bristles; first scale less than one-half as long as the spikelet, 1-3-nerved; second and third scales 5-nerved; fourth scale finely and faintly transversely rugose, or pitted, striate, only moderately convex, equaling or slightly exceeding the second; palet of third scale usually empty.

In waste places and cultivated grounds, throughout North America except the extreme north, and often a troublesome weed. Naturalized from Europe. July-Sept.
4. *Ixophorus Italicus* (L.) Nash. Italian Millet. Hungarian Grass. (Fig. 283.)

*Panicum Italicum* L. Sp. Pl. 56. 1753.

*Chamaeraphis Italica* Kunze, Rev. Gen. Pl. 768. 1891.


Culms erect, 2°-5° tall. Sheaths smooth or scabrous; leaves 6'-10' or more in length, \( \frac{3}{4} '-1\frac{3}{4} \) wide, generally scabrous; spikes 4'-9' long, \( \frac{1}{2} '-2' \) thick, usually very compound; spikelets about 1\( \frac{3}{4} ' \) long, elliptic equalled, or exceeded by the upwardly barbed generally purplish bristles; first scale less than one-half as long as the spikelet, 1-3-nerved; second and third 5-7-nerved; fourth scale equalling or somewhat exceeding the second, finely and faintly transverse-rugose, or pitted, striate, only moderately convex; palet of third scale minute or wanting.

In waste places, escaped from cultivation, Quebec to Minnesota, south to Florida and Texas. Native of the Old World. July-Sept.


Annual or perennial grasses with usually flat leaves. Inflorescence in spikes. Spikelets subtended by a spiny involucr which is deciduous with them at maturity. Scales 4; the first hyaline; the second and third membranous, the latter sometimes having a palet and stamine flower in its axil; the fourth chartaceous, subtending a palet of similar structure which encloses a perfect flower. Stamens 3. Styles united below. Stigmas plumose. Grain free, enclosed in the scales. [Ancient Greek name for some grass, probably Millet.]

About 12 species, in tropical and temperate regions. Besides the following, some 4 others occur in the southern parts of North America.

1. *Cenchrus tribuloides* L. Bur-grass. Hedgehog-grass. (Fig. 284.)

*Cenchrus tribuloides* L. Sp. Pl. 1050. 1753.

*Cenchrus Carolinianus* Walt. Fl. Car. 79. 1788.

Culms erect or decumbent from an annual root, usually robust, 8'-2\( \frac{1}{2} \) long, branching freely. Sheaths usually very loose, compressed, smooth; leaves 2\( \frac{1}{2} '-5' \) long, 2'-4' wide, flat or somewhat complanate; spikes 1'-2\( \frac{1}{2} ' \) long, sometimes partially included in the upper sheath; involucres crowded on the scabrous rachis, 2-flowered, globose, pubescent except at the base, forming spiney burs, the spines stout; spikelets about 3' long.


Tall aquatic monoeocious grasses, with long flat leaves and paniculate inflorescence. Spikelets 1-flowered, the stamine borne at the top of the branches, the pistillate at the base. Scales 2, nearly equal, membranous, the outer one in the pistillate spikelets broad, acute and bearing an awn. Stamens 6. Styles united. Grain nearly globose, the pericarp readily separable. [Name in allusion to the resemblance of this grass to *Zizania*.]

A monotypic genus, of temperate and tropical America.
16. ZIZÀNIA L. Sp. Pl. 991. (1753.)

A tall aquatic monoecious grass with long flat leaves and an ample panicle. Spikelets 1-flowered, the pistillate borne on the upper branches of the panicle, the staminate on the lower. Scales 2, membranous, the outer somewhat longer, acute in the stamine, long-awned in the pistillate spikelets. Stamens 6. Styles nearly distinct. Grain linear, 5"-5' long. [From an ancient Greek name for Darnel.]

A monotypic genus of North America and Asia.


(Fig. 286.)


Culms erect from an annual root, 3"-10" tall, smooth and glabrous. Sheaths loose, glabrous; ligule about 1/4" long, thin-membranous; leaves 1" or more long, 1'/4-1'/2" wide, more or less roughened, especially above, glabrous; panicle 1'-3" long, the upper branches erect, the lower widely spreading; staminate spikelets 3'-6' long, scales acute or awn-pointed, outer 5-nerved, the inner 3-nerved; scales of the linear pistillate spikelets 4'-12' long, the outer one 5-nerved, with an awn 1'-2' long, the inner narrower, 3-nerved, awn-pointed.

In swamps, New Brunswick to Manitoba, south to Florida, Louisiana and Texas. June-Oct.


Marsh grasses with flat narrow generally rough leaves, and paniculate inflorescence. Spikelets 1-flowered, perfect, strongly flattened laterally, and usually more or less imbricated. Scales 2, chartaceous, the outer one broad and strongly couduplicate, the inner much narrower. Stamens 1-6. Styles short, distinct. Stigmas plumose. Grain ovoid, free. [Greek, in reference to the supposed resemblance of these grasses to Millet.]

About 5 species, natives of temperate and tropical countries. Besides the following, 2 others occur in the southern United States.

Spikelets oblong, their width less than one-half their length, somewhat imbricated.

Spikelets 1'/2-1'/2" long; panicule-branches usually rigid. 1. H. Virginicus.

Spikelets 2'-21/2" long; panicule-branches generally lax. 2. H. oryzoides.

Spikelets oval, their width more than one-half their length, much imbricated. 3. H. lenticularis.
1. Homalocenchrus Virginicus (Willd.) Britton. White Grass. (Fig. 287.)

Asprella Virginica R. & S. Syst. 2: 266. 1817.

Culms glabrous, decumbent, 1°-3° long, much branched, slender, smooth. Sheaths usually shorter than the internodes; ligule short; leaves 2'-6' long, 1'-8' wide, acute, usually narrowed toward the base, scabrous; terminal panicle finally long-exserted, 3'-8' long, its branches generally spreading, usually naked below the middle; lateral panicles smaller and usually included; spikelets 1 1/4'-1 1/2' long, about 1/2' wide, oblong, appressed; outer scale hispid on the keel and margins; inner scale hispid on the keel; stamens 1 or 2.

Swamps or wet woods, Maine to Ontario and Minnesota, south to Florida, Kansas and Texas. Aug.-Sept.

2. Homalocenchrus oryzoides (L.) Poll. Rice Cut-grass. (Fig. 288.)

Phalaris oryzoides L. Sp. Pl. 55. 1753.
Leersia oryzoides Sw. Fl. Ind. Occ. 1: 132. 1797.

Culms glabrous, decumbent, 1°-3° long, much branched, rather stout, smooth. Sheaths shorter than the internodes, very rough; ligule very short; leaves 3'-10' long, 2'-5' wide, acute, narrowed toward the base, scabrous; terminal panicle 5'-9' long, finally long-exserted, its branches lax, naked at the base, at first erect, later more or less widely spreading; lateral panicles generally included; spikelets 2'-2 1/2' long, about 3/8' wide, elliptic; scales pubescent, the outer one hispid on the keel and on the margins; inner scale much narrower, hispid on the keel; stamens 3; anthers yellow.

In swamps and along streams, often forming dense tangled masses, Nova Scotia to western Ontario, south to Florida, Kansas and Texas. Also in the temperate parts of Europe and Asia. Aug.-Sept.

3. Homalocenchrus lenticuläris (Michx.) Scribn. Catch-fly Grass. (Fig. 289.)


Culms glabrous, erect, 2°-4° tall, usually simple, smooth. Sheaths shorter than the internodes, scabrous; ligule very short; leaves 4'-12' long, 4'-10' wide, acute, more or less narrowed at the base, scabrous; panicle 4 1/2'-9' long, finally exserted, its branches lax, naked below, at first erect, later spreading; spikelets much imbricated, 2'-2 1/2' long, 1'-1 1/2' wide, broadly oval; scales smooth or sparingly hispid-scabrous, the outer one strongly 3-nerved, hispid on the keel and margins, the inner much narrower, strongly 1-nerved, hispid on the keel; stamens 2.

Wet grounds, Virginia to Illinois and Missouri, south to Florida and Texas. July-Sept.
Annual or perennial grasses with flat leaves, the inflorescence spike-like, capitate or a narrow panicle. Spikelets crowded, 1-flowered. Scales 5, the first and second about equal in length, strongly compressed laterally, usually wing-keeled; third and fourth scales much smaller or reduced to mere rudiments; fifth scale subtending a palet similar to itself and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, smooth, enclosed in the scales. [Greek, alluding to the shining grain.]

About 10 species, mostly natives of southern Europe. Besides the following, 3 others occur in the United States.

Outer scales not winged; inflorescence a narrow panicle.
Outer scales broadly winged; inflorescence a spike or spike-like panicle.
Spikelets narrow; third and fourth scales much reduced, rigid, subulate, hairy.
Spikelets broad; third and fourth scales thin-membranous, broadly lanceolate, glabrous or sparingly hairy.

1. Phalaris arundinacea L. Reed Canary-grass. (Fig. 290.)

Glabrous; culms erect, 2°-5° tall, simple, smooth. Sheaths shorter than the internodes; ligule 1°-'-3° long, obtuse, membranous; leaves 3½'-10° long, 3°-8° wide, acuminate, smooth or scabrous; panicle 3°-8° long, dense, its branches ½°-1½° long, erect or sometimes slightly spreading; spikelets 2½°-3° long; outer scales scabrous, 3-nerved; third and fourth scales less than one-half as long as the fifth, subulate, rigid, hairy; fifth scale about three-fourths as long as the spikelet, chartaceous, pubescent with long appressed silky hairs, subtending a palet of similar texture and a perfect flower.

In moist or wet soil, Nova Scotia to British Columbia, south to New Jersey, Kentucky, Kansas and Nevada. Also in Europe and Asia. July-Aug. The Ribbon-grass or Painted-grass of cultivation, the so-called variety picta, has leaves variegated with green and white stripes, is a derivative of this species, and sometimes escapes from gardens.

2. Phalaris Caroliniana Walt. Carolina Canary-grass. (Fig. 291.)

Culms 1°-3½° tall, erect or sometimes decumbent at base, simple or somewhat branched, smooth or roughish, glabrous. Sheaths usually shorter than the internodes; ligule 1°-'-3° long, rounded, thin-membranous; leaves 2'-6° long, 2°-5° wide, smooth or slightly scabrous; spike-like panicle 1°-4° long, dense, its branches about ½° long, erect; spikelets 2½° long, the outer scales more or less scabrous, 3-nerved, wing-keeled; third and fourth scales less than one-half as long as the fifth, subulate, hairy; fifth scale about two-thirds as long as the spikelet, acuminate, pubescent with long appressed silky hairs.

In moist soil, South Carolina to Missouri and California, south to Florida and Texas. June-Aug.
3. Phalaris Canariénisis L. Canary-grass. (Fig. 292.)

Phalaris Canariénisis L. Sp. Pl. 54. 1753.

More or less roughened, culm 1°-3° tall, erect, simple or branched, glabrous. Sheaths shorter than the internodes; ligule about 1" long, rounded; leaves 2'-12' long, 2'-6' wide, strongly scabrous; spikes ½'-1½' long, ovoid or oblong; spikelets 3'-4' long; outer scales glabrous or sparingly pubescent; third and fourth scales about half the length of the fifth, broadly lanceolate, thin-membranous, sparingly hairy; fifth scale about two-thirds as long as the spikelet, acute, pubescent with appressed silky hairs.

In waste places, Nova Scotia to Ontario, Virginia and Nebraska. Naturalized from Europe. Outer scales usually nearly white with green veins. The grain is the common food of canary birds. July-Aug.


Fragrant annual or perennial grasses, with flat leaves and spike-like panicles. Spikelets 1-flowered, narrow, somewhat compressed. Scales 5; the two outer acute or produced into a short awn, the first shorter than the second; third and fourth scales much shorter, 2-lobed, awned on the back; the fifth scale shorter than the others, obtuse. Stameus 2. Styles distinct. Stigmas elongated, plumose. Grain free, enclosed in the scales. [Greek, referring to the yellow hue of the spikelets in some species.]

A genus of 4 or 5 species, natives of Europe.

1. Anthoxanthum odorátum L.

Sweet Vernal-grass. (Fig. 293.)

Anthoxanthum odorátum L. Sp. Pl. 28. 1753.

Culms 1°-2° tall, erect, simple or branched, smooth and glabrous. Sheaths shorter than the internodes; ligule 1'-2' long, acute, membranous; leaves ½'-6' long, 1'-3' wide, glabrous or nearly so; spike-like panicles 1'-2½' long, branches short, erect or ascending; spikelets 4' long, crowded; outer scales acute, glabrous or pubescent, the first 1-nerved, half as long as the second which is 3-nerved; the third and fourth very hairy, the former with an awn nearly twice its length inserted about the middle, the fourth scale bearing near the base an awn more than twice its length; fifth scale about two-thirds as long as the fourth, obtuse or rounded at the apex, and bearing a fertile flower.


20. SAVASTÀNA Schrank, Baier. Fl. 1: 100. 1789.


Aromatic perennial grasses, with flat leaves and contracted or open panicles. Spikelets 3-flowered, the terminal flower perfect, the others staminate. Scales 5; the first and second nearly equal, acute, glabrous; the third and fourth somewhat shorter, obtuse, entire, emarginate, 2-toothed or 2-lobed, with or without an awn, enclosing a palet and stamens; fifth scale often produced into a short awn, enclosing a palet and perfect flower. Stamens in the stamine flowers 3, in the perfect 2. Styles distinct. Stigmas plumose. Grain free, enclosed in the scales. [Name unexplained.]

About 8 species, natives of temperate and cold regions.
Third and fourth scales not awned. 
Entire, culms 1'-2' tall. 
Erose-truncate, culms 6'-8' tall or less. 
Third and fourth scales awned.

1. *Savastana odorata* (L.) Scribn. Holy Grass. Seneca Grass. (Fig. 294.)

*Hierochloa borealis* R. & S. Syst. 2: 313. 1817.

Glabrous, culms 1'-2' tall, erect, simple, smooth. 
Sheaths smooth; ligule 1'/2-2'/ long; lower leaves elongated, 4'-8' long, 1'/2-3'/ wide, scabrous, the upper ones 1'/2-2'/ long; panicle 2'-4'/ long, its branches 1'/2-2'/ long, usually spreading, naked below; spikelets yellowish-brown and purple, 2'/2-3'/ long; and first and second scales about equal, glabrous; third and fourth villous and strongly ciliate, entire, awn-pointed, the fifth smaller than the others, villous at the apex.

Newfoundland to Alaska, south to New Jersey, Wisconsin and Colorado. Also in northern Europe and Asia. June-July. This and other sweet-scented grasses are strown before the churches in northern Europe, whence the name Holy Grass. Also known as Vanilla Grass.

Arctic Holy Grass. (Fig. 295.)


Glabrous, culms 6'-8' high or less, erect, simple, smooth. Sheaths mostly at the base of the culm, overlapping; ligule about 1'/2' long; leaves smooth, the basal ones 1'-2' long, 1'/2' wide, involute at least when dry; culm leaves 1'/2' long or less, 1' wide, flat; panicle less than 1' long, contracted; spikelets few, 1'/2-2'/ long; and first and second scales 1'/2-2'/ long, smooth and glabrous; third and fourth shorter, scabrous, erose-truncate, the fifth shorter than the others, obtuse, villous at the apex.

Arctic America. Summer.

3. *Savastana alpina* (Sw.) Scribn. 
Alpine Holy Grass. (Fig. 296.)


Glabrous and smooth, culms 6'-18' tall, erect, simple. Sheaths shorter than the internodes; ligule less than 1' long; lower leaves elongated, 3'-6' long, about 1' wide, the upper much shorter, 1'/2-2'/ long, 1'/2-2'/ wide; panicle 3'/2-1'/ long, contracted, branches short, erect or ascending; occasionally the panicle is larger with longer and spreading branches; spikelets 2'/2-3'/ long, crowded; first and second scales glabrous, 2'/2-3'/ long; and third and fourth shorter, scabrous, ciliate on the margins, the former bearing an awn about 1' long, the latter with a more or less bent awn about 3' long; fifth scale shorter than the others, acute, usually awn-pointed, villous at the apex.

21. ARISTIDA L. Sp. Pl. 82. 1753.

Grasses varying greatly in habit and inflorescence. Leaves narrow, often involute-setaceous. Spikelets narrow, 1-flowered. Scales 3, narrow, the two outer carinate; the third ridged and convolute, bearing three awns occasionally united at the base, the lateral awns rarely wanting or reduced to rudiments. Palet 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain free, tightly enclosed in the scale. [Latin, from arista, an awn.]

About 100 species, in the warmer regions of both hemispheres. Besides the following, some 20 others occur in the southern and western parts of North America. The English name Three-awned Grass is applied to all the species.

Awns not articulated to the scale nor united at the base.

Lateral awns usually erect, not more than half as long as the horizontal or reflected, central one, generally much shorter or occasionally wanting.

Third scale, exclusive of awns, 3'-4' long or less.

Central awn not spiral at base, terminal straight portion 2'-3' long. 1. A. dichotoma.

Central awn not spiral at base, terminal straight portion 3'-7' long. 2. A. gracilis.

Third scale, exclusive of awns, 4'-7' long or more.

Central awn spiral, lateral awns one-quarter to one-half as long. 3. A. basiramea.

Central awn not spiral or rarely so, reflexed, lateral awns less than one-sixth as long or wanting. 4. A. ramosissima.

Lateral awns usually diverging, more than half as long as the horizontal or divergent central one, generally about equaling it.

First scale exceeding the second.

Sheaths glabrous.

Sheaths, at least the lower ones, woolly.

First scale half as long as the second or equaling it.

First scale 5-nerved, or occasionally 7-nerved at base.

First scale 1-nerved, sometimes with an obscure additional nerve on each side.

Central awn 1'-2'-4' long; panicle 4'-6' long, lax, few-flowered. 8. A. purpurea.

Central awn 1' long or less.

Culms simple; panicle strict, 6'-8' long.

Culms branched; panicle somewhat lax, not 1° long.

Awns articulated to the scale, more or less united at the base.

Column of the awns conspicuous, 3' long or more.

Column of the awns inconspicuous, less than 1° long.

1. Aristida dichotoma Michx. Poverty Grass. (Fig. 297.)


Aristida dichotoma var. Curritissi A. Gray, Man. Ed. 6, 640. 1890.

Culms 6'-2° tall, erect, slender, dichotomously branched, smooth or roughened. Sheaths much shorter than the internodes, loose, smooth and glabrous; ligule very short, ciliate; leaves 1'-3' long, less than 1' wide, involute; acuminate, usually scabrous; spike-like racemes or panicles 2'-5' long, slender; spikelets about 3' long; outer scales nearly equal or the lower somewhat shorter, usually awn-pointed; third scale shorter than the second, the middle awn horizontal, coiled at base, the terminal straight portion 2'-3' long, the lateral awns 1' long or less, erect.

Dry sandy soil, Maine to Ontario, Missouri and the Indiana Territory, south to Georgia and Texas. Aug.-Sept.

5. A. purpureascens.

6. A. lanata.

7. A. oligantha.

8. A. purpurea.

9. A. stricta.

10. A. dispersa.

11. A. tuberculosa.

12. A. desniantia.

2. Aristida gracilis Ell. Slender Aristida. (Fig. 298.)


Aristida gracilis var. depauwerata A. Gray, Man. Ed. 5, 618. 1897.

Glabrous and smooth throughout, culms 6'-2° tall, erect, simple or branched. Sheaths shorter than the internodes; ligule very short; leaves 1'-4' long, 1' wide or less, flat, or involute when dry; panicle spike-like, 3'-7' long; slender; spikelets about 3' long; outer scales equal, or the lower somewhat shorter, awn-pointed; third scale about equaling the second, generally mottled, middle awn horizontal, the terminal straight portion 3'-7' in length, the lateral awns 1'-3' long, erect.

Dry soil, Massachusetts to Illinois and Nebraska, south to Florida and Texas. Aug.-Sept.
3. Aristida basiramea Engelm. Forked Aristida. (Fig. 299.)


Glabrous and smooth, culms 6'-18' tall, erect, slender, much branched. Sheaths shorter than the internodes, loose; ligule very short, ciliate; leaves 2'-6' long, about 1/2 wide, involute-setaceous; spike-like panicle 3'-5' long; first scale of spikelet half to three-quarters as long as the second, which is 5/7-7/7 in length, both awn-pointed; third scale shorter than the second; middle awn 6/7-9/7 long, coiled at base, horizontal, lateral awns one-quarter to one-half as long, erect or divergent, somewhat spiral at the base.


4. Aristida ramosissima Engelm. Branched Aristida. (Fig. 300.)

*Aristida ramosissima* Engelm.; A. Gray, Man. Ed. 5, 618. 1867.

*Aristida ramosissima* var. uniaristata A. Gray, Man. Ed. 5, 618. 1867.

Glabrous, culms 6'-2° tall, erect, slender, branched, smooth. Sheaths much shorter than the internodes, loose; ligule very short; leaves 1½'-3' long, 1/2 wide or less, flat, attenuate into a long point, smooth beneath, scabrous above; spikelets few, borne in loose spikes from 2'-3' in length; first scale awn-pointed; second scale 8'/7'-10'/7 in length, exceeding the first, terminated with an awn 1'/7-3'/7 long; third scale as long as the second; middle awn about 1' long, horizontal or reflexed and forming a hook, the lateral awns erect, 1'-2' long, rarely wanting.

In dry soil, Illinois to Kentucky and Missouri. July-Sept.

5. Aristida purpurascens Poir. Purplish Aristida. (Fig. 301.)

*Aristida purpurascens* Poir. in Lam. Encycl. Suppl. 1: 452. 1816.

Glabrous and smooth, culms 1°-2½° tall, erect, simple or sparingly branched at the base. Sheaths longer than the internodes, crowded at the base of the culm; ligule very short; leaves 4'-5' long, about 1/2 wide, flat, or becoming involute in drying, attenuate into a long point; spike-like panicles 5'-18' long, strict, or sometimes nodding, its branches appressed; outer scales of spikelet awn-pointed, the first longer than the second; the third scale from two-thirds to three-quarters as long as the first, middle awn 9'/7-12'/7 long, horizontal, the lateral awns somewhat shorter, erect or divergent.

6. *Aristida lanata* Poir. Woolly Aristida. (Fig. 302.)


Culms 2°-4° tall, erect, simple, smooth and glabrous. Sheaths longer than the internodes, crowded at the base of the culm, woolly; ligule very short, minutely ciliate; leaves 1° long or more, about 2" wide, attenuate into a long slender point, smooth beneath, scabrous above; panicle 1°-2° long, strict, branches erect or occasionally somewhat spreading; outer scales of the spikelet awn-pointed, the first 5"-7" long, exceeding the second; third scale slightly shorter than the second, middle awn 8"-12" long, usually horizontal, the lateral awns about two-thirds as long, erect or divergent.

Dry sandy soil, Delaware to Florida, west to Texas. Aug.-Sept.

7. *Aristida oligantha* Michx. Few-flowered Aristida. (Fig. 303.)


Glabrous, culms 1°-2° tall, erect, slender, dichotomously branched, smooth or roughish. Sheaths exceeding the internodes, loose; ligule very short, minutely ciliate; leaves 1°-6° long, ½"-1" wide, smooth, the larger ones attenuate into a long slender point; spikelets few, borne in a lax spike-like raceme or panicle; first scale 5-nerved, occasionally 7-nerved at base, acuminate or short-awned, equalling or somewhat shorter than the second, which bears an awn 2"-4" long; third scale shorter than the first, awns divergent or spreading, the middle one 1½"-2½" long, the lateral somewhat shorter.

Dry soil, New Jersey and Maryland to Nebraska, south to Louisiana and Texas. Aug.-Sept.

8. *Aristida purpurea* Nutt. Purple Aristida. (Fig. 304.)


Glabrous, culms 8'-18' tall, erect, slender, simple, smooth or rough. Sheaths usually shorter than the internodes, smooth or slightly scabrous; ligule short, ciliate; leaves 1½'-4' long, ½"-2½" wide, involute, at least when dry, generally scabrous; spikelets few in spike-like racemes or panicles which are 4'-8' in length; first scale one-nerved or sometimes with an obscure additional nerve on each side; second scale 7'-9' long, about twice as long as the first; third scale equalling or a little exceeding the first, awns divergent, the middle one 1'-3½' long, the lateral ones a little shorter or of the same length.

Dry soil, Minnesota to Idaho and British Columbia, south to Kansas, Texas and Arizona. Plant purple or purplish. July-Sept.
9. Aristida stricta Michx. Erect Aristida. (Fig. 305.)


Culms 2°-4° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth, glabrous or pubescent at the apex; ligule short; leaves involute-hiliform, the basal 1° or more in length, those of the culm 8'-12' long, or the upper shorter; panicle spike-like, strict, or the top sometimes nodding, 6'-2° long, its branches erect; outer scales of the spikelet awn-pointed, the first 1-nerved or occasionally with an obscure additional nerve on each side, shorter than the second; third scale equaling the first or a little shorter; middle awn 5'-10' long, horizontal when old, the lateral ones shorter, erect or divergent.

Dry soil. Virginia (according to S. Watson), south to Florida. July-Sept.

10. Aristida dispersa Trin. & Rupr. Bushy Aristida. (Fig. 306.)

*Aristida Americana* L. Amoen. Acad. 5: 393. 1759?

Glabrous, culms 1°-2° tall, erect, slender, branched, smooth. Sheaths shorter than the internodes, ligule short, ciliate; leaves 2'-6' long, 1' wide or less, flat, attenuate into a long point, smooth or scabrous; panicle 3'-7' long, at first strict, the branches finally more or less spreading; first scale of spikelet 1-nerved, or occasionally with an obscure additional nerve on each side, shorter than the second scale; third scale equaling or longer than the second; awns divergent, the middle one 4'-8' long, the lateral ones shorter.

Dry soil, Kansas to Texas, Mexico, New Mexico and California. Aug.-Sept.

11. Aristida tuberculosa Nutt. Sea-beach Aristida. (Fig. 307.)


Glabrous, culms 6'-2° tall, erect, dichotomously branched, smooth. Sheaths shorter than the internodes; ligule short, ciliate; leaves 5'-9' long, about 1' wide, attenuate into a long slender point, smooth beneath, scabrous above; panicle 5'-8' long, branches slender, ascending; outer scales of the spikelet about equal, awned, the third scale shorter; awns divergent or reflexed, more or less coiled, united at base into a column 3'-6' long which is articulated to the scale.

Sandy soil, especially on sea-beaches, Massachusetts to Minnesota, south to Georgia. Also in the interior in Illinois, Wisconsin and Minnesota. Aug.-Sept.
Western Aristida. (Fig. 308.)


Culms 1°-2° tall, erect, branched, smooth and glabrous. Sheaths shorter than the internodes, smooth, glabrous or the lower sometimes pubescent; ligule short; leaves 6'-12' long, less than 1' wide, attenuate into a slender point, smooth beneath, scabrous above; panicle about 6' long, the branches slender, ascending; outer scales of the spikelet about equal, the third one shorter; awns spreading or reflexed, somewhat coiled, united at base into a column less than 1' long, which is articulated to the scale.

In dry soil, Kansas (?), the Indian Territory and Texas. Aug.-Sept.

22. STIPA L. Sp. Pl. 78. 1753.

Generally tall grasses, the leaves usually convolute, rarely flat, the inflorescence paniculate. Spikelets 1-flowered, narrow. Scales 3; the two outer, acute or rarely bearing an awn, the third rigid, convolute, with a hairy callus at the base, and bearing a more or less bent awn, which is spiral at the base, and articulated to the scale. Palet 2-nerved. Stamens 3, rarely fewer. Styles short, distinct. Stigmas plumose. Grain narrow, free, tightly enclosed in the scale. [Greek, in allusion to the tow-like plumes of some species.]

A genus of about 100 species, distributed throughout the temperate and tropical zones. Besides the following, some 20 others occur in the southern and western parts of North America.

Outer scales of the spikelet 2'-6' long:  
Obtuse or blunt-pointed, 2' in length.  
Acute, 4'-6' in length.  
Awn less than five times the length of the scale.  
Awn more than seven times the length of the scale.

Outer scales of the spikelet 10' long or more.  
Base of panicle usually included in the upper sheath; third scale 4'-6' long; awn slender, curled.  
Panicle exserted from the upper sheath; third scale 7'-12' long, bent.

1. Stipa Macounii Scribn. Macoun's Stipa. (Fig. 309.)


Culms glabrous, 1°-2° tall, erect, simple, slender, smooth or somewhat scabrous. Sheaths shorter than the internodes; ligule about 1'' long, obtuse or truncate; leaves 2'-5' long, ½'-1'' wide, flat, becoming involute-setaceous in drying, scabrous; panicle 2'-5' long, contracted, the branches 1'-2' long, erect, naked below; spikelets borne at the ends of the branches; outer scales about 2' long, obtuse or blunt-pointed, glabrous; third scale somewhat shorter, pubescent with long appressed silky hairs, callus obtuse; awn 4'-5' long, contorted.

2. **Stipa viridula** Trin. Green Stipa.  
(Fig. 310.)


Glabrous, culms 1½°–3° tall, erect, simple, smooth. Sheaths shorter than the internodes; ligule 1″–2″ long; leaves smooth or scabrous, the basal ones involute-filiform, one-third to one-half as long as the culm, those of the culm 3′–9′ long, broader; panicle spike-like, strict and erect, branches appressed; outer scales of spikelet 3′–4′ long, long-acuminated, glabrous; third scale shorter, more or less pubescent with long appressed silky hairs, callus acute; awn 3½′–1½′ long, bent, loosely spiral at base.

Minnesota to British Columbia, south to Kansas, New Mexico and California. July–Aug.

3. **Stipa avenacea** L. Black Oat-grass.  
(Fig. 311.)

*Stipa avenacea* L. Sp. Pl. 73. 1753.


*Stipa bicolor* Pursh, Fl. Am. Sept. 73. 1814.

Culms glabrous, 1°–2½° tall, erect or leaning, simple, smooth. Sheaths shorter than the internodes; ligule about 1″ long, obtuse; leaves involute-filiform, smooth beneath, scabrous above, the basal one-third to one-half the length of the culm, those of the culm 3′–5′ long; panicle 5′–8′ long, loose, the branches lax, erect or finally spreading, naked below; outer scales of the spikelet 4″–5″ long, acute, glabrous; third scale a little shorter, scabrous near the summit, black, pilose at base and with a ring of short hairs at the top, otherwise smooth and glabrous; callus hard, acute; awn 1½′–2½′ long, bent, loosely spiral below.

In dry woods, Rhode Island to Florida, mostly near the coast. Also in western Ontario and Wisconsin. May–June.

4. **Stipa comata** Trin. & Rupe. Western Stipa.  
(Fig. 312.)


Glabrous, culms 1°–2° tall, erect, simple, smooth. Sheaths usually longer than the internodes, smooth or scabrous, the uppermost very long and inflated, enclosing the base of the panicle; ligule 1″–2″ long, obtuse; leaves smooth or somewhat scabrous, the basal involute-filiform, one-quarter to one-half as long as the culm, the culm leaves 3′–6′ long, a little broader than the basal ones, involute; panicle 6′–9′ long, loose, the branches 3′–5′ in length, erect-ascending, naked at base; outer scales of the spikelet 9′–12′ long, glabrous, acuminate into an awn 2″–4″ in length; third scale 4″–6″ long, callus acute; awn 4″–8″ in length, slender, curled, spiral and pubescent below.

(Fig. 313.)


Culms glabrous, 2°-4° tall, erect, simple, smooth. Sheaths longer than the internodes, smooth or somewhat scabrous; ligule 1'-2' long, obtuse; leaves smooth beneath, scabrous above, the basal one-third to one-half as long as the culm, 1'-2' wide or less, usually involute, those of the culm 6'-12' long, about 2' wide, generally flat, attenuate into a long slender point; panicle finally long-exserted, 4'-10' in length, its branches 3'-6' long, erect, naked below; outer scales of spikelet 12'-18' long, acuminate into a long slender point, glabrous; third scale 7'-12' long, callus acute; awn 4'-8' long, stout, usually twice bent, tightly spiral and pubescent below, doubly spiral about the middle.


Usually tufted grasses, with flat or convolute leaves and paniculate inflorescence. Spikelets 1-flowered, broad. Scales 3; the two lower about equal, obtuse or acuminate; the third scale shorter or a little longer, broad, bearing a terminal awn which is early deciduous, the callus at the base of the scale short and obtuse, or a mere scar. Stamina 3. Styles distinct. Stigmas plumose. Grain oblong, free, tightly enclosed in the convolute scale. [Greek, in allusion to the supposed resemblance of these grasses to rice.]

About 24 species, distributed through temperate and subtropical regions, rarely extending into the tropics. Besides the following, some 7 others occur in the western parts of North America.

Third scale of the spikelet glabrous or sparingly pubescent with short appressed hairs.
Spikelet, exclusive of awn, 13'/-20' long.
   Awn less than 1' long, much shorter than the scale; outer scales 11/'-2' in length.
   1. O. juncea.

   Awn 3'-4' long, more than twice as long as the scale; outer scales about 1'/ in length.
   2. O. micrantha.

Spikelet, exclusive of awn, 3'-4' long.
Culms nearly naked, leaves all crowded at the base; panicle 2'-3' long, its branches 1' in length or less, erect.
Culms leafy to the top; panicle 6'-12' long; branches 2'-4' in length, more or less spreading.
   3. O. asperifolia.
   4. O. melauocarpa.
   5. O. cuspidata.

Third scale of the spikelet densely pubescent with long silky hairs.

1. Oryzopsis júncea (Michx.) B.S.P. Slender Mountain Rice. (Fig. 314.)

Stipa júncea Michx. Fl. Bor. Am. i: 54. 1803.

Culms glabrous, 6'-2° tall, erect, slender, simple, smooth. Sheaths shorter than the internodes, usually crowded at the base of the culm; ligule about 1'/long, decurrent; leaves smooth or scabrous, erect, involute, the basal about one-half the length of the culm, occasionally equalizing it, filiform, those of the culm 1'-4' long, the uppermost often very small or reduced to the sheath only; panicle 1'-2½' long, the branches ½'-1' in length, erect or ascending, the lower half naked; spikelets 1½'-2' long, the outer scales about equal, glabrous, whitish; third scale about the same length or a little longer, pubescent with short appressed silky hairs, the awn less than 1' long.

In dry rocky places, Quebec to British Columbia, south to Massachusetts, Pennsylvania and Wisconsin. May-June.
2. **Oryzopsis micrantha** (Trin. & Rupr.) Thurb. Small-flowered Mountain Rice. (Fig. 315.)


Culms glabrous, 1°-2½° tall, erect, slender, simple, smooth. Sheaths shorter than the internodes; ligule about ½′ long, truncate; leaves erect, scabrous, the basal one-half the length of the culm, less than ½′ wide, usually more or less involute, the culm leaves 2′-8′ long, ½′-1′ broad, the larger attenuate into a long slender point; panicle 3′-6′ long, the branches finally spreading, the lower ones 1′-2′ long, naked for about two-thirds their length; spikelets 1′-4½′ long, the outer scales about equal, acute, glabrous; third scale shorter, glabrous, bearing an awn 3′-4′ long.

South Dakota to Nebraska, New Mexico and Arizona. June-July.

3. **Oryzopsis asperifolia** Michx. White-grained Mountain Rice. (Fig. 316.)


Culms glabrous, 10′-20′ tall, erect, simple, smooth or scabrous. Sheaths 1′-2′ long, crowded at base; ligule very short, truncate; leaves erect, scabrous, especially above, the basal ones elongated, often equaling or exceeding the culm, 2′-4′ wide, attenuate into a long point, the 1 or 2 culm leaves much reduced, less than ½′ long; panicle 2′-3′ long, contracted, the branches 1′ in length or less, erect; spikelet, exclusive of awn, 3′-4′ long; outer scales glabrous, usually apiculate, the first somewhat shorter; third scale whitish, equaling the second or a little shorter, sparingly pubescent, the awn 3½′-5′ long.

In woods, Nova Scotia to British Columbia, south to New Jersey, Pennsylvania, Minnesota and in the Rocky Mountains to New Mexico. May-June.

4. **Oryzopsis melanocarpa** Muhl. Black-fruited Mountain Rice. (Fig. 317.)

*Oryzopsis melanocarpa* Muhl. Gram. 79. 1817.


Glabrous, culms 1½°-3° tall, erect, simple, roughish. Sheaths smooth or scabrous, the lower ones usually longer, the upper slightly shorter than the internodes; ligule very short; leaves 5′-12′ long, 2′-7′ wide. narrowed toward the base, acuminate at apex into a long slender point, scabrous especially above; panicle branched or nearly simple, 3′-12′ long, its branches 2′-4′ long, spreading or ascending, the lower half naked; outer scales of the spikelet about equal, 3′-4′ in length, acute; third scale shorter, acute, dark colored, sparingly pubescent, the awn 8′-12′ long.

Rocky woods, Vermont and Ontario to Minnesota, south to New Jersey, Kentucky and Missouri. July-Aug.
5. Oryzopsis cuspidata (Nutt.) Vasey. Silky Oryzopsis. (Fig. 318.)

Eriocoma cuspidata Nutt. Gen. 1: 40. 1818.
Oryzopsis membranacea Vasey, Grasses S. W. Part 2, pl. 10. 1891.

Culms glabrous, 1°-2° tall, erect, rigid, simple, smooth. Sheaths usually shorter than the internodes, smooth or somewhat rough; ligule 1°-2° long, acute; leaves 6'-12' long, less than 1° wide, involute, stiff, smooth or somewhat scabrous; panicle 6°-1° long, diffuse, generally partially included in the upper sheath, its branches widely spreading and many times forked, the ultimate divisions flexuous; outer scales of the spikelet 3°-4° in length, long-acuminate, glabrous; third scale about one-half as long, acute, densely pubescent with long silky erect hairs nearly twice its own length, the awn 2°-3° long.

On prairies, Alberta to Washington, south to Nebraska, Arizona and Mexico. May-July.


Annual or perennial grasses, with flat leaves and terminal lax panicles. Spikelets 1-flowered. Scales 3, obtuse, not awned; the outer about equal; the third thin-membranous, at length rigid, glabrous or pubescent; palet scarcely shorter. Stamens 3. Styles short, distinct. Stigmas plumose. Grain ovoid or oblong, free, tightly enclosed in the rigid and shining scale and palet. [Latin name for Millet.]

Species 5 or 6, chiefly in Europe and Asia.

1. Milium effusum L. Tall Millet-grass. (Fig. 319.)

*Milium effusum* L. Sp. Pl. 61. 1753.

Glabrous throughout, culms 2°-6° tall, erect, simple, smooth, Sheaths shorter than the internodes; ligule 1\(\frac{1}{2}\)°-3° long, truncate, erose-dentate; leaves 3°-9° long, 3\(\frac{1}{2}\)-8° wide, narrowed toward the base, acuminate, smooth or scabrous; panicle 3°-10° in length, lax, its branches 2°-3° long, slender, somewhat flexuous, naked at base and dividing above the middle, at length widely spreading; spikelets 1\(\frac{1}{2}\)°-1\(\frac{1}{2}\)° long; outer scales equal, smooth or scabrous, the third scale shorter, smooth, white.

In woods, Cape Breton Island and Quebec to western Ontario, south to Massachusetts, Pennsylvania and Michigan. Also in northern Europe and Asia. June-July.

25. MUHLENBÉRGIA Schreb. Gen. 44. 1789.


Mostly perennial grasses, with flat or convolute leaves and paniculate inflorescence. Rootstocks often scaly. Spikelets 1-flowered, very rarely 2 flowered. Scales 3, very rarely 4; the outer ones empty, membranous or hyaline, acute and sometimes awned; third scale 3-5-nerved, subtending a palet and perfect flower, obtuse, acute, or very often produced into a capillary awn; palet 2-keeled. Stamens often 3. Styles distinct. Stigmas plumose. Callus minute. Grain narrow, free, tightly enclosed in the scale. [In honor of Henry Muhlenberg, 1756-1817, North American botanist.]

About 60 species, chiefly natives of America, a few Asiatic.
Panicle contracted, narrow, spike-like, the short branches rarely spreading.
Flowering scale not awned but sometimes awn-pointed.
Outer scales not awned, about half as long as the flowering scale, acuate. 1. *M. sobolifera.*
Outer scales long-acuminate, awn-pointed or awned.
Outer scales about equal in length to the flowering scale, sharp-pointed, about 1½" long.
2. *M. Mexicana.*
Outer scales exceeding the flowering scale, generally twice its length, awned, about 2½" long.
Flowering scale long-awned; awn usually twice the length of the scale, sometimes shorter.
Outer scales about equalling the flowering scale.
Basal hairs not more than one-half the length of the flowering scale.
Spikelets consisting of 3 scales and 1 perfect flower.
Spikelets consisting of 4 scales, the third with a perfect flower, the fourth empty and awned.
3. *M. racemosa.*
Basal hairs as long as the flowering scale.
Outer scales one-half to two-thirds as long as the flowering scale.
Outer scales less than one-quarter the length of the flowering scale.
Lower scale minute, often wanting; flowering scale with an awn twice its length.
4. *M. sylvatica.*
Lower scale about two-thirds as long as the second; flowering scale with an awn four times its length or more.
Panicle open, its branches long and spreading.
Culms 1½" tall or more; panicle diffuse; leaves elongated, not rigid.
5. *M. capillaris.*
Culms 1½" tall or less; leaves 2′ long or less, rigid.
Secondary branches of the panicle single; basal leaves short, numerous, strongly recurved.
Secondary branches of the panicle fascicled; basal leaves few, not recurved.
7. *M. purpurea.*

1. **Muhlenbergia sobolifera** (Muhl.) Trin. Rock Muhlenbergia. (Fig. 320.)

*Agrostis sobolifera* Muhl.; Willd. Enum. 95. 1809.  
*Muhlenbergia sobolifera* Trin. Unif. 189. 1824.

Glabrous, culms 2°-3° tall, erect, slender, simple, or sparsely branched above, smooth. Sheaths smooth, those of the culm shorter than the internodes, those of the branches overlapping and crowded; ligule very short, truncate; leaves rough, those of the culm 4′-6′ long, 1½′-3′ wide, those of the branches 1′-3′ long, about 1′ wide; panicle 3′-6′ in length, slender, its branches 2½′-4′ long; outer scales about ½′ long, half to two-thirds the length of the spikelet, equal, or the lower somewhat shorter, acute, scabrous, especially on the keel; third scale scabrous, obtuse, 3-nerved, the middle nerve usually excursive as a short point.

Rocky woods, Massachusetts to Minnesota, south to Virginia, Tennessee and the Indian Territory. Sept.-Oct.

2. **Muhlenbergia Mexicana** (L.) Trin. Meadow Muhlenbergia. (Fig. 321.)

*Agrostis Mexicana* L. Mant. 1: 31. 1767.  
*Agrostis filiformis* Willd. Enum. 95. 1809.  

Glabrous, culms 2°-4° long, erect, or often prostrate, much branched, smooth. Sheaths shorter than the internodes, excepting at the extremities of the branches, where they are crowded and overlapping, smooth or scabrous; leaves scabrous, those of the culm 4′-6′ long, 1½′-3′ wide, the branch leaves smaller; panicle 2′-6′ long, contracted, its branches spike-like, 1′-2′ long, erect or appressed; spikelets 1½′-1½′ long; outer scales somewhat unequal, exceeding the flowering one, or slightly shorter, acuminate or short-awned, scabrous especially on the keel; third scale acuminate, scabrous, particularly toward the apex.

In swamps and borders of fields, New Brunswick to western Ontario, south to North Carolina, Tennessee and the Indian Territory. Aug.-Sept.
3. *Muhlenbergia racemosa* (Michx.) B.S.P. Marsh *Muhlenbergia.* (Fig. 322.)


Culms 1°-3° tall, erect, usually much branched, smooth and glabrous. Sheath smooth, those of the culm shorter than the internodes, those of the branches overlapping and often crowded; ligule about 1/2" long, erose-truncate; leaves 2'-5' long, 1'-3' wide, scabrous; panicle 2'-4½' in length, usually dense and interrupted, the branches ½'-1' long, erect or appressed, the spikelets much crowded; outer scales of the spikelet acuminate, 2½'-3' long, including the awn, smooth or scabrous, especially on the keel; third scale one-half to two-thirds as long, acuminate, the strongly scabrous midrib excurrent in a short point.

In wet places, Newfoundland to British Columbia, south to New Jersey, Missouri and New Mexico. Aug.-Sept.

4. *Muhlenbergia sylvatica* Torr. Wood *Muhlenbergia.* (Fig. 323.)

*Agrostis diffusa* Muhl. Gram. 64. 1817. Not Host, 1809.

Culms 1°-3° tall, erect, branched, smooth or somewhat scabrous. Sheaths smooth or slightly scabrous, those of the culm shorter than the internodes, those of the branches overlapping and often crowded; ligule about 1½" long, erose-truncate; leaves 2'-7' long, 1½'-3' wide, rough; panicle 3'-7' in length, somewhat lax, the branches 1'-3' long, erect or ascending; outer scales of the spikelet 1½"-1½' long, awn-pointed, scabrous; third scale equaling or somewhat exceeding the outer ones, strongly scabrous, attenuate into a slender awn 2-4 times its length.

In moist woods and along streams, New Brunswick to Ontario and Minnesota, south to North Carolina, Tennessee and the Indian Territory. Aug.-Sept.

5. *Muhlenbergia ambigua* Torr. Minnesota *Muhlenbergia.* (Fig. 324.)


Glabrous, culms 1° tall or lower, erect, branched, smooth. Sheaths shorter than the internodes; ligule about ½" long, erose-truncate; leaves 1'-2' long, 1½'-2½' wide, scabrous; panicle 1'-3' long, rigid, its branches ½'-1' long, dense, appressed; outer scales of the spikelet awn-pointed, unequal, the longer about 2½" in length and exceeding the body of the third scale which is scabrous, villous, and attenuate into an awn 2-3 times its length; a fourth narrow awned scale is nearly always present.

Along a lake shore in Minnesota.
6. *Muhlenbergia comata* (Thurb.) Benth. Hairy Muhlenbergia. (Fig. 325.)


Culms 1°–2½° tall, erect, slender, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly scabrous; ligule about ½" long, truncate, naked or minutely ciliate; leaves 2½'–5' long, 1½'–2½' wide, erect, flat, rough; panicle often tinged with purple, 2'–4' in length, dense, branches ½'–1½' long, erect; outer scales of the spikelet equal, or the second a little the longer, smooth, scabrous on the keel; third scale shorter, smooth and glabrous, bearing an awn 2–3 times its length, the basal hairs silky, erect, fully as long as the scale.


7. *Muhlenbergia tenuiflora* (Willd.) B.S.P. Slender Muhlenbergia. (Fig. 326.)

*Muhlenbergia Willdenovii* Trin. Unifl. 188. 1824.
*Muhlenbergia tenuiflora* B.S.P. Pre! Cat. N. Y. 67. 1888.

Glabrous, culms 2°–3° tall, erect, slender, simple or sparingly branched, smooth. Sheaths usually shorter than the internodes; ligule short and truncate; leaves 2½'–7' long, 1½'–4½' wide, narrowed toward the base, acuminate, scabrous; panicle 5'–9' long, slender, its branches 1½'–3½' long, appressed; outer scales of the spikelet unequal, half to two-thirds the length of the third one, awn-pointed, scabrous; third scale 1½'–1½' long, scabrous, bearing an awn 2–4 times its length.

In rocky woods, Massachusetts to southern Ontario and Minnesota, south to Alabama and Texas. Aug.–Sept.

8. *Muhlenbergia diffusa* Schreb. Nimble Will. Dropseed Grass. (Fig. 327.)


Glabrous, culms 1°–3° long, decumbent, or often prostrate or creeping and ascending, very slender, diffusely branched. Sheaths shorter than the internodes, loose; ligule short, fringed; leaves 1½'–3½' long, ½'–2½' wide, scabrous; panicle 2'–8' long, slender somewhat lax, its branches 1'–2' long, erect; outer scales of the spikelet minute, the lower one often wanting; the third scale, exclusive of the awn, about 1½" long, strongly scabrous, particularly upon the nerves; the awn ½'–2½' in length.

On dry hills and in woods, Maine and southern Ontario to Minnesota, south to Florida, Kansas and Texas. Aug.–Sept.

(Fig. 328.)

Muhlenbergia microsperma Trin. Unifl. 193. 1824.

Culms 6'-1½" tall, erect, finally decumbent or somewhat prostrate at base, slender, diffusely branched. Sheaths usually shorter than the internodes, loose; ligule ½" long, truncate, toothed; leaves ½'-2½" long, 1" wide or less, scabrous; panicle 2'-4" in length, slender, open, the branches ½' long or less, ascending or erect; outer scales of the spikelet unequal, obtuse or rounded at apex, about one-third the length of the third scale, which is 1½'-2½" long exclusive of the awn and strongly scabrous; awn 6'-12" in length.

In dry soil, Kansas to California, south to Mexico.

10. Muhlenbergia capillàris (Lam.) Trin. Long-awned Hair-grass.

(Fig. 329.)

Muhlenbergia capillàris Trin. Unifl. 191. 1824.

Glabrous, culms 1½'-4" tall, erect, simple, smooth or nearly so. Sheaths smooth, the lower short and overlapping, the upper ones much longer; ligule about 2" in length; leaves 6'-1" long, 1½'-2½" wide, scabrous; panicle 7'-1½" in length or more, diffuse, the capillary branches 4½'-8½" long, at length widely spreading; spikelets on long hair-like pedicels which are clavate-thickened at the apex; outer scales unequal, acute or short-awned, slightly scabrous; third scale, exclusive of the awn, 2½' long, about twice as long as the first one, scabrous, the awn 5½'-9½" in length.

In dry soil, Massachusetts to New Jersey and Missouri, south to Florida and Texas. Panicle usually light purple. Sept.-Oct.

II. Muhlenbergia gracíllima Torr. Filiform Muhlenbergia. (Fig. 330.)


Glabrous, culms 4'-14' tall, from a slender creeping rootstock, erect, slender, simple, rigid. Sheaths smooth; ligule 1½'-2" long, entire and acuminate, or variously cleft, with acuminate teeth; leaves 1½'-2½' long, involute-setaceous, smooth or somewhat scabrous, rigid, the basal numerous, usually strongly recurved, the 1-3 culm leaves erect or ascending; panicle 2'-9' in length, open, the branches finally widely spreading, 1½'-3½' long, filiform; spikelets about as long as the filiform pedicels which are clavate-thickened at the apex; outer scales unequal, usually awn-pointed or short-awned, slightly scabrous; third scale 1½'-2½" long, longer than the outer ones, sometimes twice as long, scabrous; awn 1½'-2½" long.

On prairies, Kansas to Colorado, south to Texas and New Mexico. Sept.-Oct.
12. Muhlenbergia pungens Thurb.  
Prairie Muhlenbergia. (Fig. 331.)


Culms 6'-15' tall from a creeping root-stock, erect from a decumbent branching base, rigid, minutely pubescent. Sheaths overlapping, crowded at the base of the culm, scabrous; ligule a ring of soft silky hairs; leaves 1'-2' long, involute-setaceous, rigid, scabrous; panicle 3'-6' in length, open, the branches 2'-2½' long, single, distant, much divided from near the base, the divisions apparently fascicled; spikelets on long pedicels, which are clavate-thickened at the apex; outer scales, when mature, equaling or often shorter than the body of the third one, scabrous, especially on the keel; third scale, when mature, ¾'-1' long, scabrous, the awn shorter than its body.

On prairies, Nebraska to Utah, south to Texas and Arizona. Aug.–Sept.


A tall grass with flat leaves and a narrow panicle. Spikelets 1-flowered, narrow, the rachilla produced beyond the flower and sometimes bearing a minute scale at the summit. Scales 3; the outer small and inconspicuous, the lower often wanting; the third much longer, rigid, 5-nerved, acuminate into a long awn; palet scarcely shorter, rigid, sulcate on the back, 2-nerved. Stamens 2. Styles short, distinct. Stigmas plumose, elongated. Grain oblong, free, enclosed in the scale and palet. [Greek, in allusion to the minute outer scales.]

A monotypic genus of eastern North America.

1. **Brachyelytrum eréctum** (Schreb.) Beauv. Brachyelytrum. (Fig. 332.)


*Brachyelytrum aristatum* R. & S. Syst. 2: 413. 1817.


Culms 1°-3° tall, erect, slender, simple, smooth or rough, pubescent at and near the nodes. Sheaths shorter than the internodes, scabrous toward the apex, more or less villous especially at the throat; ligule about ¾' long, irregularly truncate; leaves 2'-5' long, 3'-9' wide, acuminate at both ends, scabrous; panicle 2'-6' in length, slender, branches 1'-3' long, erect or appressed; outer scales of the spikelet unequal, the upper less than one-third as long as the flowering scale, the lower minute or wanting; third scale, exclusive of the the awn, 4½'-6' long, 5-nerved, scabrous, especially on the midnerves, the awn erect, 9'-12' long; rachilla produced beyond the flower about half the length of the third scale and lying in the groove of the palet.

27. HELEÓCHLOA Host, Gram. 1: 23. pl. 29, 30. 1801.

[CRYPSIS Lam. Tabl. Encycl. 1: 166. 1791. Not Ait. 1789.]

Perennial tufted grasses with flat leaves and spicate or paniculate inflorescence. Spikelets 1-flowered. Scales 3; the 2 outer empty, somewhat unequal, membranous, acute, ciliate-keeled; the third scale similar, a little longer; palet shorter, hyaline, 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, loosely enclosed in the scale. [Greek, signifying meadow-grass.]

About 8 species, chiefly natives of the Mediterranean region, one or two also widely distributed through middle Europe and Asia.

1. Heleochloa schoenoides (L.) Host. Rush Cat's-tail Grass. (Fig. 333.)

Phleum schoenoides L. Sp. Pl. 60. 1753.

Crypsis schoenoides Lam. Tabl. Encycl. 1: 166. pl. 42. 1791.

Heleochloa schoenoides Host, Gram. 1: 23. pl. 30. 1801.

Glabrous, culms 4'-18' tall, erect or sometimes decumbent at the base, branched, smooth. Sheaths about half the length of the internodes, the upper loose, the one immediately below the spike inflated and usually partially enclosing it; ligule a ring of short hairs; leaves 1'-3' long, 1''-2'' wide, flat, acuminate, smooth beneath, scabrous above; spikelets 1'-5' long, the empty scales acute, compressed, ciliate-keeled, 1-nerved, the lower shorter than the upper; third scale equaling or longer than the second, acute, compressed, ciliate-keeled, otherwise glabrous, 1-nerved; palet shorter, obtuse.


Annual or perennial grasses with flat leaves and spicate inflorescence. Spikelets 1-flowered. Scales 3; the 2 outer empty, membranous, compressed, keeled, the apex obliquely truncate, the midnerve produced into an awn; the third scale much shorter, broader, hyaline, truncate, denticulate at the summit; palet narrow, hyaline. Stamens 3. Styles distinct, somewhat elongated. Stigmas plumose. Grain ovoid, free, enclosed in the scale and palet. [Name Greek, taken from Pliny; originally applied to some very different plant.]

About 10 species, inhabiting the temperate zones of both hemispheres. The following only are natives of North America. The English name Cat's-tail Grass is applied to all the species.

Spires usually elongated, cylindrical; awns less than one-half the length of the outer scales; upper sheath not inflated.

Spikes not elongated, ovoid to oblong and cylindrical; awns about one-half the length of the outer scales; upper sheath inflated.

1. Phleum pratense L. Timothy. Herd's Grass. (Fig. 334.)


Glabrous and smooth or very nearly so throughout, culms 1''-4'' tall, erect, simple. Sheaths usually exceeding the internodes, sometimes shorter, the upper one long and not inflated, or very slightly so; ligule 1''-2'' long, rounded; leaves 3'-9' long, 2''-3'' wide, smooth or scabrous; spike usually elongated, cylindrical, 1'-5' in length, 2'-4'' in diameter; outer scales of the spikelet, exclusive of the awn, 1'-5' long, ciliate on the keel, the awn less than half their length.

In fields and meadows nearly throughout North America. Also in Europe and Asia. Widely cultivated for hay. The scales are sometimes modified into small leaves. July-Aug.
29. ALOPECURUS L. Sp. Pl. 60. 1753.

Annual or perennial grasses with erect or decumbent culms, usually flat leaves, and spike inflorescence. Spikelets 1-flowered, flattened; scales 3, the 2 lower empty, acute, sometimes short-awned, more or less united below, compressed-keeled; keel ciliate or somewhat winged; third scale truncate or obtuse, hyaline, 3-nerved, awned on the back, subending a perfect flower and usually a palet; palet hyaline, acute, sometimes wanting. Stamens 3. Styles distinct or rarely united at the base. Stigmas elongated, hairy. [Greek, signifying Fox-tail Grass, in allusion to the spikes.]

About 20 species, principally natives of the north temperate zone. Besides the following, some 4 others occur in western North America.

Outer scales of the spikelet united for one-half their length, smooth to hispid on the keel.

Outer scales of the spikelet united for one-quarter their length or less, long-ciliate on the keel.

Scales 1'/2-1½' in length.

1. A. agrestis.

Scales 2'/3'-3 in length.

2. A. geniculatus.

Spike 1½'-2½' long; outer scales glabrous or sparingly pubescent on the lateral nerves.

3. A. pratensis.

Spike 1½' long or less; outer scales villous.

4. A. alpinus.

i. Alopecurus agréstis L. Slender Foxtail. (Fig. 336.)


Smooth or slightly scabrous, culms 1'-2' tall, erect, simple. Sheaths shorter than the internodes; ligule 1'/2' long, truncate; leaves 1½'-5' long, 1'/3'-3' wide, scabrous, especially above; spike 1½'-4' long, 2'/4'-4' thick; outer scales of the spikelet united at the base for about half their length, narrowly wing-keeled, 2'-2½' long, the nerves smooth or scabrous, sometimes hispid below, especially on the keel; third scale equalling or slightly exceeding the outer ones, smooth and glabrous, the awn inserted near the base, about twice its length, bent.

2. Alopecurus geniculatus L. Marsh Foxtail. (Fig. 337.)

Alopecurus geniculatus L. Sp. Pl. 60. 1753.

Glabrous or very nearly so, culms 6'-18' tall, erect, or sometimes decumbent at the base, simple or sparingly branched, smooth. Sheaths usually shorter than the internodes, loose or somewhat inflated; ligule 1 1/2'-3' long; leaves 1'-6' long, 1/2'-2' wide, scabrous, especially above; spikes 1'-3' in length, 2'-4' thick; outer scales of the spikelet slightly united at the base, 1'-1 1/2' long, obtuse or subacute, smooth, glabrous except on the pubescent lateral nerves and strongly ciliate keel; third scale somewhat shorter, obtuse, smooth and glabrous, the awn inserted at or below the middle, equalling or exceeding it.

In wet soil, Newfoundland to British Columbia, south to Florida, Tennessee, Arizona and California. Also in Europe and Asia. July-Sept.

3. Alopecurus pratensis L. Meadow Foxtail. (Fig. 338.)

Alopecurus pratensis L. Sp. Pl. 60. 1753.

Nearly or quite glabrous, slender, culms 1'-2 1/2' tall, erect, simple. Sheaths usually much shorter than the internodes, loose or somewhat inflated; ligule about 3/4' long, erose-truncate; leaves 1 1/2'-3 1/2' long, 1'-3' wide, scabrous, at least above; spikes 1 1/2'-2 1/2' in length, 4'-6' thick; outer scales of the spikelet united at the base for about one-quarter their length, 2'-3' long, acute, glabrous except the sparingly pubescent lateral nerves and the strongly ciliate keel; third scale slightly shorter, obtuse, smooth and glabrous, the awn inserted about quarter way up the scale and exceeding it.


4. Alopecurus alpinus J. E. Smith. Alpine Foxtail. (Fig. 339.)


Culms glabrous and smooth or nearly so, 5'-2' tall, erect, sometimes decumbent at the base, simple. Sheaths generally shorter than the internodes, loose, often inflated; ligule 1'-2' long, rounded at the apex; leaves 1'-7' long, 1'-3' wide, smooth beneath, slightly scabrous above; spike 1 1/2' in length or less, 3'-6' thick; outer scales of the spikelet united only at the base, 2' long, obtuse, villous and ciliate; third scale about equalling the outer ones, obtuse, glabrous except at the villous apex, the awn inserted about one-third the way up, a little exceeding the scale.

Greenland and Labrador to Alaska. Also in arctic and alpine Europe and Asia. Summer.

A low annual tufted grass, with flat leaves and spike-like panicles. Spikelets 1-flowered; scales 3; the 2 outer empty, minute, the first often wanting; the third scale thin-membranous, keeled. Palet somewhat shorter, 2-keeled. Stamens 1, rarely 2 or 3. Styles short, distinct. Stigmas plumose. Grain oblong, enclosed in the scale and palet, which readily split and allow it to drop out. [In honor of John Constantine Phipps, 1714–1792, Arctic navigator.]

A monotypic genus of the arctic regions.

1. **Phippsia algida** (Solander.) R. Br. Phippsia. (Fig. 340.)


Smooth and glabrous throughout, culms 1½–5' tall, erect, simple; ligule ½' long; leaves 1' in length or less, ½'–1½' wide, obtuse; panicle ½'–1½' in length, contracted; branches ½'–3' long, erect or appressed; spikelets ½'–3½' long; outer scales minute, unequal, acuminate, the first often wanting; third scale broad, 1-nerved, obtuse, or sub-truncate and somewhat erose, the palet about two-thirds as long, broad, 2-keeled, erose-truncate,

Arctic regions of both the Old World and the New. Summer.


*[Vulpia* Beauv. Agrost. 16. 1812.]

Perennial or rarely annual grasses, with flat or convolute leaves and open or contracted panicles. Spikelets generally small, 1-flowered, occasionally 2-3-flowered. Scales in the 1-flowered spikelets 3, membranous; the 2 outer empty, the first somewhat shorter; the third scale equaling or longer than the empty ones; palet 2-nerved. Stamens 2–3. Styles very short, distinct. Stigmas plumose. Grain free, and often early deciduous. [Greek, referring to the deciduous grain.]

About 80 species, in tropical and temperate regions, very numerous in America. Besides the following, 4 or 5 others occur in the southern and western United States.

Panicle contracted, spike-like.

Spikelets more than 1½' in length.

Panicle terminal; upper sheaths ½' long or more.

Leaves glabrous or very nearly so.

Third scale of the spikelet acuminate, much longer than the second and usually greatly exceeded by the palet.

Third scale of the spikelet acute or obtuse, somewhat exceeding the second and equaling or a little shorter than the palet.

Leaves, at least the lower, papillose-hirsute.

Panicles terminal and lateral; sheaths 1½' long or less.

Spikelets 1½' long or less.

Spikelets inflated, the uppermost usually enclosing the base of the panicle.

Sheaths not inflated; panicle exserted.

Branches of the panicle not crowded; third scale acuminate.

Outer scales of the spikelet obtuse or abruptly acute, less than half as long as the third scale; ligule about 1½' long, acuminate.

6. *S. brevifolius*.

Outer scales of the spikelet acuminate and awn-pointed, more than half as long as the third scale; ligule less than ½' long, erose-truncate.

7. *S. cuspilatus*.

Branches of the panicle densely crowded; third scale acute.

Culms decumbent and branched at the base, from a stout horizontal rootstock; panicle short.

Culms erect, simple, tufted; panicle usually elongated.

3. *S. pilosus*.

5. *S. vaginacrus*.

8. *S. Virginicus*.

9. *S. Indicus*.
Panicle open, the branches more or less spreading, at least at maturity.

Pedicels equalling or shorter than the spikelets; first scale about half as long as the second.

Branches of the panicle verticillate.

Spikelets \(\frac{3}{4}''\) long, green.

Spikelets \(1\frac{3}{4}''-1\frac{1}{2}''\) long, purple.

Branches of the panicle alternate or sometimes sub-verticillate.

Spikelets about \(1''\) long; first scale lanceolate.

Sheaths naked or sparingly ciliate at the throat; panicle usually exerted.

Sheaths densely pilose at the throat; base of the panicle generally included.

Spikelets \(2''-2\frac{3}{4}''\) long; first scale subulate.

Pedicels at least twice the length of the spikelets; first scale about equalling the second.

Culms erect, simple; leaves elongated.

Culms slender, from an annual root; outer scales about half the length of the spikelet.

Culms stout, from a horizontal rootstock; outer scales slightly shorter than the spikelet.

Culms decumbent and branched below; leaves short.

1. *Sporobolus asper* (Michx.) Kunth. Rough Rush-grass. (Fig. 341.)


*Sporobolus asper* Kunth, Enum. i: 210. 1833.


Culms \(2''-5''\) tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a mere ring, less than \(\frac{3}{4}''\) long, naked; leaves \(3''-15''\) long, \(1''-2''\) wide at the base, attenuate into a long slender involute tip, smooth and glabrous beneath, scabrous above, or somewhat hairy at the base; panicle \(2''-5''\) in length, linear, strict, its branches \(1''-2''\) long, appressed; spikelets \(3''-4''\) long, the outer scales unequal, acute; third scale pubescent at the base, much longer than the second and greatly exceeded by the long-acuminate almost awned palet.

In dry soil, Delaware to Illinois, south to Florida and Texas. Aug - Sept.

2. *Sporobolus longifolius* (Torr.) Wood. Long-leaved Rush-grass. (Fig. 342.)


Culms \(1\frac{1}{2}''-3\frac{1}{2}''\) tall, erect, simple or occasionally branched, smooth and glabrous. Sheaths shorter than the internodes; ligule very short, minutely ciliate; leaves \(4''-18''\) long, \(1''-2''\) wide at the base, attenuate into a long slender involute tip, smooth and glabrous beneath, scabrous and hairy at the base above; panicle more or less included in the upper sheath, \(3''-10''\) in length, linear, strict, the branches \(1''-2''\) long, erect; spikelets \(2''-2\frac{3}{4}''\) long; outer scales unequal, acutish, glabrous, the lower shorter; third scale glabrous, acutish or obtuse, exceeding the second and equalling or a little shorter than the obtuse palet.

In dry soil, Maine to Pennsylvania, Missouri and Kansas, south to Florida and Texas. Aug - Sept.
3. *Sporobolus pilosus* Vasey. Hairy Rush-grass. (Fig. 343.)


Culms 1½"-1½" tall, erect, rigid, stout, smooth and glabrous. Sheaths shorter than the internodes, crowded and overlapping at the base of the culm; ligule very short, minutely ciliate; leaves 3'-6' long, 1½'-2½' wide at base, erect, rigid, attenuate into a slender involute tip, the lower papillose-hirsute on both sides, the upper usually glabrous beneath, scabrous above and somewhat hairy near the base; panicle 2'-3' in length, included at the base, erect, strict, its branches ½'-1' long, erect; spikelets 2½'' long, the outer scales unequal, glabrous, obtuse, the lower shorter; third scale obtuse, glabrous, somewhat exceeding the second and equaling or a little longer than the obtuse palet.

In dry soil, Kansas and Missouri. Aug.–Sept.

4. *Sporobolus vaginaeflorus* (Torr.) Wood. Sheathed Rush-grass. (Fig. 344.)

*Vista vaginaeflora* Torr.; A. Gray, Gram. and Cyp. No. 3. 1834.

*Sporobolus vaginaeflorus* Wood, Classbook. 775. 1861.

*Sporobolus minor* Vasey; A. Gray, Man. Ed. 6. 646. 1890.

Culms 8'-18' tall, erect, slender, smooth or scabrous. Sheaths usually inflated, about half as long as the internodes; ligule very short; leaves 1½' wide or less, smooth and glabrous beneath, scabrous and hairy near the base above, attenuate into a slender involute point, the lower elongated, the upper 1½'-3' long, setaceous; panicles ½'-2½' in length, the terminal one excised or sometimes partially included, strict, the branches ½' long or less, erect, the lateral ones enclosed in the sheaths; spikelets 1½''-2½'' long, the outer scales unequal, acuminate, smooth, the lower one shorter; third scale scabrous, especially toward the apex, about as long as the second and equaling or slightly exceeded by the very acute palet.

In dry soil, New York to Illinois and Missouri, south to Georgia and Texas. Aug.–Sept.

5. *Sporobolus neglecutus* Nash. Small Rush-grass. (Fig. 345.)


Culms 6'-12' tall, erect from a usually decumbent base, slender, often much branched, smooth and glabrous. Sheaths about half as long as the internodes, inflated; ligule very short; leaves 1½' wide or less at the base, smooth and glabrous beneath, scabrous and hairy near the base above, attenuate into a slender point, the lower elongated, the upper 1½'-3' long, setaceous; terminal panicle ½'-2½' in length, usually more or less included in the upper sheath, strict; lateral panicles enclosed in the sheaths; spikelets about 1½'' long, the outer scales acute, the lower one slightly shorter; third scale acute, glabrous, a little longer than the second and about equalling the acute palet.

In dry soil, Massachusetts to Kentucky and Kansas. Aug.–Sept.
6. Sporobolus brevifolius (Nutt.) Scribn. (Fig. 346.)

Sporobolus brevifolius Nutt. Gen. i: 44. 1818.
In part. 1882.

Smooth and glabrous, culms 6'-18' tall, arising from a horizontal rootstock, erect, slender, decumbent and branching at the base. Sheaths much shorter than the internodes; ligule 3'-4' long, acutish; leaves 3'-2' long, involute-setaceous; panicle 3'-4' in length, usually about 3'-2', linear, its branches 3'-3' long, erect or appressed; spikelets 1'-2' long, the outer scales unequal, less than half as long as the third, obtuse or abruptly acute, scabrous on the keel and at the apex; third scale long-acuminate, sometimes cuspidate, scabrous toward the apex.

Anticosti Island and Maine to British Columbia, south in the mountains to New Mexico and California. Summer.

7. Sporobolus cuspidatus (Torr.) Wood. Prairie Rush-grass. (Fig. 347.)

Sporobolus cuspidatus Wood, Bot. & Fl. 358. 1870.

Smooth and glabrous, culms 1'-2' tall, erect, simple or somewhat branched. Sheaths shorter than the internodes; ligule a mere ring, 1'/2 long or less, erose-truncate; leaves 1'-4' long, less than 1' wide at the base, erect, involute-setaceous, at least when dry; panicle 3'-4' in length, slender, its branches 3'-1' long, appressed; spikelets 1'-2' long, the outer scales half to three-quarters as long, acuminate or cuspidate, scabrous on the keel; third scale long-acuminate and cuspidate, sparingly scabrous.

In dry soil, Manitoba to the Northwest Territory, south to Missouri and Kansas. Aug.-Sept.

8. Sporobolus Virginicus (L.) Kunth. Seashore Rush-grass. (Fig. 348.)

Agrostis Virginica L. Sp. Pl. 65. 1753.

Culms 6'-2' tall, erect or sometimes decumbent, simple or branched at the base, smooth and glabrous. Sheaths numerous, short, overlapping and crowded at the lower part of the culm, smooth, glabrous or sometimes pilose on the margins and at the throat; ligule a ring of short hairs; leaves 1'-8' long, 3'-5' wide or less at the base, distichous, acuminate into a long point, involute on the margins and at the apex, smooth beneath, scabrous above or sometimes sparingly hairy; panicle 1'-3' long, 2'-5' thick, dense and spike-like, usually exerted; spikelets 1'-1'/2' long, the outer scales about equal, acute, smooth and glabrous; third scale smooth and glabrous, acute, slightly shorter than the second and about equaling the obtuse palet.

On sandy shores, Virginia to Florida, west to Texas and Mexico. Also in Cuba. Aug.-Sept.
9. Sporobolus Indicus (L.) R. Br. India Rush-grass. Smut-grass. (Fig. 349.)

*Agrostis Indica* L. Sp. Pl. 63. 1753.


Glabrous and smooth throughout, culms 1°-4° tall, erect, tufted, simple or rarely sparingly branched. Sheaths few, long, shorter than the internodes; ligule a ring of very short hairs; leaves 1°-3' wide, attenuate into a long slender point, the lower 8'-1° long, the upper shorter; panicle 4'-15' in length, usually elongated, narrow, spike-like; spikelets 34'-1' long, the outer scales unequal, about half as long as the third, obtuse, smooth and glabrous, the lower one shorter and often erose-truncate; third scale acute, somewhat exceeding the obtuse or acutish palet.

In meadows and waste places, Virginia to Florida, west to Arkansas and California. Naturalized from tropical regions; very abundant in Central and South America. July-Sept.

10. Sporobolus argutus (Nees) Kunth. Pointed Dropseed-grass. (Fig. 350.)


Culms 1° tall or less, erect, or somewhat decumbent at the base, simple or sometimes branched, smooth and glabrous. Sheaths shorter than the internodes, their margins sometimes hisurate at the top; ligule a ring of short hairs; leaves 1°-2' long, 1°-2' wide at the base, acuminate, smooth and glabrous beneath, scabrous and often sparingly hairy at the base above; panicle 134'-3' in length, the branches 34'-1' long, verticillate, at first appressed, finally widely spreading; spikelets 34'-1' long; outer scales smooth and glabrous, the first rounded or obtuse, one-quarter the length of the acute second one; third scale about equalling the second, acute.

Kansas, the Indian Territory and Colorado, south to Texas and Mexico. Also in the West Indies. July-Sept.

11. Sporobolus juncceus (Michx.) Kunth. Purple Dropseed-grass. Wire-grass. (Fig. 351.)


*Sporobolus juncceus* Kunth, Rev. Gram. 1: 68. 1835.

Glabrous and smooth throughout, culms 1°-2° tall, tufted, erect, slender, simple. Sheaths shorter than the internodes; ligule very short; leaves filiform or setaceous, the basal 6°-1° long, numerous, those of the culm few, 1°-3' long; panicle 3'-7' in length, open, the branches verticillate, the lower 1°-2' long, widely spreading; spikelets 134'-1' long, purple, the outer scales very unequal, the first obtuse or acutish, one-fourth to one-third the length of the acute second one; third scale subacute or blunt, equalling the second and the obtuse palet.

Dry sandy soil, Virginia to Florida, west to Texas. Reported from Minnesota and Wisconsin. Aug.-Sept.
12. **Sporobolus airoides** Torr.  Hair-grass Dropseed.  (Fig. 352.)


Culms 1½°-3° tall, erect, simple, smooth and glabrous. Sheaths generally shorter than the internodes, sometimes sparsely ciliate at the throat; ligule very short; leaves smooth beneath, scabrous above and sometimes sparingly hairy near the base, ½"-1½" wide at the base, attenuate into a long slender involute point, the basal about one-half as long as the culm, the upper culm leaves 2'-5' in length; panicle 5'-15' long, usually exserted, the branches alternate or the upper verticillate, at length widely spreading, the lower 3'-7' long; spikelets ¼'-1" long, the scales acute, glabrous, the outer unequal, the lower one about half as long as the upper; third scale equalling the second and the palet.

Prairies, Nebraska to California, south to Texas and Arizona.  Aug.-Sept.

13. **Sporobolus cryptandrus** (Torr.) A. Gray.  Sand Dropseed.  (Fig. 353.)

*Sporobolus cryptandrus* A. Gray, Man. 576. 1848.

Culms 1½°-3½° tall, erect, simple or sometimes branched at the base, smooth and glabrous. Sheaths smooth, with a dense pilose ring at the summit, the lower short, crowded and overlapping, the upper much longer, generally enclosing the base of the panicle; ligule a ring of short hairs; leaves 3'-6' long, 1½'-2" wide, flat, glabrous beneath, scabrous above, long-acuminate; panicle 6'-10' in length, the base generally included in the upper sheath, rarely entirely exserted, the branches spreading or ascending, alternate, the lower 1½'-3' long; spikelets 1½'-1½" long, the scales acute, glabrous, the outer scabrous on the keel, the lower one-third as long as the upper; third scale somewhat longer or shorter than the second.

In sandy soil, coast of New England, along all the Great Lakes, west to Dakota, south in the interior to Missouri, Texas and Mexico.  Aug.-Oct.

14. **Sporobolus heterolepis** A. Gray.  Northern Dropseed.  (Fig. 354.)

*Sporobolus heterolepis* A. Gray, Man. 576. 1848.

Culms 1°-3° tall, erect, simple, smooth and glabrous. Sheaths sometimes sparingly pilose at the summit, the lower short, loose, and overlapping, the upper much elongated and tight to the culm; ligule a ring of short hairs; leaves involute-setaceous, glabrous, the margins and upper part of the midrib very rough, the basal about three-fourths the length of the culm, occasionally equalling it, those of the culm shorter; panicle 3'-10' in length, its branches erect or ascending, alternate or sub-verticillate, the lower 1½'-3½' long; spikelets 2½'-2¾" long, the scales smooth and glabrous, the outer unequal, acuminate, the lower subulate, about half the length of the broad second one, often awn-pointed; third scale obtuse or acute, shorter than the second or occasionally equalling it.

In dry soil, Quebec to Assiniboia, south to Pennsylvania, Illinois and Arkansas.  Aug.-Sept.
15. Sporobolus serotinus (Torr.) A. Gray. Late-flowering Dropseed. (Fig. 355.)

Sporobolus serotinus A. Gray, Man. 577. 1848.

Glabrous and smooth or very nearly so, culm 6'-18' tall, from an annual root, erect, slender, simple. Sheaths short, confined to the lower part of the culm; ligule less than \( \frac{1}{2} \)" in length, irregularly truncate; leaves \( \frac{1}{2} \)" wide or less, slightly scabrous above, flat, the basal one-third to half the length of the culm, those of the culm 2'-4' long; panicle 3'-9' in length, the branches capillary, erect or ascending, the lower 1'-2\( \frac{1}{2} \)' long; spikelets about \( \frac{3}{8} \)" long, the outer scales subequal, obtuse, smooth or sometimes sparingly scabrous; third scale twice the length of the outer ones, acuminate.

In wet sandy soil, Maine to Michigan, south to New Jersey. Sept.–Oct.

16. Sporobolus compressus (Torr.) Kunth. Flat-stemmed Dropseed. (Fig. 356.)

Sporobolus compressus Kunth, Enum. 1: 217. 1833.

Culms 1"-2" tall, from a horizontal rootstock, stout, simple, much compressed, smooth and glabrous. Sheaths compressed, overlapping, sometimes scabrous at the summit; ligule very short; leaves 5'-10' long, 1" wide or less, folded, slightly rough; panicle 4'-10' in length, the branches erect or ascending, the lower 2'-3' long; spikelets about \( \frac{3}{8} \)" long; outer scales subequal, obtuse or somewhat acute, smooth and glabrous; third scale obtuse and apiculate, strongly scabrous, slightly exceeding the outer ones.

In bogs, Long Island and in the pine barrens of New Jersey. Sept.–Oct.

17. Sporobolus asperifolius (Nees & Meyen) Thurber. Rough-leaved Dropseed. (Fig. 357.)


Culms 6'-18' tall, erect from a decumbent and branched base, smooth and glabrous. Sheaths short, crowded and overlapping, the upper usually enclosing the base of the panicle; ligule \( \frac{1}{4} \)" long, erose-truncate; leaves numerous, 1'-3\( \frac{1}{2} \)" long, 1"-1\( \frac{1}{2} \)" wide at the base, acuminate, strict, often erect, flat glabrous, smooth beneath, very rough above; panicle 3'-8' in length, included at the base, rarely entirely exserted, the capillary branches spreading or ascending, the lower 2'-4' long; spikelets occasionally 2-3-flowered, \( \frac{3}{4} \)" long; outer scales subequal, acute, glabrous, sparingly scabrous; third scale obtuse or acute, glabrous, somewhat exceeding the second.

Dry soil, Assiniboia to British Columbia, south to Missouri, Nebraska, California and Mexico. Aug.–Sept.

Mostly annual grasses, with decumbent or rarely erect culms, flat leaves and spike-like panicles. Spikelets 1-flowered; scales 3; the 2 outer empty, each extended into an awn; third scale smaller, generally hyaline, short-awned from below the apex, subtending a palet and perfect flower; palet shorter than the scale. Stamens 1-3. Styles short, distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Greek, in allusion to the many long awns which resemble a beard.]

About 10 species, widely distributed in temperate and warm regions, rare in the tropics.

1. Polypogon Monspeliénsis (L.) Desf. Beard-grass. (Fig. 358.)

A perennial grass with flat leaves and contracted panicle. Spikelets 1-flowered. Scales 3; the 2 outer empty, unequal, somewhat acute, membranous; the third scale exceeding the second, subtending a palet and perfect flower, obtuse; palet obtuse, 2-nerved. Stamens 2 or 3. Styles distinct, short. Stigmas plumose. Grain oblong, free, enclosed in the scale and palet. Seed adherent to the pericarp. [Latin, signifying an arctic Agrostis-like grass.]

A monotypic genus of arctic and subarctic regions.


A perennial grass with flat leaves and contracted panicle. Spikelets 1-flowered. Scales 3; the 2 outer empty, unequal, somewhat acute, membranous; the third scale exceeding the second, subtending a palet and perfect flower, obtuse; palet obtuse, 2-nerved. Stamens 2 or 3. Styles distinct, short. Stigmas plumose. Grain oblong, free, enclosed in the scale and palet. Seed adherent to the pericarp. [Latin, signifying an arctic Agrostis-like grass.]

A monotypic genus of arctic and subarctic regions.

1. Arctagrostis latifolia (R. Br.) Griseb. Arctagrostis. (Fig. 359.)


Culms 6'-2° tall, erect, or sometimes decumbent at the base, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 2' long, truncate; leaves 1'-7' long, 1'-4' wide, usually erect, scabrous; panicle 1½"-8' long, narrow, its branches ½'-2' in length, ascending or erect; spikelets 1½"-2" long; outer scales unequal, acutish, the lower about two-thirds to three-fourths the length of the upper; third scale obtuse, exceeding the second, hispid on the keel.

Greenland to Hudson Bay and Alaska. Also in arctic Europe and Asia. Summer.
34. **CINNA** L. Sp. Pl. 5. 1753.

Tall grasses with flat leaves and paniced spikelets. Spikelets 1-flowered. Scales 3; the 2 outer empty, keeled, acute; the third scale similar, but usually short-awned on the back, subtending a palet and a stalked perfect flower; palet a little shorter, 1-nerved. Stamen 1. Styles short, distinct. Stigmas plumose. Grain narrow, free, enclosed in the scale and palet. Seed adherent to the pericarp. [Greek, taken from Dioscorides.]

Four known species, inhabiting the temperate regions of Europe and North America. Besides the following, another occurs in the western United States.

Panicle narrow at maturity, its filiform branches erect or drooping; spikelets 2"-2½" long; first scale much shorter than the second.

Panicle open, its capillary branches flexuous and drooping; spikelets 1½" long; first scale about equalling the second.

1. **Cinna arundinacea** L. Wood Reed-grass. (Fig. 360.)

*Cinna arundinacea* L. Sp. Pl. 5. 1753.

Culms 2°-5° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, overlapping at the base of the culm, smooth or roughish; ligule 1½-2" long, truncate; leaves 6"-10° long, 2½-7½" wide, scabrous; panicle 6½-12° in length, usually contracted, sometimes purple, the filiform branches erect or drooping, the lower 1½-4½" long; spikelets 2½-2½" in length, the scales acute, scabrous, especially on the keel, the first one shorter than the second; third scale slightly exceeded or equalled by the second, usually bearing an awn about ⅓" long from the 2-toothed apex.

In moist woods and swamps, Newfoundland to the Northwest Territory, south to North Carolina, Louisiana, Missouri and Texas. Ascends to 1700 ft. in North Carolina. Aug.-Sept.

2. **Cinna latifolia** (Trev.) Griseb. Slender Wood Reed-grass. (Fig. 361.)


Culms 2°-4° tall, erect, usually slender, simple, smooth and glabrous. Sheaths shorter than the internodes, sometimes slightly scabrous; ligule 1½-2½" long; leaves 4½-10½" long, 2½-6½" wide, scabrous; panicle 5½-10½" in length, open, the capillary branches generally spreading, flexuous and often drooping, the lower 1½-5½" in length; spikelets 1½½" long; scales scabrous, the outer acute, strongly hispid on the keel, the first about equalling the second; third scale usually exceeded by the second and bearing a rough awn ½½"-1½" long from the 2-toothed apex.

In damp woods, Newfoundland to British Columbia, south to New Jersey, in the Alleghenies to North Carolina, to Wisconsin, and in the Rocky Mountains to Colorado and Utah. Also in northern Europe. Ascends to 5000 ft. in the Adirondacks. Aug.-Sept.

[TRICHODIUM Michx. Fl. Bor. Am. 1: 41. 1803.]

Annual or perennial tufted grasses with flat or bristle-like leaves and paniculate inflorescence. Spikelets 1-flowered. Scales 3; the 2 outer empty, membranous, keeled, acute; the third shorter, obtuse, hyaline, sometimes bearing a dorsal awn, subtending a perfect flower; palet shorter than the scale, sometimes minute or wanting. Stamens usually 3. Styles distinct, short. Stigmas plumose. Grain free, enclosed in the scale. Seed adherent to the pericarp. [Name Greek, referring to the field habitat of many species.]

A genus of about 100 species, widely distributed throughout the world, particularly numerous in temperate regions. Besides the following some 15 others are found in western North America.

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1. **Agrostis alba** L. Red-top. Fiorin. Herd's-grass. (Fig. 362.)

*Agrostis alba* L. Sp. Pl. 63. 1753.


*Agrostis alba* var. *vulgaris* Thurber in A. Gray, Man. Ed. 6. 647. 1890.

Culms 8'-2½" tall, erect or decumbent at the base, often stoloniferous, simple, smooth and glabrous. Sheaths usually shorter than the internodes, often crowded at the base of the culm; ligule 4" long or less; leaves 2'-3' long, 1'/3-3' wide, scabrous; panicle 2'-9' in length, contracted or open, green or purplish, the branches ascending or erect, the lower 1'/3-3' long; spikelets 1'/3-1'/2" long; outer scales about equal, acute, smooth and glabrous, except on the hispid or scabrous keel; third scale shorter, obtuse or acute, the palet at least one-third its length.

A most variable species occurring in fields and meadows nearly throughout North America, extensively cultivated for fodder. Naturalized from Europe, and perhaps also native northward. We have been unable satisfactorily to separate *A. sylvatica* L. from this. July-Sept.
2. Agrostis exarata Trin. Rough-leaved Bent-grass. (Fig. 363.)

Agrostis exarata Trin. "Uifi" 207. 1824.

Culms 1°-5° tall, erect, or sometimes decumbent at the base, simple, smooth and glabrous. Sheaths usually shorter than the internodes, smooth or roughish; ligule 1⁄2-3⁄2' long, more or less decurrent; leaves 1'-8' long, 1⁄2'-4' wide, generally erect, flat or involute, scabrous; panicle contracted, 21⁄2'-10' in length, often interrupted or glomerate, the branches 11⁄2'-3' in length, erect, spikelet-bearing to the base; spikelets crowded, 1'-2' long, the outer scales subequal, scabrous, especially on the keel; third scale from less than one-half to three-fourths the length of the second, obtuse or subacute; palet minute.

Manitoba to Alaska, south to Wisconsin, Nebraska, Texas and California. Aug.-Sept.

3. Agrostis Elliottiana Schultes. Elliott’s Bent-grass. (Fig. 364.)

Agrostis Elliottiana Schultes, Mant. 2: 202. 1824.

Culms 5'-14' tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly scabrous, strongly striate; ligule 1'' long; leaves rough, 1⁄2'-2' long, 1' wide or less; panicle 2'-5' in length, usually narrow, sometimes open, the branches slender, naked below, erect or ascending, the lower 1'-11⁄2' long; spikelets 3⁄4' long; outer scales subequal, scabrous on the keel, acute; third scale about three-quarters as long as the first, erose-truncate, acute or 2-toothed, bearing a very finely filiform flexuous barbellate awn, 2-4 times its length, inserted just below the apex; palet short.

In dry soil, South Carolina to Kentucky and Missouri, south to Florida and Texas. May-July.

4. Agrostis canina L. Brown Bent-grass. (Fig. 365.)


Culms 1°-2° tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 1⁄2'-1½'' long; leaves 1'-3' in length, 1' wide or less, scabrous; panicle 2'-7' in length, contracted in fruit, the branches slender, naked below, ascending or spreading in flower, the lower 1'-2½' long; spikelets 1'' long, on appressed pedicels, the outer scales subequal, acute, strongly scabrous on the keel; third scale about two-thirds the length of the first, obtuse, smooth and glabrous, bearing a straight or somewhat bent dorsal awn 1'-2' long, inserted just above the middle; palet minute or none.

5. *Agrostis rubra* L. Red Bent-grass. (Fig. 366.)


Smooth or very nearly so, glabrous, culms 6'-2' tall, erect or sometimes decumbent at the base, simple. Sheaths usually shorter than the internodes; ligule 1" long; leaves 2'-4' long, 1/2"-1'/2" wide; panicle 2'/2"-5' in length, open, the branches generally widely spreading and more or less flexuous, rarely erect, the lower 1'-2'/2" long; spikelets 1'/2"-1'/2' long, the outer scales acute, scabrous on the keel; third scale shorter than the first, obtuse, bearing a usually bent dorsal awn 2"-2'/2" long, inserted below the middle.

Summits of the highest mountains of New England, New York and North Carolina. The American plant may be specifically different from the European. Summer.

6. *Agrostis perennans* (Walt.) Tuckerm. Thin-grass. (Fig. 367.)

*Cornucopiae perennans* Walt. Fl. Car. 74. 1788.


Culms 1°-2'3/4" long from a decumbent or prostrate base, weak, slender, simple or sparingly branched above, smooth and glabrous; ligule 3/4" long; leaves 2'-6' long, 1'/2"-2' wide, lax, scabrous; panicle 4'-8' in length, open, the branches 1'-2' long, widely spreading, the branchlets and pedicels divergent; spikelets 3'/4"-1' long, the outer scales acute, scabrous on the keel; third scale about three-quarters the length of the first, smooth and glabrous, not awned; palet small or wanting.

In shady damp places, Quebec and Ontario to Wisconsin, south to South Carolina and Tennessee. Ascends to 900 ft. in North Carolina. Panicle usually light green, sometimes purplish. July-Sept.

7. *Agrostis hyemalis* (Walt.) B.S.P. Rough Hair-grass. (Fig. 368.)

*Cornucopiae hyemalis* Walt. Fl. Car. 73. 1788.


*Agrostis hyemalis* B.S.P. Prel. Cat. N.Y. 68. 1888.

Culms 1°-3° tall, erect, slender, simple, smooth and glabrous. Sheaths generally shorter than the internodes; ligule 1'/2"-2' long; leaves 2'-5' long, 1'/2"-1'/2" wide, usually erect, roughish; panicle 6'-2' long, usually purplish, the capillary scabrous branches ascending, sometimes widely spreading, or often drooping, the lower 3'-6' long, dividing above the middle, the divisions spikelet-bearing at the extremities; spikelets 3'/4"-1' long, the outer scales acute, scabrous toward the apex and on the keel; third scale two-thirds the length of the first or equalling it, obtuse, rarely bearing a short awn; palet usually very small.

In dry or moist soil throughout nearly the whole of North America except the extreme north. July-Aug.
8. Agrostis altissima (Walt.) Tuckerm. Tall Bent-grass. (Fig. 369.)

*Agrostis altissima* Walt. Fl. Car. 74. 1788.

Culms 2°-4° tall, erect, simple, smooth, usually stiff. Sheaths overlapping, scabrous, the upper one elongated; ligule 1"-2" long; leaves elongated, 6'-1' in length, 1'-1½' wide, scabrous; panicle 7'-9' long, the branches ascending or erect, somewhat scabrous, the lower 2'-4' in length, spikelet-bearing at the extremities; spikelets 1½'-1½' long, the outer scales acute, scabrous on the keel; third scale shorter, obtuse, scabrous, occasionally bearing a short awn; palet small or wanting.


9. Agrostis intermédia Scribn. Upland Bent-grass. (Fig. 370.)


Culms 1°-3° tall, erect, simple, smooth and glabrous. Sheaths smooth, those at the base of the culm often crowded and overlapping; ligule 1½'-2½' long; leaves 4½'-9' long, 1½'-3½' wide, scabrous; panicle 4½'-9' in length, the branches 1½'-3½' long, ascending, dividing at or below the middle, the divisions divergent, the pedicels appressed; spikelets about 1½' long, the outer scales acute or acuminate, scabrous on the keel; third scale about three-fourths the length of the first, smooth; palet small or wanting.


10. Agrostis Nóvae-Ángliae Tuckerm. New England Bent-grass. (Fig. 371.)

*Agrostis Nóvae-Ángliae* Tuckerm. Hovey’s Mag. 9: 143. April, 1843.

Culms 5½'-15' tall, erect, simple, smooth and glabrous. Sheaths longer than the internodes, generally overlapping; ligule 1½' long; leaves 1½'-3½' long, 1½' wide or less, erect, usually involute, scabrous; panicle 3½'-7' in length, open, the branches spreading or ascending, dividing at or below the middle, the divisions divergent, the pedicels often appressed; spikelets 1½½'-1½½' long, the outer scales acute, strongly scabrous on the keel; third scale somewhat shorter, obtuse.

Newfoundland, south to the high mountains of New England, New York and North Carolina.

[Deveuxia Clarion; Beauv. Agrost. 43. pl. 9. f. 9, 10. 1812.]

Generally perennial grasses, of various habit, with flat leaves and panicle inflorescence. Spikelets 1-flowered, the rachilla usually prolonged beyond the flower and pubescent. Scales 3; the 2 outer empty, carinate, membranous; the third scale hyaline, shorter than the outer, obtuse, usually copiously long-hairy at the base, or rarely the hairs scanty or short, and bearing a straight, bent or twisted dorsal awn; palet shorter, 2-nerved. Stames 3. Styles short, distinct. Stigmas plumose. Grain free, enclosed in the scale. Seed adherent to the pericarp. [Greek, signifying Reed-grass.]

A genus of about 130 species, widely distributed throughout temperate and mountainous regions, and particularly numerous in the Andes. Besides the following, some 20 others occur in the western parts of North America. The English name Small-reed is applied to any of the species.

Panicle open, the branches spreading or ascending, usually long and lax.

Spikelets 1'-long; outer scales acute. 1. C. Macouniana.
Spikelets 1'-2'-long; outer scales acute; awn slender. 2. C. Canadensis.
Spikelets 2'-3'-long; outer scales acuminate; awn stouter. 3. C. Langsdorfii.
Panicle narrow or contracted, the branches erect, at least in fruit, usually short and strict.
Basal hairs one-third the length of the scale or less.
Awn strongly twisted, inserted near the base of the scale; leaves long. 4. C. Porteri.
Awn not twisted, bent, inserted just below the middle of the scale; leaves short. 5. C. breviseta.
Basal hairs one-half the length of the scale or more.
Spikelets 1'-2'-long; prolongation of the rachilla hairy its whole length.
Leaves flat; basal hairs equalling or somewhat shorter than the scale. 6. C. confinis.
Leaves involute in drying; basal hairs half as long as the scale. 7. C. vegeta.
Spikelets 3'-4'-long; prolongation of the rachilla with a terminal tuft of hairs. 8. C. cinoides.

1. Calamagrostis Macouniana Vasey. Macoun’s Reed-grass. (Fig. 372.)


Culms 2'-3' tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 1'-long; leaves 3'-7'-long, 1'/2-2'/2'-wide, erect, acuminate, scabrous; panicle open, 3'-4'/2'-in length, the branches ascending, or sometimes erect, the lower 1'-1'/2'-long, naked at the base; spikelets 1'-long, the outer scales acute, scabrous, the first shorter than the second; third scale equaling the second, the awn a little exceeding it; basal hairs about as long as the scale.

Manitoba and Assiniboia. Summer.

2. Calamagrostis Canadensis (Michx.) Beauv. Blue-joint Grass. (Fig. 373.)

Calamagrostis Canadensis Beauv. Agrost. 15. 1812.

Culms 2'-5' tall, erect, simple, smooth or somewhat scabrous. Sheaths shorter than the internodes; ligule 1'-3'-long; leaves 6'-1'-long or more, 1'/2-4'/2'-wide, rough; panicle 4'-7'-in length, open, usually purplish, the branches spreading or ascending, the lower 1'/2-3'-long, naked at the base; spikelets 1'/2'-2'-long, the outer scales equal or subequal, acute, strongly scabrous; third scale equaling or slightly shorter than the second, scabrous, the awn delicate and equaling the copious basal hairs which are about as long as the scale or some of them shorter.

In swamps and wet soil, Newfoundland to Alaska, south to North Carolina, New Mexico and California. Ascends to 5000 ft. in the Adirondacks. July–Sept.
3. Calamagrostis Langsdorfi (Link) Trin. Langsdorf’s Reed-grass. (Fig. 374.)

Avundo Langsdorfi Link, Enum. 1: 74. 1821.  
Calamagrostis Langsdorfi Trin. Unil. 225. pl. 4. f. 10. 1824.

Culms 2°-4° tall, erect, simple, smooth or roughish. Sheaths shorter than the internodes; ligule 1°'-3'' long; leaves 4'-12' long, 2°'-4'' wide, scabrous; panicle 2°'-6' in length, the branches ascending or sometimes erect, the lower 1°'-2' long, naked at the base; spikelets 2°'-3'' long, the outer scales acuminate, strongly scabrous; third scale equaling or shorter than the second, scabrous, the stout awn as long as or a little exceeding the copious basal hairs which are usually somewhat shorter than the scale.

Newfoundland to Alaska, south to the mountains of New England and New York, and to Manitoba and Washington. Also in northern Europe and Asia. Summer.

4. Calamagrostis Porteri A. Gray. Porter’s Reed-grass. (Fig. 375.)


Culms 2°-4° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, slightly scabrous, with a villous ring at the summit; ligule 1°'-2'' long; leaves 6'-12' long, 2°'-4'' wide, rough; panicle 4°'-8' in length, the branches erect, the lower 1°'-2' long; spikelets 1°'-2½'' long, the outer scales strongly scabrous, acute; third scale shorter than or equaling the second, obtuse, scabrous, the lateral basal hairs about one-third the length of the scale, those at the back short or wanting; awn bent, about equaling the scale, the lower part twisted.


5. Calamagrostis breviseta (A. Gray) Scribn. Pickering’s Reed-grass. (Fig. 376.)

Calamagrostis sylvatica var. breviseta A. Gray, Man. 3: 82. 1848.  
Calamagrostis Pickeringii A. Gray, Man. Ed. 2, 547. 1856.  

Culms 12'-18' tall, erect, rigid, simple, scabrous below the panicle. Sheaths smooth and glabrous, the lower overlapping, the upper one elongated; ligule 1°'-3'' long; leaves 1½'-4' long, 2'' wide, erect, smooth beneath, rough above; panicle 3°'-4½'' in length, the branches ascending or erect, the lower 1°'-1½' long; spikelets 1½''-2'' long, purple tinged, the outer scales acute, scabrous on the keel; third scale shorter than the second, obtuse, scabrous, the basal hairs very short; awn bent, not twisted, equaling or slightly exceeding the scale.

In wet places, Cape Breton Island to New Hampshire and Massachusetts. Occurs in the alpine region of the White Mountains. Aug.-Sept.
6. Calamagrostis confinis (Willd.) Nutt. Bog Reed-grass. (Fig. 377.)

Arundo confinis Willd. Enum. i: 127. 1809.
Calamagrostis confinis Nutt. Gen. i: 37. 1818.
Calamagrostis robusta Vasey, Contr. U. S. Nat. Herb. 3: 82. 1892.

Culms 1½°–3° tall, erect, simple, smooth or rough. Sheaths shorter than the internodes; ligule about 1° long; leaves 2° wide or less, rough, flat, or involute at the apex, the basal often one-half to two-thirds as long as the culm, the stem leaves 2°–10° long; panicle contracted, 2½°–6° in length, the branches 1°–2° long, erect; spikelets 1½°–2½° long, the scales somewhat scabrous, the outer acute; third scale obtuse, the basal hairs equaling it or three-fourths as long; awn more or less bent, from a little shorter to slightly longer than the scale.

In bogs, Vermont, New York and Pennsylvania to Vancouver Island, south in the Rocky Mountains to New Mexico. Aug.–Sept. Specimens of this grass have been referred to C. Lapponica (Link) Trin., but we have been unable to prove the occurrence of that species within our area.

7. Calamagrostis neglecta (Ehrh.) Gaertn. Narrow Reed-grass. (Fig. 378.)

Arundo neglecta Ehrh. Beitr. 6: 137. 1791.
Calamagrostis stricta Beauv. Agrost. 15. 1812.

Glabrous and smooth throughout, culms 1½°–2½° tall, erect, simple, slender. Sheaths shorter than the internodes; ligule ½° long or less, truncate; leaves narrow, involute in drying, the basal one-third as long as the culm, those of the culm 2°–5° long, erect; panicle contracted, 2½°–4° in length, the branches 1° long or less, erect; spikelets 2° long, the scales scabrous, the outer acute; third scale obtuse, about three-fourths as long as the second and nearly twice the length of the basal hairs; awn bent, exceeding the scale.

Labrador and Newfoundland to Washington. Also in Europe. Summer.

8. Calamagrostis cinnoides (Muhl.) Scribn. Nuttall’s Reed-grass. (Fig. 379.)


Culms 3°–5° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or rough, the lower sometimes sparingly hirsute, and rarely with a villous ring at the summit; ligule 1°–2° long; leaves 4°–10° long or more, 2°–5° wide, attenuate into a long point, scabrous, occasionally sparingly hirsute; panicle 3°–7° in length, contracted, the branches erect, the lower 1°–2° long; spikelets 3°–4° long; scales strongly scabrous, the outer about equal, acuminate and awn-pointed; third scale shorter, obtuse, the basal hairs one-half to two-thirds its length; awn stout, exceeding or equaling the scale; prolongation of the rachilla bearing a terminal tuft of hairs.


Tall perennial grasses with flat leaves, convolute above, and dense spike-like panicles. Spikelets 1-flowered, the racillla prolonged beyond the flower and hairy. Scales 3, rigid, chartaceous, acute, keeled; the 2 outer empty, the lower 1-nerved, the upper 3-nerved; third scale 5-nerved, with a ring of short hairs at the base, subtending a chartaceous 2-nerved palet and a perfect flower. Stamens 3. Styles distinct. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek, signifying sand-loving, in allusion to the habitat of these grasses.]

Two species, the following widely distributed along the fresh and salt-water shores of the northern hemisphere, the other European.


Maram. (Fig. 380.)

Aruno arenaria L. Sp. Pl. 82. 1753.
Calamagrostis arenaria Roth, Fl. Germ. 1: 34. 1788.
Ammophila arundinacea Host, Gram. Austr. 4: 24. 1809.
Ammophila arenaria Link, Hort. Berol. 1: 165. 1827.

Glabrous, culms 2°-4° tall, erect, rigid, stout, smooth, arising from a long horizontal branching rootstock. Sheaths smooth, the lower short, crowded and overlapping, the upper longer; ligule a mere ring; leaves 6'-1° long or more, rigid, attenuate into a long slender involute point, smooth beneath, scabrous above; spike-like panicle dense, 4'-12' in length, 6'-8' thick, its branches 1½' long or less, appressed; spikelets 5'-6' long, the scales scabrous, about equal in length, the third usually with the rudiment of an awn just below the apex; basal hairs 1'-2' long.

In sands of the sea coast from New Brunswick to Virginia, and inland along the shores of the Great Lakes. Also on the coasts of northern Europe. Aug.–Sept.

38. CALAMOVILFA Hack. True Grasses, 113. 1890.

Tall grasses with stout horizontal rootstocks, elongated leaves, which are involute at the apex, and panicle in inflorescence. Spikelets 1-flowered, the racillla not prolonged beyond the flower. Scales 3, 1-nerved, acute, the 2 outer unequal, empty; third scale longer or shorter than the second, with a ring of hairs at the base; palet strongly 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain free. Seed adherent to the pericarp. [Greek, signifying a reed-like grass.]

Three known species, natives of the temperate and subtropical regions of North America.

Spikelets 2½'-2½'' long, the basal hairs less than half the length of the third scale. 1. C. brevipilis. Spikelets 3½'-4½'' long, the basal hairs more than half the length of the third scale. 2. C. longiseta.

1. Calamovilfa brevipilis (Torr.) Hack. Short-haired Reed-grass.

(Fig. 381.)

Calamagrostis brevipilis A. Gray, Man. 582. 1848.
Calamovilfa brevipilis Hack. True Grasses, 113. 1890.

Glabrous and smooth or very nearly so, culms 2°-4° tall, erect, simple. Sheaths shorter than the internodes; ligule a ring of very short hairs; leaves 6'-12' long, 1½'' wide or less, attenuate into a long slender involute tip, smooth beneath, slightly scabrous above; panicle open, 5'-10' in length, the branches ascending, the lower 2'-4' long; spikelets 2½'-3½'' long; scales acute, scabrous toward the apex, the outer unequal, the first one-half as long as the second; third scale exceeding the second, pubescent on the lower half of the keel; basal hairs one-third the length of the scale; palet nearly equaling the scale, pubescent on the lower half of the keel.

2. **Calamovilfa longifolia** (Hook.) Hack. Long-leaved Reed-grass.
(Fig. 382.)


*Calamovilfa longifolia* Hack. True Grasses, 113. 1890.

Culms 2°-6° tall, erect, simple, stout, smooth and glabrous. Sheaths crowded and overlapping, glabrous or rarely pilose; ligule a ring of hairs about 1" long; leaves 8'-1° long or more, panicle narrow, often 1° long or more, pale, the branches erect or ascending, the lower 4'-10' long; spikelets 3'-4" long; scales acute, smooth, the first shorter than the second; the third a little longer or slightly shorter than the second, and nearly twice the length of the copious basal hairs; palet slightly shorter than the third scale.

On sandy shores, western Ontario and Manitoba to the Rocky Mountains, south to Indiana, Kansas and Colorado. July–Sept.


Annual grasses with narrow flat leaves, and ample open or contracted panicles. Spikelets 1-flowered, small, the rachilla prolonged beyond the flower into a bristle. Scales 3; the 2 outer empty, unequal, thin, membranous, keeled, acute; the third scale a little shorter, membranous, bearing a long slender awn inserted just below the shortly 2-toothed apex; palet a little shorter than the scale, 2-keeled, 2-toothed. Stamens 3. Styles distinct, short. Stigmas plumose. Grain narrow, free, included in the scale. Seed adherent to the pericarp. [Greek, signifying not mutilated, whole or entire; application uncertain.]

Two species, natives of Europe and western Asia.

(Fig. 383.)

*Agrostis Spica-venti* L. Sp. Pl. 61. 1753.


Culms 1°-2° tall, erect, simple, slender, smooth and glabrous. Sheaths usually longer than the internodes, the upper one generally including the base of the panicle; ligule 1'/-3" long; leaves 1'-7' long, ½"-2" wide, scabrous; panicle 3'-9' in length, the branches erect or ascending, capillary, 1½'-3' long; outer scales of the spikelet 1'/-1½" long, acute, smooth and shining; third scale hairy or nearly smooth, bearing a dorsal scabrous awn 3'/-4" long; rudiment at the end of the rachilla less than ¾" long.


Annual or perennial grasses with flat leaves and spike-like or open panicles. Spikelets deciduous, 2-flowered; lower flower perfect, upper stamine. Scales 4; the 2 lower empty, membranous, keeled, the first 1-nerved, the second 3-nerved and often short-awned; flowering scales chartaceous, that of the upper flower bearing a bent awn. Palet narrow, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, enclosed in the scale. [Greek, taken from Pliny.]

About 8 species, natives of the Old World.

1. **Hólcus lanátus** L. Velvet-grass. Meadow Soft-grass. (Fig. 384.)


Softly and densely pubescent, light green, culms 1 1/2°-3° tall, erect, often decumbent at the base, simple. Sheaths shorter than the internodes; ligule 1/2"-1" long; leaves 1"-6" long, 2"-6" wide; spikelets 2" long, the empty scales white-villosus, the upper awn-pointed; flowering scales 1" long, smooth, glabrous and shining, the lower sparsely ciliate on the keel, somewhat obtuse, the upper 2-toothed and bearing a hooked awn just below the apex.


41. **Aíra** L. Sp. Pl. 63. 1753.

Mostly annual grasses with narrow leaves and contracted or open panicles. Spikelets small, 2-flowered, both flowers perfect. Scales 4; the 2 lower empty, thin-membranous, acute, subequal, persistent; the flowering scales usually contiguous, hyaline, mucronate or 2-toothed, deciduous, bearing a delicate dorsal awn inserted below the middle; palet a little shorter than the scale, hyaline, 2-nerved. Stamens 3. Stigmas plumose. Grain enclosed in the scale and palet, and often adhering to them. [Greek name for _Lolium temulentum._]

Four or five species, natives of Europe.

Panicle open; flowering scales about 1" long; plants 5'-10' tall.
Panicle contracted; flowering scales about 1 1/2" long; plants 2'-4' tall.

1. **Aíra caryophylleá** L. Silvery Hair-grass. (Fig. 385.)

_Aíra caryophylleá_ L. Sp. Pl. 66. 1753.

Smooth and glabrous throughout, culms 5'-10' tall, erect from an annual root, simple, slender. Sheaths mostly basal; ligule 1 1/2" long; leaves 1/2'-2' long, involute-setaceous; panicle 1'-4' in length, open, the branches spreading or ascending, the lower 1" long or less; spikelets 1'-1 1/2" long, the empty scales acute; flowering scales very acute, 2-toothed, 1" long, bearing an awn 1 1/2'-2' long.

In fields and waste places, eastern Massachusetts to Virginia. Also on the Pacific coast. Local. Naturalized from Europe. Panicle silvery, shining. May-July.
2. *Aira praecox* L. Early Hair-grass. (Fig. 386.)

*Aira praecox* L. Sp. Pl. 65. 1753.

Glabrous and smooth throughout, culms 2'-4' tall, erect, from an annual root, simple, rigid. Sheaths clothing the whole culm, the upper one often enclosing the base of the panicle; ligule about 1 1/2'' long; leaves 1' long or less, involute-setaceous; panicle contracted, strict, 5'-1' in length; spikelets about 1 1/2'' long, the empty scales acute; the flowering scales acuminate, 2-toothed, about 1 1/2'' long, bearing an awn 1 1/2''-2'' long.

In dry fields, southern New Jersey and Pennsylvania to Virginia. Naturalized from Europe. May-July.

**42. DESCHAMPSIA** Beauv. Agrost. 91. pl. 18. f. 3. 1812.

Perennial grasses with flat or involute leaves, and contracted or open panicles. Spikelets 2-flowered, both flowers perfect, the hairy rachilla extended beyond the flowers or rarely terminated by a staminate one. Scales 4 (rarely more), the lower empty, keeled, acute, membranous, shining, persistent; the flowering scales of about the same texture, deciduous, bearing a dorsal awn, the apex toothed. Palet narrow, 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, enclosed in the scale. [In honor of J. C. A. Loiseleur-Deslongchamps, 1774-1849, French physician and botanist.]

About 20 species, inhabiting cold and temperate regions, a few occurring in the high mountains of the tropics. Besides the following, some 6 others occur in the western parts of North America.

Upper flowering scale reaching or extending beyond the apex of the empty scales.

Flowering scales about 1 1/2'' long, erose-truncate; leaves flat.

Flowering scales about 2'' long, acute or obtuse; leaves involute.

Empty scales extending much beyond the upper flowering scale.

1. *Deschampsia caespitosa* (L.) Beauv. Tufted Hair-grass. (Fig. 387.)

*Aira caespitosa* L. Sp. Pl. 64. 1753.

*Deschampsia caespitosa* Beauv. Agrost. 166. pl. 18. f. 3. 1812.

Culms 2'-4' tall, erect, simple, smooth and glabrous. Sheaths much shorter than the internodes; ligule 1''-3'' long; leaves flat, 1''-1 1/2'' wide, smooth beneath, strongly scabrous above, the basal ones numerous, one-quarter to one-half as long as the culm, those of the culm 2'-6' long; panicle open, 3'-9' in length, the branches widely spreading or ascending, often somewhat flexuous, naked at the base, the lower 2'-5' long; spikelets 1 1/2''-2'' long; flowering scales about 1 1/4'' long, erose-truncate at the apex, the awns somewhat shorter or a little longer, the upper scale reaching to or extending beyond the apices of the empty ones.

Newfoundland to Alaska, south to New Jersey, Illinois, Minnesota and in the Rocky Mountains and Sierra Nevada to New Mexico and California, mostly in wet soil. Also in Europe and Asia. July-Aug.
2. Deschampsia flexuosa (L.) Trin.  Wavy Hair-grass.  (Fig. 388.)

_Aira flexuosa_ L. Sp. Pl. 65.  1753.

Glabrous throughout, culms 1'-2½' tall, erect, slender, simple, smooth. Sheaths much shorter than the internodes; ligule 1'' long or less; leaves involute-setaceous, smooth beneath, scabrous above, the basal very numerous, one-fifth the length of the culm or less, those of the culm 1½'-3' long; panicle open, 2'-8' in length, the branches ascending or erect, sometimes widely spreading, naked at the base, flexuous, the lower 1½'-5' long; spikelets 2½'-2½'' long; flowering scales about 2'' long, acutely toothed at the apex; awns bent and twisted, much exceeding the scale; upper scale reaching to or extending beyond the apices of the empty ones.

In dry soil, Greenland and Newfoundland to Ontario and Michigan, south to North Carolina and Tennessee. Ascends to 5100 ft. in the Adirondacks. Also in Europe. July-Aug.

3. Deschampsia atropurpurea (Wahl.) Scheele.  Mountain Hair-grass.  (Fig. 389.)

_Aira atropurpurea_ Wahl. Fl. Lapp. 37.  1812.
_Deschampsia atropurpurea_ Scheele, Flora, 27: 56.  1844.

Glabrous and smooth or very nearly so, culms 6'-18' tall, erect, simple, rigid. Sheaths shorter than the internodes; ligule 1'' long or less, truncate; leaves 1''-2'' wide, erect, sometimes slightly scabrous above, the basal 2½'-5' long, those of the culm shorter; panicle contracted, usually purple or purplish, 1'-2' in length, the branches erect, or sometimes ascending, the lower ½'-1½' long; spikelets 2½'' long; flowering scales about 1½'' long, erose-truncate at the apex; awns bent and much longer than the scales; upper scale much exceeded by the very acute outer ones.


Mostly perennial tufted grasses, with flat leaves and spike-like or open panicles. Spikelets 2-4-flowered, the flowers all perfect, or the uppermost staminate; rachilla glabrous or pilose, extended beyond the flowers. Scales 4-6, membranous, the 2 lower empty, unequal, acute, persistent; flowering scales usually shorter than the empty ones, deciduous, 2-toothed, bearing a dorsal awn below the apex, or the lower one sometimes awnless. Palet narrow, hyaline, 2-toothed. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale. [Latin, referring to the three bristles (one awn and two sharp teeth) of the flowering scales in some species.]

About 50 species, widely distributed in temperate or mountainous regions. Besides the following, about 8 others occur in the western parts of North America.

Flowering scales all bearing long dorsal awns.

Panicle contracted, dense; flowering scales 2½'' long or less.  
1. _T. subspicatum._
2. _T. flavescens._
Lower flowering scale not bearing a long dorsal awn, a rudiment sometimes present.

3. _T. Pennsylvanicum._
1. *Trisetum subspicatum* (L.) Beauv. Narrow False Oat. (Fig. 390.)

*Trisetum subspicatum* var. molle A. Gray, Man. Ed. 2, 572. 1859.

Softly pubescent or glabrous, culms 6'-2° tall, erect, simple. Sheaths usually shorter than the internodes, ligule ½"-1" long; leaves 1'-4' long, ½"-2" wide; panicle spike-like, 1'-5' in length, often interrupted below, its branches 1½' or less long, erect; spikelets 2-3-flowered, the empty scales hispid on the keel, shining, the second about 2½" long, the first shorter; flowering scales 2½"-2½" long, acuminate, scabrous, each bearing a long bent and somewhat twisted awn.

In rocky places, Labrador to Alaska, south on the mountains to North Carolina, New Mexico and California. Also in Europe and Asia. Aug.-Sept.

2. *Trisetum flavescens* (L.) R. & S. Yellow False Oat. (Fig. 391.)

*Avena flavescens* L. Sp. Pl. 809. 1753.
*Trisetum flavescens* R. & S. Syst. 2:663. 1817.

Culms 1½°-2½° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, more or less pubescent; ligule ½" long; leaves 1½'-5' long, 1'-3' wide, scabrous, sometimes sparingly hairy; panicle open, 2'-5' in length, the branches ascending or erect, somewhat flexuous, naked below, the lower 1'-2' long; spikelets 3-4-flowered; empty scales smooth and glabrous, the second acute, 2½" long, the first about half as long, narrower, acuminate; flowering scales 2½"-3½" long, scabrous, bearing a long bent and twisted awn.


3. *Trisetum Pennsylvanicum* (L.) Beauv. Marsh False Oat. (Fig. 392.)

*Avena Pennsylvanica* L. Sp. Pl. 70. 1753.

Culms 1°-3° tall, erect, simple, slender and often weak, smooth and glabrous. Sheaths shorter than the internodes, sometimes scabrous; ligule ½" long; leaves 1°-6° long, 1°-3° wide, rough; panicle 2'-8' in length, yellowish, narrow, the branches ascending, the lower 1'-2' long; spikelets 2-flowered; outer scales smooth, shining, subequal, the second 2'-2½" long; flowering scales 2½'-2½" long, scabrous, the lower not long-awned, but a rudimentary awn sometimes present, the upper with a long bent and twisted awn.

Annual or perennial grasses, with usually flat leaves and paniced spikelets. Spikelets 2-many-flowered, or rarely 1-flowered; lower flowers perfect, the upper often staminate or imperfect. Scales 4-many (rarely 3); the 2 lower empty, somewhat unequal, membranous, persistent; flowering scales deciduous, rounded on the back, acute, generally bearing a dorsal awn, the apex often 2-toothed. Palet narrow, 2-toothed. Stamens 3. Styles short, distinct. Stigmas plumose. Grain oblong, deeply furrowed, enclosed in the scale and palet, free or sometimes adherent to the latter. [Old Latin name for the Oat.]

About 50 species, widely distributed in temperate regions, chiefly in the Old World. Oats (Avena sativa L.) sometimes appears in waste places or in fields where it has been cultivated.

Empty scales of the spikelet 6′ in length or less, shorter than the flowering scales.
Flowering scales with a ring of short hairs at the base; awn nearly as long as the scale.

Flowering scales naked at the base; awn not over one-half as long as the scale.

Empty scales of the spikelet 6′-9′ in length, enclosing the flowering scales.

1. Avena striāta Michx. Purple Oat. (Fig. 393.)


Culms 1°-2° tall, erect, simple, slender, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly scabrous; ligule ½′ long or less; leaves erect, 1′-6′ long, 1′-3′ wide, smooth beneath, usually scabrous above; panicle 2½′-5′ in length, lax, the branches erect or ascending, naked below, the lower 1′-2½′ long; spikelets 3-6-flowered, the empty scales smooth, the second 3′-3½′ in length, 3-nerved, the first two-thirds to three-quarters as long, 1-nerved; flowering scales 3′-4′ long, with a ring of short hairs at the base, strongly nerved, scabrous; awns as long as the scales or longer.


2. Avena Smithii Porter. Smith’s Oat. (Fig. 394.)


Culms 2½°-5° tall, erect, simple, scabrous. Sheaths shorter than the internodes, very rough; ligule 2′ long; leaves 4′-8′ long, 3′-6′ wide, scabrous; panicle 6′-12′ in length, the branches finally spreading; spikelets 3-6-flowered; empty scales smooth, the second 3′-4′ in length, 5-nerved, the first shorter, obscurely 3-nerved; flowering scales 5′ long, naked at the base, strongly nerved, scabrous, bearing an awn one-fourth to one-half their length.

Northern Michigan and Isle Royal. Summer.
3. **Avena fatua** L. Wild Oat. (Fig. 395.)

*Avena fatua* L. Sp. Pl. 80. 1753.

Culms 1°-4° tall, erect, simple, stout, smooth and glabrous. Sheaths smooth, or scabrous at the summit, sometimes sparingly hirsute, the lower often overlapping; ligule 1°-2° long; leaves 3°-8° long, 1°'-4° wide; panicle open, 4°-12° in length, the branches ascending; spikelets 2-4-flowered, drooping; outer scales 3°-1° in length, smooth, enclosing the flowering scales; flowering scales 6°'-6° long, with a ring of stiff brown hairs at the base, pubescent with long rigid brown hairs, bearing a long bent and twisted awn.

In fields and waste places, Dakota and Minnesota; abundant on the Pacific Coast. Naturalized from Europe or Asia. July–Aug.

45. **ARRHENATHERUM** Beauv. Agrost. 55. pl. ii. f. 5. 1812.

Tall perennial grasses, with flat leaves and contracted or open panicles. Spikelets 2-flowered; lower flower staminate, upper perfect; rachilla extended beyond the flowers. Scales 4, the 2 lower empty, thin-membranous, keeled, very acute or awn-pointed, unequal, persistent, flowering scales rigid, 5-7-nerved, deciduous, the first bearing a long bent and twisted dorsal awn, inserted below the middle, the second unawned; palet hyaline, 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose. Grain ovoid, free. [Greek, referring to the awn of the staminate scale.]

Six species, natives of the Old World.

1. **Arrhenatherum elatius** (L.) Beauv.

Oat-grass. (Fig. 396.)

*Avena elatior* L. Sp. Pl. 70. 1753.

*Arrhenatherum avenaceum* Beauv. Agrost. 152. Name only. 1812.


Glabrous, culms 2°-4° tall, erect, simple. Lower sheaths longer than the internodes; ligule 1° long; leaves 2½°-12° long, 1°'-4° wide, scabrous; panicle 4°-12° in length, contracted, the branches erect, the lower 1°-2° long; empty scales finely roughened, the second 4° long, the first shorter; flowering scales about 4° long.

In fields and waste places, Maine and Ontario to Georgia and Tennessee. Also on the Pacific Coast. Naturalized from Europe. June–Aug.

46. **DANTHÔNIA** DC. Fl. France, 3: 32. 1805.

Mostly perennial grasses, with flat or convolute leaves and contracted or open panicles. Spikelets 3-many-flowered, the flowers all perfect, or the upper staminate; rachilla pubescent, extending beyond the flowers. Scales 5-many, the 2 lower empty, keeled, acute, subequal, persistent, generally extending beyond the uppermost flowering one; flowering scales rounded on the back, 2-toothed, deciduous, the awn arising from between the acute or awned teeth, flat and twisted at base, bent; palet hyaline, 2-keeled near the margins, obtuse or 2-toothed. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale. [Name in honor of Etienne Danthoine, a Marseilles botanist of the last century.]

A genus of about 100 species, widely distributed in warm and temperate regions, chiefly in South Africa. Empty scales ½° long or less; sheaths glabrous or sometimes sparingly pubescent at the base.

Teeth of the flowering scale about ½° long, acute; culm leaves short; panicle contracted.

1. **D. spicata**.

Teeth of the flowering scale 1°'-1½° long, awned; culm leaves elongated; panicle usually open.

Empty scales more than ½° long; sheaths usually villous.

2. **D. compressa**.

3. **D. sericea**.
1. Danthonia spicata (L.) Beauv. Common Wild Oat-grass. (Fig. 397.)

*Avena spicata* L., Sp. Pl. 80. 1753.

*Culms* 1'-2'-1/2' tall, erect, simple, smooth and glabrous, nearly terete. Sheaths shorter than the internodes, glabrous or only sparingly pubescent below; ligule very short; leaves rough, 1'-1/2' wide or less, usually involute, the lower 4'-5' long, the upper 1'-2' long; inflorescence racemose or paniculate, 1'-2' in length, the pedicles and branches erect or ascending; spikelets 5-8-flowered; empty scales 4'-5' long, glabrous; flowering scales broadly oblong, sparingly pubescent with appressed silky hairs, the teeth about 1/2'' long, acute or short-pointed, the bent and widely spreading awn closely twisted at the base, loosely so above.

In dry soil, Newfoundland to Quebec and Dakota, south to North Carolina and Louisiana. Ascends to 3000 ft. in Virginia. July-Sept.

2. Danthonia compressa Austin. Flattened Wild Oat-grass. (Fig. 398.)

*Danthonia compressa* Austin; Peck, Rept. Reg. N. Y. State Univ. 22: 54. 1869.


*Culms* 1 1/2'-3' tall, erect, slender, simple, flattened, smooth and glabrous. Sheaths shorter than the internodes; ligule pilose; leaves 1' wide or less, rough, lax, the basal from one-third to one-half the length of the culm; lower culm leaves 6'-8' long, the upper 3'-6'; panicle open, 2 1/2'-4' in length, the lower branches generally spreading; spikelets 5-10-flowered; empty scales 5'-6' long, glabrous; flowering scales oblong, with a ring of short hairs at base, pubescent with appressed silky hairs, the awn erect or somewhat bent, strongly twisted below, slightly so above, the teeth 1'-1 1/2' long, acuminate, awned.

In woods, Maine and Vermont to North Carolina and Tennessee. Ascends to 6000 ft. in North Carolina. July-Sept.

3. Danthonia sericea Nutt. Silky Wild Oat-grass. (Fig. 399.)


*Culms* 1 1/2'-3' tall, simple, glabrous. Sheaths shorter than the internodes, usually villous; ligule pilose; leaves rough and more or less villous, 1' 1/2'-1 1/2' wide, the basal one-quarter to one-half the length of the culm, usually flexuous, those of the culm 1'-4' long, erect; panicle 2 1/2'-4 1/2' in length, contracted, the branches erect or ascending; spikelets 4-10-flowered; empty scales 7'-8' long, glabrous; flowering scales oblong, strongly pubescent with long silky hairs, the awn erect or somewhat bent, closely twisted below, loosely so above, the teeth 1'-1 1/2' long, acuminate, awned.

In dry sandy soil, Massachusetts to New Jersey, south to Florida. May-July.
47. **CAPRIOLA** Adans. Fam. Pl. 2: 31. 1763.


Perennial grasses with short flat leaves and spicate inflorescence, the spikes digitate. Spikelets 1-flowered, second. Scales 3; the 2 lower empty, keeled; flowering scale broader, membranous, compressed; palet a little shorter than the scale, hyaline, 2-keeled. Stamens 3. Styles distinct. Stigmas short, plumose. Grain free. [Name mediaeval Latin for the wild goat, that feeds on this grass in waste rocky places.]

Four known species, of which three are Australian, the following widely distributed.

1. **Capriola Dactylon** (L.) Kuntze.
   Bermuda-grass. Scutch-grass. Dog's-tooth Grass. (Fig. 400.)


   Culms 4'-12' tall, erect, from long creeping and branching stolons, smooth and glabrous. Sheaths glabrous or somewhat hairy, crowded at the bases of the culms and along the stolons; ligule pilose; leaves 1'-2' long, 1'/2-2'/2 wide, flat, rigid, smooth beneath, scabrous above; spikes 4-5, 1'/2-2' in length, digitate; rachis flat; spikelets 1'/2 long; outer scales hispid on the keel, narrow, the first shorter than the second, about two-thirds as long as the broad and strongly compressed third one.


48. **SPARTINA** Schreb. Gen. 43. 1789.

Perennial glabrous grasses, with long horizontal rootstocks, flat or involute leaves, and an inflorescence of one-sided spreading or erect alternate spikes. Spikelets 1-flowered, narrow, deciduous, borne in two rows on the rachis, articulated with the very short pedicels below the scales. Scales 3; the 2 outer empty, keeled, very unequal; the third subtending a perfect flower, keeled, equalling or shorter than the second; palet often longer than its scale, 2-nerved. Stamens 3. Styles filiform, elongated. Stigmas filiform, papillose or shortly plumose. Grain free. [Greek, referring to the cord-like leaves of some species.]

About 7 species, widely distributed in saline soil, a few in fresh-water marshes.

First scale awn-pointed, equalling the third; second long-awned.

First scale acute, shorter than the third, usually one-half as long.

First scale strongly scabrous-hispid on the keel.

Leaves 1'/2 wide or more, flat.

Leaves 1'/2 wide or less.

Spikes ascending or erect; leaves narrow, involute; coast plant.

Spikes appressed; leaves usually flat at the base; western species.

First scale smooth on the keel or occasionally slightly scabrous.

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1. **Spartina cynosuroides** (L.) Wild.
   Tall Marsh-grass. (Fig. 401.)

   *Dactylis cynosuroides* L. Sp. Pl. 71. 1753.
   *Spartina cynosuroides* Wild. Enum. 50. 1809.

   Culms 2'-6' tall, erect, simple, smooth. Sheaths long, overlapping, those at the base of the culm crowded; ligule a ring of hairs; leaves 1' long or more, 3'/4-7' wide, scabrous on the margins, becoming involute in drying, attenuate into a long slender tip; spikes 5-30, 2'-5' long, often on peduncles 1'/2-1' in length, ascending or erect; rachis rough on the margins; spikelets much imbricatated, 6'-7' long; outer scales awn-pointed or awned, strongly hispid-scabrous on the keel; third scale as long as the first, the scabrous midrib terminating just below the emarginate or 2-toothed apex; palet sometimes exceeding the scale.

   In swamps and streams of fresh or brackish water, Nova Scotia to Assiniboia, New Jersey and Texas. Sometimes glaucous. Called also Fresh-water Cord-grass. Aug.-Oct.
2. Spartina polystachya (Michx.) Ell. Salt Reed-grass. (Fig. 402.)

Trachynotia polystachya Michx. Fl. Bor. Am. 1: 64. 1803.

Culms 4°-9° tall, erect, stout, simple, smooth. Sheaths overlapping, those at the base of the culm crowded; ligule a ring of hairs; leaves 1° long or more, 1/2-1' wide, flat, scabrous at least on the margins, attenuate into a long slender tip; spikes 20-50, ascending, often long-peduncled, 2'-4' in length, the rachis rough on the margins; spikelets much imbricated, 4'-5' long, the outer scales acute, strongly scabrous-hispid on the keel, the first half the length of the second; third scale scabrous on the upper part of the keel, obtuse, longer than the first and exceeded by the palet.

In salt and brackish marshes, Maine to New Jersey and Florida. Called also Creek-thatch. Aug.-Oct.

3. Spartina patens (Ait.) Muhl. Salt-meadow Grass. (Fig. 403.)

Spartina patens Muhl. Gram. 55. 1817.

Culms 1°-3° tall, erect, or decumbent at base, smooth. Lower sheaths overlapping and crowded; ligule a ring of short hairs; leaves 1/2-1° long, 1'-2' broad, involute, attenuate into a long tip, smooth and glabrous beneath; spikes 2-10, 1'-2' long, usually ascending, more or less peduncled, the rachis slightly scabrous; spikelets 3'-4' long; outer scales acute, scabrous-hispid on the keel, the first usually rather less than one-half as long as the second; third scale somewhat scabrous on the upper part of the keel, emarginate or 2-toothed at the apex, longer than the first and exceeded by the palet.

On salt meadows, Newfoundland and Nova Scotia to Florida, west to Texas. This and Juncus Gerardi, the "Black Grass," furnish most of the salt meadow hay of the Atlantic coast. Aug.-Oct.

4. Spartina gracilis Trin. Inland Cord-grass. (Fig. 404.)


Culms 1°-3° tall, erect, simple, smooth. Sheaths overlapping, those at the base of the culm short and crowded; ligule a ring of short hairs; leaves 1° long or less, 1'-3' wide, flat or involute, attenuate into a long tip; spikes 4-8, 1'-2' long, appressed, more or less peduncled; spikelets 3'-4' long; outer scales acute, scabrous-hispid on the keel, the first half the length of the second; third scale obtuse, slightly shorter than the second and about equalling the obtuse palet.

In saline soil, Assiniboia and British Columbia to Nebraska and Nevada. Aug.-Sept.
5. **Spartina stricta** (Ait.) Roth. Smooth Marsh-grass. (Fig. 405.)

*Spartina stricta* Roth, Cat. Bot. 3: 9. 1806.

Culms 1°-3° tall, erect, simple, smooth. Sheaths overlapping, those at the base shorter and looser, much crowded; ligule a ring of short hairs; leaves 3'-12' long, 2''-4'' wide at the base, involute, at least when dry; spikes 3-5, erect or nearly so, 1'-2' long; spikelets 6''-8'' long, loosely imbricated; empty scales acute or acutish, 1-nerved, the first shorter than the second, which exceeds or equals the third; palet longer than the third scale.


*Dactylis maritima* Walt. Fl. Car. 77. 1788.
*Spartina glabra* Muhl. Gram. 54. 1817.

Culms taller, sometimes 6° high, and leaves longer; spikelets more numerous, usually appressed.

*Spartina stricta alterniflora* (Lois.) A. Gray, Man. Ed. 2, 552. 1896.

Culms 4°-6° tall; spikelets slender, appressed, 3'-5' long, the spikelets barely overlapping.

Very variable. Common, in some one of its forms, along the coast from Maine to Florida and Texas. Also on the coast of Europe. Our plant does not appear to be satisfactorily identified with the European. Aug.–Oct.


Tall pungent-tasted grasses, with flat or convolute narrow leaves and a curved spicate inflorescence. Spikelets borne pectinately in two rows on one side of the flat curved rachis, 1-flowered. Lower 4 scales empty, the first very short, hyaline; the second, third, fourth and fifth awned on the back, the latter subtending a perfect flower and palet, the uppermost scales empty. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, loosely enclosed in the scale. [Greek, in allusion to the curved spike.]

Seven known species, four of them American, the others in the eastern hemisphere.

1. **Campulosus aromático** (Walt.) Scribn. Toothache Grass. (Fig. 406.)

*Ctenium Americanum* Spreng. Syst. 1: 274. 1825.

Culms 3°-4° tall, erect, simple, smooth or somewhat scabrous. Sheaths shorter than the internodes, rough; ligule 1'' long, truncate; leaves 1'-6' long, 1''-2'' wide, flat or involute, smooth; spike terminal, solitary, curved, 2'-4' long, the rachis extended into a point; spikelets about 3' long; second scale thick and rigid, awned from below the 2-toothed apex, the fifth subtending a perfect flower, the others empty.

In wet soil, especially in pine barrens, Virginia to Florida. July–Sept.
50. **CHLORIS** Sw. Prodr. 25. 1788.

Mostly perennial grasses with flat leaves and spike inflorescence, the spikes solitary, few, or numerous and verticillate or approximate. Spikelets 1-flowered, arranged in two rows on one side of the rachis. Scales 4: the 2 lower empty, unequal, keeled, acute; third and fourth usually awned, the former subtending a perfect flower; palet folded and 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale. [Greek, greenish-yellow, referring to the color of the herbage.]

About forty species, mostly natives of warm and tropical regions. Besides the following some 10 others occur in the southern United States.

1. **Chloris verticillata** Nutt. Prairie Chloris. (Fig. 407.)


Culms 6'-8' tall, erect, or decumbent and rooting at the lower nodes, smooth, glabrous. Sheaths shorter than the internodes, smooth, or roughish at the summit; ligule a ring of short hairs; leaves 1'-3' long, 1''-2'' wide, obtuse, often apiculate, scabrous; spikes slender, usually spreading, 2'-4½' long, in one or two whorls, or the upper ones approximate; spikelets, exclusive of the awns, about 1½'' long, the first scale about one-half the length of the second; the third 1'' long, obtuse, ciliate on the nerves, especially on the lateral ones, bearing just below the apex a scabrous awn about 2½'' long; fourth scale as long as or shorter than the third, awned near the usually truncate apex.

On prairies, Kansas to Texas. May-July.

51. **GYMNOPOGON** Beauv. Agrost. 41. pl. 9. f. 3. 1812.

Perennial grasses with flat and usually short rigid leaves, and numerous slender alternate spikes. Spikelets 1-flowered, almost sessile, the rachilla extended and bearing a small scale which is usually awned. Scales 3 or 4; the 2 lower empty, unequal, narrow, acute; third broader, fertile, 3-nerved, slightly 2-toothed at the apex, bearing an erect awn; the fourth empty, small, awned; palet 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain linear, free, enclosed in the rigid scale. [Greek, naked-beard, referring to the prolongation of the rachilla.]

Six known species, all but one of them natives of America.

Spikes bearing spikelets their whole length; awn longer than flowering scale. 1. *G. ambiguus*. Spikes bearing spikelets above the middle; awn shorter than flowering scale. 2. *G. brevifolia*.

1. **Gymnopogon ambiguus** (Michx.) B.S.P. Broad-leaved Gymnopogon. (Fig. 408.)


*Gymnopogon racemosus* Beauv. Agrost. 164. 1812.

*Gymnopogon ambiguus* B.S.P. Prel. Cat. N. Y. 69. 1888.

Culms 12'-18' tall, erect, or decumbent at the base, simple or sometimes sparingly branched, smooth and glabrous. Sheaths short, glabrous, excepting a villous ring at the summit, crowded at the base of the culm; ligule very short; leaves 1'-4' long, 2''-6'' wide, lanceolate, acute, cordate at the base, spreading, smooth or a little scabrous above; spikes slender, spikelet-bearing throughout their entire length, at first erect, the lower 4'-8' long, at length widely spreading; spikelets, exclusive of awns, 2''-2½'' long; first scale shorter than the second; third scale exceeded by the second, the callus at the base hairy, the awn 2''-3'' long.

**In dry sandy soil, southern New Jersey to Missouri, south to Florida and Texas.** Aug.-Oct.
2. Gymnopogon brevifolius Trin.
   Short-leaved Gymnopogon.
   (Fig. 409.)


Culms 1°-2° long, from a decumbent base, simple, slender, smooth and glabrous. Sheaths shorter than the internodes, sometimes crowded near the middle of the culm; ligule very short; leaves 1'-2' long, 1'-4' wide, usually spreading, lanceolate, acute, cordate at the base; spikes very slender, spikelet-bearing above the middle, the lower 4'-6' long, at first erect, finally widely spreading; spikelets, exclusive of the awns, 1½' long; first scale shorter than the second; third scale equaling or exceeded by the second, short-awned, sparingly villous or glabrous, the callus hairy.


An annual grass with branching culms, narrow leaves and slender spikes arranged along a common axis. Spikelets 1-flowered, sessile and alternate on the rachis. Scales 3; the 2 lower empty, narrow, membranous, acuminate; the flowering scale longer, of similar texture; palet narrow, shorter. Stamens 3. Styles distinct. Stigmas plumose. Grain linear, free, enclosed in the rigid scale. [Greek, in allusion to the resemblance of this grass to the genus _Nardus._]

A monotypic genus of central North America.

1. Schedonnardus paniculátus (Nutt.) Trelease. Schedonnardus. (Fig. 410.)


Culms 8'-18' tall, erect, slender, rigid, branching at the base, scabrous. Sheaths crowded at the base of the culm, compressed, smooth and glabrous; ligule 1' long, truncate; leaves 1'-2' long, 1' wide or less, flat, usually erect; spikelets numerous, rigid, widely spreading, alternate, the lower 2'-4' long, the axis and branches triangular; spikelets 1¼'-1½' long, sessile and appressed, alternate; scales hispid on the keel, the second longer than the first and exceeded by the acute third one.

Manitoba and Assiniboia, south to Illinois, Texas and New Mexico. July-Sept.


Annual or perennial grasses with flat or convolute leaves and numerous spikelets in one-sided spikes. Spikelets 1-2-flowered, arranged in two rows on one side of a flat rachis, the rachilla extended beyond the base of the flowers, bearing 1-3 awns and 1-3 rudimentary scales. Two lower scales empty, acute, keeled; flowering scale broader, 3-toothed, the teeth awn-pointed or awned; palet hyaline, entire or 2-toothed. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free. [In honor of Claudius Bouteloua, a Spanish botanist.]

About 30 species, particularly numerous in Mexico and in the southwestern United States. Spikelets 1-4, erect or spreading; spikelets numerous, pectinately arranged.

Rachilla bearing the rudimentary scales and awns glabrous; second scale strongly papillose-hispid on the keel.

1. _B. hirsuta._

Rachilla bearing the rudimentary scales and awns with a tuft of long hairs at the apex; second scale scabrous and sparingly long-ciliate on the keel.

2. _B. oligostachya._

Spikes numerous, spreading or reflexed; spikelets few or several, diverging from the rachis.

3. _B. curtisperdula._
1. **Bouteloua hirsuta** Lag.  Hairy Mesquite-grass.  (Fig. 411.)


Culms 6'-20' tall, erect, simple or sometimes sparingly branched at the base, smooth and glabrous. Sheaths mostly at the base of the culm, the lower short and crowded, the upper longer; ligule a ring of short hairs; leaves 1'-5' long, 1'' wide or less, erect or ascending, flat, scabrous, sparingly papillose-hirsute near the base, especially on the margins; spikes 1-4, ½'-2' long, usually erect or ascending, the rachis extending beyond the spikelets into a conspicuous point; spikelets numerous, 2½'-3'' long, pectinately arranged; first scale hyaline, shorter than the membranaceous second one, which is strongly papillose-hirsute on the keel; third scale pubescent, 3-cleft to the middle, the nerves terminating in awns; rachilla without a tuft of hairs under the rudimentary scales and awns.

In dry soil, especially on prairies, Illinois to Dakota, Texas and Arizona. July-Sept.

2. **Bouteloua oligostachya** (Nutt.) Torr.  Grama-grass. Mesquite-grass.  (Fig. 412.)

*Atheropogon oligostachyus* Nutt. Gen. 1: 78. 1818.


Culms 6'-18' tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a ring of short hairs; leaves 1'-4' long, 1'' wide or less, involute, at least at the long slender tip, smooth or scabrous; spikes 1-3, 1'-2' long, often strongly curved, the rachis terminating in a short inconspicuous point; spikelets numerous, pectinately arranged, about 3'' long; first scale hyaline, shorter than the membranaceous second one, which is scabrous and sometimes long-ciliate on the keel, and sometimes bears a few papillae; third scale pubescent, 3-cleft, the nerves terminating in awns; rachilla with a tuft of long hairs under the rudimentary scales and awns.

On prairies, Manitoba to Alberta, south to Wisconsin, Texas and Mexico. July-Sept.

3. **Bouteloua curtipendula** (Michx.) Torr.  Racemed Bouteloua.  (Fig. 413.)


*Bouteloua curtipendula* var. *aristosa* A. Gray, Man. Ed. 2, 553. 1856.

Culms 1'-3' tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a ring of short hairs; leaves 2'-12' long, 2'' wide or less, flat or involute, rough, especially above; spikes numerous, 3'-8'' long, widely spreading or reflexed; spikelets 4-12, divergent from the rachis, 3½''-5'' long, scales scabrous, especially on the keel, the first shorter than or equalling the second; the third 3-toothed, the nerves extended into short awns; rachilla bearing at the summit a small awned scale, or sometimes a larger 3-nerved scale, the nerves extended into awns; anthers vermilion or cinnabar-red.

In dry soil, Ontario to Manitoba, south to New Jersey, Kentucky, Texas and Mexico. July-Sept.
54. BECKMÁNNIA Host, Gram. Austr. 3: 5. pl. 6. 1805.

A tall erect grass with flat leaves and erect spikes borne in a terminal panicle. Spikelets 1-2-flowered, globose, compressed. Scales 3 or 4; the 2 lower empty, membranous, saccate, obtuse or abruptly acute; the flowering scales narrow, thin membranous; palet hyaline, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain oblong, free, enclosed in the scale and palet. [In honor of Johann Beckmann, 1739-1811, teacher of Natural History at St. Petersburg.]

A monotypic genus of the north temperate zone.

1. Beckmannia erucaeformis (L.) Host.

Beckmannia. (Fig. 414.)

*Phalaris erucaeformis* L. Sp. Pl. 55. 1753.
*Beckmannia erucaeformis* Host, Gram. Austr. 3: 5. 1805.

Beckmannia erucaeformis var. uniflora Scribn.; Wats. & Coult. in A. Gray, Man. Ed. 6, 628. 1890.

Glabrous, culms 1½-3° tall, erect, simple, smooth. Sheaths longer than the internodes, loose; ligule 2″-4″ long; leaves 3'-9' long, 2″-4″ wide, rough; panicle 4'-10' in length, simple or compound, the spikes about ½' long; spikelets 1½'-1½" long, 1-2-flowered, closely imbricated in two rows on one side of the rachis; scales smooth, the outer saccate, obtuse or abruptly acute; flowering scales acute, the lower generally awn-pointed, the upper rarely present.

In wet places, western Ontario to British Columbia, south to Iowa, Colorado and California. July-Sept.


Tufted annual or perennial grasses, with flat leaves and spicate inflorescence, the spikes digitate or close together at the summit of the culm. Spikelets several-flowered, sessile, closely imbricated in two rows on one side of the rachis, which is not extended beyond them; flowers perfect or the upper staminate. Scales compressed, keeled; the 2 lower empty; the others subtending flowers, or the upper empty. Stamens 3. Styles distinct. Stigmas plumose. Grain loosely enclosed in the scale and palet. [From the Greek name of the town where Ceres was worshipped.]

Species 6, natives of the Old World. Besides the following, two others have been found in ballast fillings about the eastern seaports.

1. Eleusine Indica (L.) Gaertn. Wire-grass. Crab-grass. Yard-grass. (Fig. 415.)

*Cynosurus Indicus* L. Sp. Pl. 72. 1753.

Culms 6'-2° tall, tufted, erect, or decumbent at the base, smooth and glabrous. Sheaths loose, overlapping and often short and crowded at the base of the culm, glabrous or sometimes sparingly villous; ligule very short; leaves 3'-12' long, 1½'-3½" wide, smooth or scabrous; spikes 2-10, 1½'-3½" long, whorled or approximate at the summit of the culm or one or two sometimes distant; spikelets 3-6-flowered, 1½'-2½" long; scales acute, minutely scabrous on the keel, the first 1-nerved, the second 3-7-nerved, the others 3-5-nerved.

In fields, dooryards and waste places all over North America except the extreme north. Naturalized from the warmer regions of the Old World. June-Sept.
56. **DACTYLOCTÉNIUM** Willd. Enum. 1029. 1809.

An annual grass with flat leaves and spicate inflorescence, the spikes in pairs or digitate. Spikelets several-flowered, sessile, closely imbricated in two rows on one side of the rachis which is extended beyond them into a sharp point. Scales compressed, keeled, the 2 lower and the uppermost ones empty, the others subterminating flowers. Stamens 3. Styles distinct, short. Stigmas plumose. Grain free, rugose, loosely enclosed in the scale. [Greek, referring to the digitately spreading spikes.]

A monotypic genus of the warmer parts of the Old World.

1. **Dactyloctenium Aegyptium** (L.) Willd. Egyptian Grass. (Fig. 416.)

*Cynosurus Aegyptius* L. Sp. Pl. 72. 1753.


*Dactyloctenium Aegyptiacum* Willd. Enum. 1029. 1809.

Culms 6'-2° long, usually decumbent and extensively creeping at the base. Sheaths loose, overlapping and often crowded, smooth and glabrous; ligule very short; leaves 6' in length or less, 1'-3' wide, smooth or rough, sometimes pubescent, ciliate toward the base; spikes in pairs, or 3-5 and digitate, ½'-2' long; spikelets 3-5-flowered; scales compressed, scabrous on the keel, the second awned, the flowering ones broader and pointed.

In waste places and cultivated ground, southern New York, Pennsylvania and Virginia to Illinois and California, south to Florida and Mexico. Widely distributed in tropical America. Naturalized from Asia or Africa. July-Oct.

57. **LEPTÓCHLOA** Beauv. Agrost. 71. pl. 15. f. 1. 1812.

Usually tall annual grasses, with flat leaves and numerous spikes forming a simple panicle. Spikelets usually 2-many-flowered, flattened, alternating in two rows on one side of the rachis. Scales 4-many; the 2 lower empty, keeled, shorter than the spikelet; the flowering scales keeled, 3-nerved. Palet 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Greek, in allusion to the slender spikes.]

About 12 species, natives of the warmer regions of both hemispheres. Besides the following, 3 others occur in the southern United States.

1. **Leptochloa mucronata** (Michx.) Kunth. Northern Leptochloa. (Fig. 417.)


*Leptochloa mucronata* Kunth, Gram. 1: 91. 1829-35.

Culms 1°-3° tall, erect, branched, smooth and glabrous. Sheaths shorter than the internodes, smooth and glabrous; ligule short, lacerate-toothed; leaves 2'-8' long, 1'-3' wide, scabrous; spikes numerous, slender, rigid, spreading or ascending, the lower 2'-6' long; spikelets usually 3-flowered, about 1' long, the empty scales shorter than the spikelet, acute, 1-nerved, slightly scabrous on the keel; flowering scales 2-toothed at the apex, ciliate on the nerves.

In dry or moist soil, Virginia to Illinois, Missouri and California, south to North Carolina, Louisiana and Mexico. Also in Cuba. July-Sept.

[Buchloe Engelm. Trans. St. Louis Acad. 1: 432. pl. 1f, figs. 1-17. 1859.]

A perennial stoloniferous monoecious or apparently dioecious grass with flat leaves and spike-like clusters of 2 or 3, on very short culms, scarcely exerted from the sheath. Stamine 3. Styles distinct, long. Stigmas elongated, short-plumose. Grain ovate, free, enclosed in the scale. [Name apparently from the supposed bulb-like base of old plants.]

A monotypic genus of central North America.

1. Bubilis dactyloides (Nutt.) Raf.

Buffalo Grass. (Fig. 418.)


Culms bearing staminate flowers 4'-12' tall, erect, slender, naked above, smooth and glabrous; those bearing pistillate flowers ½'-3' long, much exceeded by the leaves; ligule a ring of short hairs; leaves ⅓' wide or less, more or less papillose-hirsute, those of the staminate culms 1'-4' long, erect, those of the stolons and pistillate culms ⅓' long or less, spreading; staminate spikes 2 or 3, approximate; spikelets 2'/-2½' long, flattened, 2-3-flowered, the empty scales 1-nerved, the flowering 3-nerved; pistillate spikelets ovoid, the outer scales indurated.

On plains and prairies, Minnesota to Dakota, south to Arkansas, Texas and Mexico. A valuable fodder grass. June-July.


A low diffusely branched grass, with flat pungently pointed leaves crowded at the nodes and the ends of the branches. Spikelets in clusters of 3-6, nearly sessile in the axils of the floral leaves, 2-5-flowered, the flowers perfect. Two lower scales empty, lanceolate, acute, 1-nerved, hyaline; flowering scales larger, 3-nerved; 1 or 2 empty scales sometimes present above the flowering ones; palet hyaline. Stamine 3. Styles distinct, elongated. Stigmas barbellate or short-plumose. Grain free, enclosed in the scale and palet. [In honor of Gen. William Munro, English agrostologist.]

Three known species, the following of the plains of North America, the others South American.


Munro's Grass. (Fig. 419.)


Culms 2'-8' long, tufted, erect, decumbent or prostrate, much branched, smooth or rough. Sheaths short, crowded at the nodes and ends of the branches, smooth, pilose at the base and throat, sometimes ciliate on the margins; ligule a ring of hairs; leaves ⅓' long or less, ½'-1' wide, rigid, spreading, scabrous, pungently-pointed; spikelets 2-3-flowered, the flowers perfect; empty scales 1-nerved, shorter than the flowering scales which are about 2½' long, 3-toothed, the nerves excurrent as short points or awns, tufts of hairs near the middle; palets obtuse.

On dry plains, South Dakota to Alberta, south to Nebraska, Texas and Arizona. Aug.-Oct.

Tall perennial reed-like grasses, with broad flat leaves and ample panicles. Spikelets 3- or several-flowered, the first flower often staminate, the others perfect; rachilla articulated between the flowering scales, long-pilose. Two lower scales empty, unequal, membranous, lanceolate, acute, shorter than the spikelet; the third scale empty or subtending a staminate flower; flowering scales glabrous, narrow, long-acuminate, much exceeding the short palets. Stamens 3. Styles distinct, short. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek, referring to its hedge-like growth along ditches]

Three known species, the following of the north temperate zone, one in Asia, the third in South America.

1. **Phragmites Phragmites** (L.) Karst.

Reed. (Fig. 420.)

*Acorus Phragmites* L. Sp. Pl. 81. 1753.


**Phragmites Phragmites** Karst. Deutsch. Fl. 379. 1880-83.

Culms 5'-15' tall, erect, stout, from long horizontal rootstocks, smooth and glabrous. Sheaths overlapping, loose; ligule a ring of very short hairs; leaves 6'-1' long or more, 1/2'-2' wide, flat smooth, glabrous; panicle 6'-1' long or more, ample; spikelets crowded on the ascending branches; first scale 3-nerved, half to two-thirds as long as the 3-nerved second one; flowering scales 5'-6' long, 3-nerved, long-acuminate, equalling the hairs of the rachilla.


Perennial grasses with narrow leaves and contracted or open panicles. Spikelets 2- many-flowered, the flowers perfect or the upper staminate. Scales 5-many, rigid, 1-3- nerved; the lower empty, shorter than the spikelet, keeled; flowering scales rounded on the back, at least at the base, the apex lobed or toothed, 3-nerved, the nerves pilose, and usually excurrent as short points between the lobes or teeth; palet broad, 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Name in honor of Professor Siegling, German botanist.]

About 30 species, widely distributed in temperate regions; a few in tropical America. Besides the following, some 20 others occur in the southern and western parts of North America.

Internodes of the rachilla less than one-quarter the length of the flowering scales.

- Panicle open, the branches 4'-10' long.
- Panicle spike-like, the branches 3' or less.
- Panicle 5'-10' long; spikelets numerous.
- Panicle 1'-2' long; spikelets few.

Internodes of the rachilla one-half the length of the flowering scales.

1. **Sieglingia seslerioides** (Michx.) Scribn. Tall Red-top. (Fig. 421.)


Culms 2'-5' tall, erect, somewhat flattened, simple, glabrous, often viscid above. Sheaths sometimes villous at the summit, the lower short, overlapping and crowded, the upper longer, equaling or shorter than the internodes; ligule a ring of very short hairs; leaves 4'-1' long or more, 3'-6' wide, flat, attenuate into a long tip, smooth beneath, scabrous above; panicle 6'-18' long, the branches finally ascending or spreading, the lower 4'-10' long, usually dividing above the middle; spikelets 4-8-flowered, 3'-1' long, purple; joints of the rachilla short; empty scales glabrous, obtuse, generally slightly 2-toothed; flowering scales oval, the nerves pilose, excurrent as short points.

In fields, New York to Kansas, south to Florida and Texas. July-Sept.
2. Sieglingia stricta (Nutt.) Kuntze.  
Narrow Sieglingia.  (Fig. 422.)


Culms 1½°-1° tall, erect, a little compressed, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule a ring of short hairs; leaves 6'-1° long or more, flat, long-acuminate, smooth beneath, scabrous above; spike-like panicle 5'-12' in length, the branches appressed, the lower 1'-2' long; spikelets 4-10-flowered, 2''-3'' long, the joints of the rachilla very short; lower scales usually about two-thirds as long as the spikelet, rarely extending beyond the flowering scales, acute, glabrous; flowering scales ovate, the nerves pilose for more than half their length, the middle and often the lateral excurrent as short points.

Moist soil, Mississippi to Kansas and Texas. July-Oct.

3. Sieglingia decumbens (L.) Kuntze.  Heather-grass.  (Fig. 423.)

Festuca decumbens L. Sp. Pl. 75.  1753.
Triodia decumbens Beauv. Agrost. 76.  1812.

Culms 6'-18' tall, erect, often decumbent at the base, simple, smooth and glabrous. Sheaths shorter than the internodes, villous at the summit; ligule a ring of very short hairs; leaves smooth beneath, usually scabrous above, ½''-1½'' wide, the basal 3'-6' long, those of the culm 1'-3' long; panicle 1'-2' long, contracted, the branches 1' long or less, erect; spikelets 3-5-flowered, 3'-5'' long, the joints of the rachilla very short; lower scales equalling the spikelet, acute; flowering scales broadly oval, ciliate on the margins below, obtusely 3-toothed, with two tufts of hair on the callus.

Introduced into Newfoundland. Native of Europe and Asia. Summer.

4. Sieglingia purpurea (Walt.) Kuntze.  Sand-grass.  (Fig. 424.)

Aira purpurea Walt. Fl. Car. 78.  1758.
Tricuspis purpurea A. Gray, Man. 589.  1848.

Culms 1°-3° tall, erect, prostrate or decumbent, smooth and glabrous or the nodes pubescent. Sheaths shorter than the internodes, rough; ligule a ring of short hairs; leaves ½'-2½' long, 1'' wide or less, rigid, scabrous, sometimes sparsely ciliate; panicle 1'-3' in length, the branches rigid, finally widely spreading, the lower ½'-1½' long; spikelets 2-5-flowered, 2½''-4'' long, the joints of the rachilla half as long as the flowering scale; lower scales glabrous; flowering scales oblong, 2-lobed at the apex, the lobes erose-truncate, the nerves strongly ciliate, the middle one excurrent as a short point; palets long-ciliate on the upper part of the keel.

In sand, especially on sea beaches, Maine to Texas, and along the Great Lakes. Also from Nebraska to New Mexico. Plant acid. Aug.-Sept.
A tall perennial grass, with long narrow leaves and an ample panicle. Spikelets 1-3-flowered, the flowers all perfect. Empty scales 2, about equal, shorter than the spikelet, 1-nerved; flowering scales membranous, 3-nerved, with a ring of hairs at the base. Palet 2-nerved, shorter than the scale. Stamens 3. Styles long, distinct. Stigmas short, plumose. Grain oblong, free. [In honor of John H. Redfield, 1815-1895, American naturalist.]

A monotypic genus of the western United States.

1. Redfieldia flexuosa (Thurb.) Vasey. Redfieldia. (Fig. 425.)


Culms 1½-4½ tall, erect from a long horizontal rootstock, simple, smooth and glabrous. Sheaths smooth, the lower short and overlapping, often crowded, the upper much longer; ligule a ring of short hairs; leaves 1°-2° long, 1'/-3'/ wide, involute; panicle ample and diffuse, 8'-22' in length, the branches finally widely spreading, flexuous, the lower 3'-8' long; spikelets about 3' long, 1-3-flowered, the empty scales acute, glabrous; flowering scales with a ring of hairs at the base, minutely scabrous, twice the length of the empty ones, acute, the middle nerve usually excurrent as a short point.


Tufted grasses, with narrow flat leaves and long slender spikes arranged in an open panicle, or rarely only one terminal spike. Spikelets several-flowered, narrow, sessile or shortly pedicelled, erect. Two lower scales empty, membranous, keeled, acute, unequal; flowering scales 1-3-nerved, 2-toothed and mucronate or short-awned between the teeth. Palet hyaline, 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek, referring to the 2-toothed flowering scales.]

About 15 species, natives of the warmer regions of both hemispheres. Besides the following species, about 6 others occur in the southern and western parts of North America.

1. Diplachne fasciculāris (Lam.) Beauv. Salt-meadow Diplachne. (Fig. 426.)


Culms 1°-2½° tall, erect, ascending, or rooting at the lower nodes, simple or branched, smooth and glabrous. Sheaths shorter than the internodes, loose, smooth or rough, the upper one longer and enclosing the base of the panicle; ligule 1'/-2' long; leaves 3'-12' long, 1'/-3'/ wide, slightly scabrous; panicle 4'-12' long, often exceeded by the upper leaf, the branches erect or ascending, the lower 2'-5' long; spikelets 5-10-flowered, 3'-5' long, short-pedicelled, erect; lower scales glabrous, rough on the keel; flowering scales scabrous, ciliate on the margins toward the base, 3-nerved.

In brackish marshes, Rhode Island to Florida and Texas. Also from Missouri and Nebraska to Mexico, and in the West Indies. Aug.-Oct.
64. MOLÍNIA Schrank, Baier. Pl. i. 100. 1789.

A perennial tufted grass, with narrow flat leaves and paniculate inflorescence. Spikelets 2-4-flowered. Two lower scales empty, somewhat obtuse or acute, unequal, shorter than the spikelet; flowering scales membranous, rounded on the back, 3-nerved; palets scarcely shorter than the scales, obtuse, 2-keeled. Stamens 2. Styles short. Stigmas short, plumose. Grain oblong, free, enclosed in the scale and palet. [Name in honor of Joh. Ignaz Molina, Chilian missionary and naturalist.]

A monotypic genus of Europe and Asia.


(Fig. 427.)

Aira coerulea L. Sp. Pl. 63. 1753.

Molinia coerulea Moench, Meth. 183. 1794.

Culms 1.5°-3.5° tall, erect, simple, smooth and glabrous. Sheaths overlapping and confined to the lower part of the culm, smooth and glabrous; ligule a ring of very short hairs; leaves 4°-1° long or more, 1'-3'' wide, erect, acuminate, smooth beneath, slightly scabrous above; panicle 3-10' in length, green or purple, the branches usually erect, 1'-4' long; spikelets 2-4-flowered, 2.5'-4'' long; empty scales acute, unequal; flowering scales about 2'' long, 3-nerved, obtuse.


Annual or perennial grasses, rarely dioecious, from a few inches to several feet in height, the spikelets in contracted or open panicles. Spikelets 2-many-flowered, more or less flattened. Two lower scales empty, unequal, shorter than the flowering ones, keeled, 1-nerved, or the second 3-nerved; flowering scales membranous, keeled, 3-nerved; palets shorter than the scales, prominently 2-nerved or 2-keeled, usually persisting on the rachilla after the fruiting scale has fallen. Stamens 2 or 3. Styles distinct, short. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [Greek etymology doubtful, perhaps signifying a low grass, or Love-grass, an occasional English name.]

A genus of about 100 species, widely distributed throughout all warm and temperate countries. Besides the following, some 15 others occur in the southern and western parts of North America.

Culms often decumbent at the base and generally much branched, 1.5° tall or less.

Spikelets 2-5-flowered, 1°'-1.5°' long.

Culms branched only at the very base; pedicels and branches of the panicle long and capillary.

1. E. capitatis. Culms branched above the base; pedicels and branches of the panicle short.

2. E. Frankii.

Spikelets 5-many-flowered, 1.5°'-8' long.

Flowering scales thin, usually bright purplish, the lateral nerves faint or wanting; spikelets about 1° wide.

3. E. pilosa. Flowering scales firm, usually dull purple or green, the lateral nerves very prominent; spikelets about 3/4° wide.

Spikelets 1° wide or more.

5. E. Eragrostis. Lower flowering scales about 3/4° long; spikelets 1° wide.

6. E. major. Culms erect or ascending, simple, rigid, 1.5°-4'' tall.

Spikelets not clustered.

Branches of the open panicle widely spreading, at least when old.

7. E. sessilisepica. Spikelets closely sessile.

Spikelets more or less pedicellate.

8. E. curtipediacellata. Pedicels long, commonly at least the length of the spikelets.

Leaves elongated; branches of the panicle long and slender; spikelets scattered, 6-25-flowered.

9. E. pectinacea. Leaves not elongated; branches of the panicle short and stout, rigid, spikelets crowded, 5-12-flowered.

Branches of the elongated panicle erect or ascending, capillary, somewhat flexible.

10. E. refracta. Spikelets clustered on the very short erect or ascending branches.

12. E. secundiflora. Culms extensively creeping; flowers dioecious.

13. E. hypnoides.
1. *Eragrostis capillaris* (L.) Nees. Capillary Eragrostis. (Fig. 428.)

*Culms 8'-18' tall, erect, slender, sparingly branched at the base, smooth and glabrous. Sheaths short, overlapping and crowded at the base of the culm, glabrous or sparingly hairy, the upper enclosing the base of the panicle; ligule a ring of very short hairs; leaves 3'-10' long, 1'-2' wide, long-acuminate, smooth beneath, scabrous above and sparingly hirsute near the base; panicle diffuse, 4'-15' in length, the branches capillary, spreading or ascending, 1½'-5' long; spikelets ovate, 2-4-flowered, little flattened, 1½'-1¼' long; empty scales about equal, acute; flowering scales acute, the lower ½'' long, the lateral nerves obscure.

In dry places, Rhode Island to New York and Missouri, south to Georgia and Texas. Aug.-Sept.

2. *Eragrostis Fränkii* Steud. Frank's Eragrostis. (Fig. 429.)


Glabrous, culms 6'-15' tall, tufted, erect, or often decumbent at the base, branched, smooth. Sheaths loose, shorter than the internodes; ligule a ring of hairs; leaves 2'-5' long, 1½'-2½' wide, smooth beneath, scabrous above; panicle 2'-6' in length, open, the branches ascending, the lower 1½'-1¾' long; spikelets ovate, 3-5-flowered, 1½'-1¾' long; empty scales acute, the first shorter than the second; flowering scales acute, the lower ¾'' long, the lateral nerves obscure.


3. *Eragrostis pilosa* (L.) Beauv. Tufted Eragrostis. (Fig. 430.)

*Poa pilosa* L. Sp. Pl. 68. 1753.

*Poa Caroliniana* Spreng. Mant. Fl. Hal. 33. 1807?


Culms 6'-18' tall, tufted, erect, slender, branched, smooth and glabrous. Sheaths shorter than the internodes, smooth, sometimes pilose at the throat; ligule a ring of short hairs; leaves 1½'-5' long, 1½' wide or less, smooth beneath, scabrous above; panicle 2'-6' in length, the branches at first erect, finally widely spreading, 1½'-1¾' long, often hairy in the axils; spikelets 5-12-flowered, 1½'-3½' long, about ¾'' wide; lower scales acute, the first one-half as long as the second; flowering scales acute, the lower ¾'' long, thin, usually purplish, the lateral nerves faint or wanting.

4. *Eragrostis* Purshii Schrad. Pursh's *Eragrostis*. (Fig. 431.)

*Poa Caroliniana* Spreng. Mant. Fl. Hal. 33. 1807?

Culms 6'-18' tall, tufted, usually decumbent at the base and much branched, smooth and glabrous. Sheaths loose, shorter than the internodes, smooth and glabrous; ligule a ring of short hairs; leaves 1\(\frac{1}{2}\)'-3\(\frac{1}{2}\)' long, 1'' wide or less, smooth beneath, rough above; panicle open, 3'-5' long, the branches spreading, 1'-2\(\frac{1}{2}\)' long, naked in the axils; spikelets 5-15-flowered, dull purple or green, 1\(\frac{3}{4}\)''-4'' long, about 3\(\frac{1}{4}\)'' wide; empty scales acute, the lower about two-thirds as long as the upper, scabrous on the keel; flowering scales acute, firm, the lower ones 3\(\frac{1}{4}\)'' long, the lateral nerves prominent.

In dry places, apparently throughout the United States, extending into Ontario. Aug.-Sept.

5. *Eragrostis* Eragröttis (L.) Karst. Low *Eragrostis*. (Fig. 432.)

*Poa Eragrostis* L. Sp. Pl. 68. 1753.

Culms -seldom over 15' tall, tufted, usually decumbent and much branched, smooth and glabrous. Sheaths loose, shorter than the internodes, smooth, sometimes a little pubescent, sparingly pilose at the throat; ligule a ring of short hairs; leaves 1/-2\(\frac{1}{2}\)' long, 2'/-4' wide, smooth beneath, rough above and somewhat pilose near the base; panicle 2'/-4' in length, the branches spreading or ascending, 3'/-5' long; spikelets 8-18-flowered. 3'/-5' long, about 1'' wide; empty scales acute, the first two-thirds as long as the second; flowering scales obtuse, 3/4'' long, the lateral nerves prominent.


6. *Eragrostis* major Host. Strong-scented *Eragrostis*. (Fig. 433.)

*Eragrostis poaeoides* var. *megastachya* A. Gray, Man. Ed. 5. 631. 1867.

Culms 6'-2' tall, erect, or decumbent at the base, usually branched, smooth and glabrous. Sheaths shorter than the internodes, smooth, sparingly pilose at the throat; ligule a ring of short hairs; leaves 2'/-7' long, 1'/-3' wide, flat, smooth beneath, scabrous above; panicle 2'/-6' in length, the branches spreading or ascending, 1'/-2' long; spikelets 8-35-flowered, 2'/-8' long, about 1'/ wide, very flat; empty scales acute, the first slightly shorter than the second; flowering scales obtuse, 1'/-1\(\frac{1}{4}\)'' long, the lateral nerves prominent.

7. Eragrostis sessilispica Buckley. Prairie Eragrostis. (Fig. 434.)

Diplachne rigida Vasey, Grasses S. W., Part 2. pl. 41. 1891.

Culms 8'-3½' tall, erect, simple, smooth and glabrous. Sheaths short, crowded at the base of the culm, smooth, pilose at the summit; ligule a ring of short hairs; leaves 2'-6' long, 3/4'-1½' wide, rough above, glabrous or sparingly pilose beneath; panicle 8'-16' in length, the branches stout, rigid, widely diverging; spikelets scattered, closely sessile, appressed, 5-12-flowered, 4'-7' long, empty scales about equal in length, acute; flowering scales very acute, about 2' long, the lateral nerves very prominent.

Prairies, Kansas to Texas. Aug.-Sept.

8. Eragrostis curtipedicellata Buckley. Short-stalked Eragrostis. (Fig. 435.)


Culms 6'-3° tall, erect, rigid, simple and glabrous. Sheaths overlapping, smooth, pilose at the summit; ligule a ring of hairs; leaves 2'-8' long, 1½'-2½' wide, smooth beneath, scabrous above; panicle 4'-12' in length, the branches widely spreading, 1½'-4½' long; spikelets 5-12-flowered, 1½'-3' long, on pedicels of less than their own length; scales acute, the empty ones somewhat unequal, the flowering ones about 3 '/4' long, scabrous on the midnerves, the lateral nerves prominent.

Prairies, Kansas to Texas. Aug.-Sept.

9. Eragrostis pectinacea (Michx.) Steud. Purple Eragrostis. (Fig. 436.)

Eragrostis pectinacea var. spectabilis A. Gray, Man. Ed. 5, 632. 1867.

Culms 1°-2½° tall, erect or ascending, rigid, simple, smooth and glabrous. Sheaths overlapping, smooth, glabrous or villous, the upper one often enclosing the base of the panicle; ligule a ring of hairs; leaves 5'-12' long, 2'-4' wide, smooth beneath, scabrous above and sparingly villous at the base; panicle 6'-24' in length, purple or purplish, the branches 3'-10' long, strongly bearded in the axils, widely spreading or the lower often reflexed; spikelets 5-15-flowered, 1½'-4' long, on pedicels of at least their own length; scales acute, the empty ones about equal, the flowering ones about 3 '/4' long, their lateral nerves very prominent.

In dry soil, Massachusetts to Illinois and South Dakota, south to Florida and Texas. Aug.-Sept.
GRASS FAMILY.

10. Eragrostis refrácta (Muhl.) Scribn. Meadow Eragrostis. (Fig. 437.)

Poa refracta Muhl. Gram. 146. 1817.

Culms 1°-3° tall, erect, slender, simple, smooth and glabrous. Sheaths overlapping, smooth and glabrous; ligule a ring of short hairs; leaves 5'-12' long, 1'-2' wide, smooth beneath, rough above, and villous toward the base; panicle 8'-20' long; branches slender, 4'-10' long, at length widely spreading, the axils often bearded; spikelets 6-25-flowered, 2½'-6' long, on pedicels shorter than themselves; empty scales acute, the first somewhat shorter than the second; flowering scales very acute, ½'-1' long, the lateral nerves prominent.

In moist soil, Delaware and Maryland to Florida, west to Texas. Aug.-Sept.

11. Eragrostis trichódes (Nutt.) Nash. Hair-like Eragrostis. (Fig. 438.)

Eragrostis tenuis A. Gray, Man. Ed. 2, 564. 1856.
Not Steud. 1855, nor Poa tenuis Ell. 1855.

Culms 2°-4° tall, erect, simple, smooth and glabrous. Sheaths overlapping, smooth, pilose at the throat; ligule a ring of very short hairs; leaves 6'-28' long, 1'-2' wide, smooth beneath, slightly scabrous above, attenuate into a long slender tip; panicle 9'-26' in length, narrow and elongated, the branches erect or ascending, capillary, subdividing, somewhat flexuous, 3'-7' long; lower axils sometimes bearded; spikelets usually pale, 3-10-flowered, 2½'-4½' long; lower scales very acute, about equal; flowering scales acute, the lower ones 1½'-1½' long, their lateral nerves manifest.

In dry sandy soil, Ohio and Illinois to Nebraska, south to Tennessee and Texas. Aug.-Sept.

12. Eragrostis secundifóra Presl. Clustered Eragrostis. (Fig. 439.)

Eragrostis oxylepis Torr, Marcy's Report, 269. 1854.

Smooth and glabrous, culms 6'-3° tall, erect, simple. Sheaths shorter than the internodes; ligule a ring of hairs; leaves 2'-12' long, 1'-2' wide; panicle 1½'-6' in length, the branches ½'-1½' long, erect or ascending; spikelets crowded or clustered, sessile or nearly so, strongly flattened, 8-40-flowered, 3'-10' long, 1½'-2½' wide; lower scales acute, about equal; flowering scales 1½'-1½' long, acute, usually purple-bordered, the lateral nerves prominent.

In dry soil, Kansas and Missouri, south to Texas and Louisiana. Aug.-Sept.
13. **Eragrostis hypnoides** (Lam.) B.S.P. Creeping Eragrostis. (Fig. 440.)


*Eragrostis reptans* Nees, Agrost. Bras. 314. 1829.


Culms 1'-18' long, extensively creeping, branched, smooth and glabrous, the branches erect or ascending, 1'-6' high. Sheaths shorter than the internodes, villoys at the summit; ligule a ring of short hairs; leaves 2' long or less, ½''-1'' wide, flat, smooth beneath, rough above; spikelets dioecious, 10-35-flowered, 2''-8'' long; lower scales unequal, the first one-half to two-thirds as long as the second; flowering scales about 1½'' long, the lateral nerves prominent; scales of the pistillate flowers more acute than those of the staminate.

On sandy or gravelly shores, Vermont and Ontario to Oregon, south to Florida and Mexico. Also in the West Indies. Aug.-Sept.

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Tufted perennial grasses, with flat or involute leaves and usually contracted panicles. Spikelets 2-3-flowered; the rachilla extended beyond the flowers. Two lower scales empty, shorter than the spikelet, the first linear, acute, 1-nerved, the second much broader, 3-nerved, obtuse or rounded at the apex, or sometimes acute, the margins scarious; flowering scales narrower, generally obtuse. Palet narrow, 2-nerved. Stamens 3. Styles distinct, short. Stigmas plumose. Grain free, loosely enclosed in the scale and palet. [In honor of Amos Eaton, 1776-1842, American botanist.]

A genus of 4 or 5 species, confined to North America.

Empty scales unequal, the first shorter and about one-sixth as wide as the second.

Second scale obovate, often almost truncate.

Second scale oblanceolate, obtuse or abruptly acute.

Empty scales equal, the first not less than one-third as wide as the second.

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(Fig. 441.)


**Eatonia obtusata** A. Gray, Man. Ed. 2. 558. 1856.

Culms 1°-2½° tall, erect, simple, often stout, smooth and glabrous. Sheaths shorter than the internodes, usually more or less rough, sometimes pubescent; ligule ½''-1'' long; leaves 1'-9' long, 1''-4'' wide, scabrous; panicle 2'-6' in length, dense and generally spikeletike, strict, the branches 1½' long or less, erect; spikelets crowded, 1½''-1½'' long; empty scales unequal, often purplish, the first narrow, shorter than and about one-sixth as wide as the obtuse or almost truncate second one; flowering scales narrow, obtuse, ¾''-1'' long.

In dry soil, Massachusetts and Ontario to Assiniboia, Florida and Arizona. June-Aug.
2. **Eatonia Pennsylvanica** (DC.) A. Gray. Pennsylvania Eatonia. (Fig. 442.)


Usually glabrous, culms 1°–3° tall, erect, simple, slender, smooth. Sheaths shorter than the internodes; ligule 3/4” long; leaves 21/2°–7° long, 1°–3° wide, rough; panicle 3°–7° in length, contracted, often nodding, lax, its branches 1°–21/2° long; spikelets 11/2°–11/4° long, usually numerous, somewhat crowded and appressed to the branches; empty scales unequal, the first narrower, shorter than and about one-sixth as broad as the obtuse or abruptly acute second one, which is smooth, or somewhat rough on the keel; flowering scales narrow, acute, 11/4° long.

In hilly woods or moist soil, New Brunswick to British Columbia, south to Georgia, Louisiana and Texas. June–July.


Culms taller; panicle longer and more compound; leaves longer and broader. Range apparently nearly that of the typical form.

3. **Eatonia nitida** (Spreng.) Nash. Slender Eatonia. (Fig. 443.)


Glabrous, culms 1°–2° tall, erect, very slender, smooth. Sheaths shorter than the internodes, generally pubescent; ligule 3/4” long; leaves 1/2°–3° long, 1” wide or less, often pubescent, the uppermost very short; panicle 2°–6° in length, lax, the branches spreading at flowering time, afterwards erect, 1°–21/2° long; spikelets not crowded, 11/2° long; empty scales smooth, the first about onethird as wide as and equaling the second, which is obtuse or almost truncate, often apiculate; flowering scales narrow, 1°–11/4° long, obtuse or acutish, smooth.

In dry woods, southern New York and New Jersey to Georgia and Alabama. May–June.


Tufted annual or perennial grasses, with flat or setaceous leaves and mostly spike-like panicles. Spikelets 2–5-flowered. Two lower scales empty, narrow, acute, unequal, keeled, scarsious on the margins; the flowering scales 3–5-nerved. Palet hyaline, acute, 2-keeled. Stamens 3. Styles very short. Stigmas plumose. Grain free, enclosed in the scale and palet. [In honor of Georg Ludwig Koeler, German botanist.]

About 15 species of wide geographic distribution. The following, which may contain two forms, occurs in North America.
1. Koeleria cristata (L.) Pers. Koeleria. (Fig. 444.)

Aira cristata L. Sp. Pl. 63. 1753.
Koeleria cristata var. gracilis A. Gray, Man. 591. 1848.

Culms 1-2½" tall, erect, simple, rigid, smooth, often pubescent just below the panicle. Sheaths often shorter than the internodes, smooth or scabrous, sometimes hirsute; ligule ½" long; leaves 1½'-12" long, ½"-1½" wide, erect, flat or involute, smooth or rough, often more or less hirsute; paulete 1'-7' in length, pale green, usually contracted or spike-like, the branches erect or rarely ascending, ½' long or less; spikelets 2-3-flowered, 2½'-3½' long, the scales rough, acute, the empty ones unequal; flowering scales 1½'-2" long, shining.

In dry sandy soil, especially on prairies. Ontario to British Columbia, south to Pennsylvania, Nebraska, Texas and California. Also in Europe and Asia. Very variable. July-Sept.


A perennial grass, with soft flat leaves and an open panicle. Spikelets usually 2-flowered. Two lower scales empty, thin-membranous, much shorter than the flowering ones, unequal, rounded or obtuse at the apex; flowering scales membranous, erose-truncate. Palet barely shorter than the scale. Stamens 3. Styles distinct. Stigmas plumose. [Greek, in allusion to the erose top of the flowering scales.]

A monotypic genus of arctic and mountainous regions of the northern hemisphere.

Water Whorl-grass. (Fig. 445.)

Aira aquatica L. Sp. Pl. 64. 1753.

Smooth and glabrous, culms 4'-2½" tall, erect, from a creeping base, bright green, flaccid. Sheaths usually overlapping, loose; ligule 1½"-2½" long; leaves 1½'-5' long, 1½'-3½" wide, flat, obtuse; paulete 1'-5' in length, open, the branches whorled, spreading or ascending, very slender, ½'-2' long; spikelets 1½'-1½" long, the empty scales rounded or obtuse, the first about half as long as the second, which is crenulate on the margins; flowering scales 1½'-1½" long, 3-nerve, erose-truncate at the apex.

In water or wet soil, Labrador and Quebec to Alaska, south to Nebraska, Colorado, and Utah. Also in Europe and Asia. Summer.


Perennial grasses, with usually soft flat leaves and contracted or open panicles. Spikelets 1-5-flowered, often secund, the rachilla extended beyond the flowers and usually bearing 2-3 empty club-shaped or hooded scales, convolute around each other. Two lower scales empty, membranous, 3-5-nerved; flowering scales larger, rounded on the back, 7-13-nerved, sometimes bearing an awn, the margins more or less scarios; palets broad, shorter than the scales, 2-keeled. Stamens three. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Name used by Theophrastus for Sorghum; said to be in allusion to the sweet culms of some species.]

About 30 species, inhabiting temperate regions. Besides the following, some 15 others occur in the Rocky Mountains and on the Pacific Coast.

Second scale much shorter than the 3-5-flowered spikelets.
Spikelets few; branches of the panicle spreading or ascending.
Spikelets usually numerous; branches of the panicle erect.
Second scale nearly equalling the 2-flowered spikelet.

1. M. diffusa.
2. M. parviflora.
3. M. mutica.
1. *Melica diffusa* Pursh. Tall Melic-grass. (Fig. 446.)

*Culms* 1½°-4° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, the lower often overlapping; ligule 1°-2° long; leaves 4'-7' long, 2'-4' wide, rough; panicle 6½°-8½° in length, open, the branches spreading or ascending, the lower 1½°-3' long; spikelets usually numerous, about 3-flowered, 4½°-5½° long, nodding, on slender, more or less flexuous pubescent pedicels; empty basal scales very broad, obtuse or acutish, the first shorter than the second, which is generally much exceeded by the spikelet; flowering scales 3½°-4½° long, acute or obtuse, scabrous.

Pennsylvania to Missouri, south to Virginia, Kentucky and Texas. May-June.

2. *Melica parviflora* (Porter) Scribn. Small Melic-grass. (Fig. 447.)

*Culms* 1½°-2½° tall, erect, simple, smooth and glabrous. Sheaths short, overlapping, more or less rough; ligule 1° long; leaves 5'-9° long, 1°-2° wide, rough; panicle 5°-7° in length, contracted, the branches erect, the lower 1°-2° long; spikelets few, 4-5-flowered, 5°-6½° long, nodding, on somewhat flexuous strongly pubescent pedicels; lower scales oblique or acutish, the first shorter than the second, which is much exceeded by the spikelet; flowering scales 3½°-4° long, acutish, scabrous.

Prairies, Kansas and Colorado to Arizona and Texas.

3. *Melica mútica* Walt. Narrow Melic-grass. (Fig. 448.)

*Culms* 1°-3° tall, erect, usually slender, simple, smooth and glabrous. Sheaths often overlapping, rough; ligule 1°-2° long; leaves rough, 4°-9° long, 1°-5° wide, panicle 3½°-10½° in length, narrow, the branches spreading or ascending, 1°-2° long; spikelets about 2-flowered, 3½°-4½° long, nodding, on more or less flexuous pubescent pedicels; empty scales very broad, acutish to obtuse, the first shorter than the second, which is nearly as long as the spikelet or sometimes equals it; flowering scales 3°-4° long, generally very obtuse, scabrous.

In rich soil, Pennsylvania to Wisconsin, south to Florida and Texas. June-July.
70. KORYCĂRpus Zea, Act. Matrit. 1806.  
[Diarrhena Beauv. Agrost. 142. 1812.]

Erect grasses, with long flat leaves and narrow paniculate or racemose inflorescence. Spikelets 3-5-flowered, the rachilla readily disarticulating between the flowers. Upper scales empty, convolute. Two lower scales empty, the first narrow, 3-nerved, acute, the second broader, 5-nerved; flowering scales broader than the lower ones, acuminate or mucronate, rounded on the back, finally coriaceous and shining, 3-nerved. Palet 2-keeled. Stamens 2, rarely 1. Styles short, distinct. Stigmas plunose. Grain beaked, free. [Greek, in allusion to the beaked grain.]

Two known species, the following North American, the other Japanese.


(Fig. 449.)

Diarrhena Americana Beauv. Agrost. 142. pl. 25. f. 11. 1812.

Culms 1½-4' tall, erect, simple, very rough below the panicle. Sheaths overlapping, confined to the lower part of the culm, smooth or a little rough at the summit, sometimes pubescent; ligule very short; leaves 8'-24' long, 5'-9' wide, long-acuminate at the apex, usually scabrous; panicle often reduced to a raceme, 2'-7½' in length, the branches erect, 1'-2' long; spikelets 3-5-flowered, 6'-8' long, the lower scales unequal, the first shorter than the second, which is much exceeded by the spikelet; flowering scales somewhat abruptly acuminate; palets shorter than the scales and exceeded by the beaked grain.

In rich woods, Ohio to Kansas, south to Georgia, Tennessee and the Indian Territory. Aug.-Sept.


Erect grasses with flat leaves and racemose inflorescence. Spikelets 5-14-flowered; flowers perfect, or the upper stamineate. Two lower scales empty, unequal, thin membranous, 1-nerved, or the second imperfectly 3-nerved; flowering scales longer, membranous, 7-nerved, the middle nerve excurrent as a short point or awn. Palet scarcely shorter than the scale, 2-keeled, the keels winged or appended. Stamens 3. Styles short. Stigmas plunose. Grain free, enclosed in the scale and palet. [Greek, side-beard, from the appendages to the palets.]

Three known species, the following arctic, the others Californiæ.

1. Pleuropogon Sabini R. Br. Sabine's Pleuropogon. (Fig. 450.)


Smooth, culms 6' or less tall, erect, simple, glabrous. Sheaths one or two; ligule 1'' long; leaves ¾'-1' long, erect, glabrous; raceme 1'-2' in length; spikelets 3-6, 5-8-flowered, about 5'' long, on spreading or reflexed pedicels 1'' or less in length; lower scales smooth, the first acute, shorter than the obtuse second; flowering scales oblong, 2''-2½'' long, erose-truncate at the scarious summit, scabrous, the midnerved sometimes excurrent as a short point; palet slightly shorter than the scale, truncate and somewhat 2-toothed at the apex, bearing an awn-like appendage on each keel near the middle.

Arctic regions of both the Old World and the New. Summer.
GRASS FAMILY.

72. UNIOLA L. Sp. Pl. 71. 1753.

Erect and often tall grasses with flat or convolute leaves and paniculate inflorescence. Spikelets 3-many-flowered, flat, 2-edged, the flowers perfect, or the upper staminate. Scales flattened, keeled, sometimes winged, rigid, usually acute; the lower 3-6 empty, unequal; the flowering scales many-nerved, the uppermost scales often smaller and empty; palets rigid, 2-keeled. Stamens 1-3. Styles distinct. Stigmas plumose. Grain compressed, free, loosely enclosed in the scale and palet. [Name diminutive of unus, one, of no obvious application.]

About 8 species, natives of America. Besides the following, 2 others occur in the southeastern United States.

Spikelets about \( \frac{1}{2} \) in length; panicle spike-like.

Spikelets exceeding \( \frac{1}{2} \) in length; panicle open.

1. **Uniola laxa** (L.) B.S.P. Slender Spike-grass. (Fig. 451.)

2. **Uniola latifolia** Michx. Broad-leaved Spike-grass. (Fig. 452.)

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1. **Uniola laxa** L. Sp. Pl. 1648. 1753.


*Uniola laxa* B.S.P. Prel. Cat. N. Y. 69. 1888.

Smooth and glabrous, culms 1½°-4° tall, erect, simple, slender. Sheaths shorter than the internodes; ligule very short; leaves 5'-15' long, 1'/5-3' wide, usually erect, flat, attenuate into a long tip, smooth or slightly rough; panicle spike-like, 4'-12' in length, erect, strict, or nodding at the summit, the branches erect, 1'-2' long; spikelets short-stalked or nearly sessile, 3-6-flowered, about 3' long; lower scales much shorter than the flowering ones, which are 1½''-2'' long, acuminate, spreading in fruit; palet arched, about two-thirds as long as the scale; stamen 1.

Sandy soil, Long Island to Pennsylvania and Kentucky, south to Florida and Texas, mostly near the coast. Ascends to 900 ft. in North Carolina. Aug.-Sept.

2. **Uniola latifolia** Michx. Fl. Bor. Am. 1: 70. 1803.

Culms 2°-5° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule \( \frac{1}{2}'' \) long, lacerate-toothed; leaves 4'-9' long, \( \frac{3}{4}''-1'' \) wide, flat, narrowed into a somewhat rounded, often ciliate base, acuminate at the apex, smooth, excepting on the margin; paulex lax, 5½'-10' in length, its branches filiform and pendulous, the lower 2'-5' long; spikelets many-flowered, oblong to ovate, \( \frac{3}{4}''-1\frac{1}{4}'' \) long, on long capillary pendulous pedicels; lower scales much smaller than the flowering ones, which are 4½''-6'' long, ciliate-hispid on the winged keel; stamen 1.

3. *Uniola paniculata* L. Sea Oats. (Fig. 453.)

*Uniola paniculata* L. Sp. Pl. 71. 1753.

Glabrous throughout, culms 3°-8° tall, erect, simple, smooth. Sheaths often longer than the internodes; ligule a ring of hairs about $\frac{1}{2}$" long; leaves 1° long or more, about $\frac{3}{4}$" wide, involute when dry, attenuate into a long slender tip; panicle 9'-1° in length or more, the branches erect or ascending, strict, rigid, the lower 2½'-5' long; spikelets many-flowered, short-pedicelled, ovoid to oval when mature, $\frac{1}{2}'$-1' long; lower scales much shorter than the flowering ones, which are 4½''-5' long and scabrous on the keels; stamens 3.

In sands of the seacoast, Virginia to Florida and west to Texas. Also in the West Indies and South America. Spikelets persistent into the winter. Oct.-Nov.


Diococious grasses, with rigid culms creeping or decumbent at the base, flat or convolute leaves and spike-like panicle inflorescence. Spikelets flattened, more numerous on the staminate plants than on the pistillate, 6-16-flowered; rachilla continuous in the staminate spikelets, articulated in the pistillate. Two lower scales empty, narrow, keeled, acute, shorter than the flowering ones; flowering scales broader, many-nerved, acute, rigid; palets 2-keeled. Stigmas 3. Styles thickened at the base, rather long, distinct. Stigmas long-plumose. Grain free, enclosed in the scale and palet. [Greek, signifying two-ranked, probably in reference to the spikelets.]

Four known species, natives of America, inhabiting the sea coast or alkaline soil; one of them is also found in Australia.

1. *Distichlis spicata* (L.) Greene. Marsh Spike-grass. (Fig. 454.)

*Uniola spicata* L. Sp. Pl. 71. 1753.


Glabrous throughout, culms 3'-2° tall, erect from a horizontal rootstock, or often decumbent at the base. Sheaths overlapping and often crowded; ligule a ring of very short hairs; leaves $\frac{3}{4}'$-6' long, 1''-2'' wide, flat or involute; panicle dense and spike-like, $\frac{3}{4}'$-2½' in length, the branches 1' long or less, erect; spikelets 6-16-flowered, 4½'-9' long, pale green; empty scales acute, the first 1-3-nerved, two-thirds as long as the 3-5-nerved second one; flowering scales 1½''-2½' long, acute or acuminate.

On salt meadows along the Atlantic coast from Maine to Florida, in saline soil throughout the interior, and on the Pacific coast north to British Columbia. The main figure is that of the staminate plant. June-Aug.
74. BRIZA L. Sp. Pl. 70. 1753.

Annual or perennial grasses, with flat or convolute leaves and open or rarely contracted panicles. Spikelets large, flattened, tunid, many-flowered, nodding, the flowers perfect. Scales thin-membranous, strongly concave, the 2 lower empty, 3-5-nerved, somewhat unequal; flowering scales incrusted, broader than the empty ones, 5-many-nerved; uppermost scales often empty; palets much shorter than the scales, hyaline, 2-keeled or 2-nerved. Stamens 3. Styles distinct. Stigmas plumose. Grain usually free, enclosed in the scale and palet. [Greek name for some grain, perhaps rye.]

About 12 species, natives of the Old World and temperate South America.

Perennial; ligule \( \frac{1}{2} \)" long or less, truncate; spikelets 5-12-flowered, \( 2'-2\frac{1}{2}' \) long. Annual; ligule \( 1'' \) long or more, acute; spikelets 3-6-flowered, \( 1''-1\frac{1}{2}'' \) long.

1. Briza media L. Quake-grass. Quaking Grass. (Fig. 455.)

Briza media L. Sp. Pl. 70. 1753.

Smooth and glabrous, culms \( 6'-2^o \) tall, erect, from a perennial root, simple. Sheaths shorter than the internodes; ligule \( \frac{3}{4}'' \) long or less, truncate; leaves \( 1'-3' \) long, \( 1''-2\frac{1}{2}'' \) wide; panicle \( 1\frac{1}{2}''-5'' \) in length, the capillary branches spreading or ascending, \( 1'-2\frac{3}{4}'' \) long; spikelets \( 2'-2\frac{1}{2}'' \) long, orbicular to deltoid-ovate, 5-12-flowered; scales scarious-margined, the lower ones about \( 1'' \) long; flowering scales \( \frac{1}{4}'' \) long, wider than the lower ones, widely spreading.


2. Briza minor L. Lesser Quaking Grass. (Fig. 456.)

Briza minor L. Sp. Pl. 70. 1753.

Smooth and glabrous, culms \( 4'-15' \) tall, erect from an annual root, simple. Sheaths shorter than the internodes; ligule \( 1''-3'' \) long, acute; leaves \( 1''-5' \) long, \( 1''-4'' \) wide, sometimes scabrous; panicle \( 2'-5' \) in length, open, the capillary branches spreading or ascending, \( 1'-2\frac{1}{2}'' \) long; spikelets 3-6-flowered, \( 1''-1\frac{3}{4}'' \) long, about \( 2'' \) broad, truncate at the base; scales scarious-margined, the lower ones about \( 1'' \) long; flowering scales much broader and deeply saccate, about \( \frac{3}{4}'' \) long.

In ballast and waste places about Camden, N. J.; common in California, and widely distributed in tropical America. Adventive or naturalized from Europe. June-July.
75. DÁCTYLIS L. Sp. Pl. 71. 1753.

A tall perennial grass, with flat leaves and paniculate inflorescence. Spikelets 3-5-flowered, short-pedicelled, in dense capitulate clusters, the flowers perfect or the upper staminate. Two lower scales empty, thin-membranous, keeled, unequal, mucronate; flowering scales larger than the empty ones, rigid, 5-nerved, keeled, the midnerve extended into a point or short awn; palets shorter than the scales, 2-keeled. Stamens 3. Styles distinct. Stigmas plumose. Grain free, enclosed in the scale and palet. [Name used by Pliny for some grass with finger-like spikes].

A monotypic genus of Europe and Asia.

1. Dactylis glomerata L. Orchard Grass. (Fig. 457.)

Dactylis glomerata L. Sp. Pl. 71. 1753.

Culms 2°-4° tall, tufted, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or rough; ligule 1'/2-2' long; leaves 3'-6' long, 1'/2-3' wide, flat, scabrous; panicle 3'-5' in length, the branches spreading or ascending in flower, erect in fruit, the lower 1'-2'-1/2' long, spikelet-bearing from above or below the middle; spikelets in dense capitulate clusters, 3-5-flowered; lower scales 1-3-nerved, the first shorter than the second; flowering scales 2'-3' long, rough, pointed or short-awned, ciliate on the keel.

In fields and waste places, New Brunswick to Manitoba, south to South Carolina and Kansas. Naturalized from Europe and cultivated for fodder. June-July.

76. CYNOSÚRUS L. Sp. Pl. 72. 1753.

Annual or perennial tufted grasses, with flat leaves and dense spike-like inflorescence. Spikelets of two kinds, in small clusters; lower spikelets of the clusters consisting of narrow empty scales, with a continuous rachilla, the terminal spikelets of 2-4 broader scales, with an articulated rachilla and subtending perfect flowers. Two lower scales in the fertile spikelets empty, 1-nerved, the flowering scales broader, 1-3-nerved, pointed or short-awned; upper scales narrower, usually empty. Scales of the sterile spikelets pectinate, spreading, all empty, linear-subulate, 1-nerved. Stamens 3. Styles distinct, short. Stigmas loosely plumose. Grain finally adherent to the palet. [Greek, signifying dog's tail, referring to the spike].

About 5 species, natives of the Old World.

1. Cynosurus cristatus L. Dog's-tail Grass. (Fig. 458.)

Cynosurus cristatus L. Sp. Pl. 72. 1753.

Culms 1'/2-2'/2 tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 1'/2'-2' long, truncate; leaves 1'/2'-5' long, 1'/2'-2' wide, smooth, glabrous; spike-like panicle 2'-4' in length, 2'/2'-6' wide, long-exserted; spikelets arranged in clusters, the terminal fertile, the lower larger and sterile; scales of the former about 1'/2' long, pointed or short-awned, the scales of the sterile spikelets very narrow, pointed, strongly scabrous on the keel.

In fields and waste places, Quebec and Ontario to southern New York and New Jersey. Adventive from Europe. June-Aug.
Annual or perennial grasses with flat or convolute leaves and contracted or open panicles. Spikelets 2-6-flowered, compressed, the rachilla usually glabrous; flowers perfect, or rarely dioecious. Scales membranous, keeled; the 2 lower empty, 1-3-nerved; the flowering scales longer than the empty ones, generally with a tuft of cobwebby hairs at the base, 5-nerved, the marginal nerves usually pubescent, often also the dorsal one; palets a little shorter than the scales, 2-nerved or 2-keeled. Stamens 3. Styles short, distinct. Stigmas plumose. Grain free, or sometimes adherent to the palet. [Name Greek, for grass or herbage.]

A genus of about 350 species, widely distributed in all temperate and cold regions. The English name *Meadow-grass* is often applied to most of the species. Besides the following some 50 others occur in the western parts of North America.

Grasses not exclusively of far northern or high mountain regions; culms generally tall. Culms strongly flattened.

1. *Poa annua* L. Annual Meadow Grass. Low Spear-grass. (Fig. 459.)

*Poa annua* L. Sp. Pl. 67. 1753.

Culms 2'-1' tall, from an annual root, erect or decumbent at the base, somewhat flattened, smooth. Sheaths loose, usually overlapping; ligule about 1' long; leaves ½'-1' long, ½'-'-1½' wide, smooth; panicle ½'-1' in length, open, branches spreading, ½'-1½' long, naked at the base; spikelets 3-5-flowered, 1½'-2½' long; lower scales smooth, the first narrow, acute, 1-nerved, about two thirds as long as the broad and obtuse 3-nerved second one; flowering scales 1½'-1½' long, distinctly 3-nerved, the nerves pilose below.

2. Poa Chapmaniana Scribn. Chapman’s Spear-grass. (Fig. 460.)


Culms 3'-6' tall, erect from an annual root, simple, rigid, smooth and glabrous. Sheaths tight, mostly at the base of the culm; ligule ½'' long, truncate; leaves ½'–1' long, ½'' wide or less, smooth; panicle 1'–2' in length, the branches usually erect, sometimes spreading or ascending, ½' long or less, naked at the base; spikelets 3-7-flowered, 1¼''–1½'' long; lower scales about equal, 3-nerved, acute; flowering scales webbed at the base, obtuse, 3-nerved, sometimes with two additional obscure nerves, the prominent ones sometimes pilose for three-fourths their length.

In dry soil, Kentucky and Tennessee to Florida and Alabama. April-May.

3. Poa compressa L. Wire-grass. Flat-stemmed Meadow-grass. English Blue-grass. (Fig. 461.)

*Poa compressa* L. Sp. Pl. 69. 1753.

Pale bluish-green, glabrous, culms 6'–2' tall, decumbent at the base, from long horizontal rootstocks, smooth, much flattened. Sheaths loose, flattened, shorter than the internodes; ligule ½'' long; leaves ½'–4' long, about 1'' wide, smooth beneath, rough above; panicle usually contracted, the branches erect or ascending, 1' long or less, spikelet-bearing nearly to the base; spikelets 3-9-flowered, ½½''–3'' long; lower scales acute, 3-nerved; flowering scales ½''–1¼'' long, obscurely 3-nerved, the nerves sparingly pubescent toward the base.


4. Poa abbreviata R. Br. Low Spear-grass. (Fig. 462.)


Culms 6' tall or less, erect, simple, smooth and glabrous. Sheaths and leaves crowded at the base of the culm; ligule ½'' long; leaves ½'–1' long, ½'' wide; panicle contracted, ½'–1' long, branches very short and erect; spikelets 3-5-flowered, 2½'' long; lower scales acute, smooth and glabrous; flowering scales about 1½'' long, obtuse, strongly pubescent all over, the intermediate nerves very obscure.

Arctic America from Greenland and Labrador to the Pacific. Summer.
(Fig. 463.)

Poa láxa Haenke, in Jirasek, Beob. Riesengeb. 118. 1791.

Smooth and glabrous, culms 1° tall or less, erect, simple. Sheaths often overlapping; ligule about 1'' long; leaves 1'-3' long, ½''-1'' wide, acuminate; panicle 1'-3' in length, the branches usually erect, sometimes ascending, 1' long or less; spikelets 3-5-flowered, 2½''-2½'' long; lower scales usually 3-nerved, acute, glabrous, rough on the keel at its apex; flowering scales 1½''-1¼'' long, obtuse, 3-nerved, or sometimes with an additional pair of obscure nerves, the midnerve pilose on the lower half, rough above, the lateral ones pilose for one-third their length.

Greenland to Alaska, south to the mountains of New England, to Manitoba and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

(Fig. 464.)

Poa alpina L. Sp. Pl. 67. 1753.

Smooth and glabrous, culms 4'-18' tall, erect, simple. Sheaths shorter than the internodes; ligule 1'' long, truncate; leaves 1'-3' long, 1''-2'' wide, abruptly acute; panicle 1'-3' in length, the branches generally widely spreading, 1' long or less; spikelets 3-5-flowered, 2½''-3'' long; lower scales broad, glabrous, rough on the keel, acute; flowering scales about 2'' long, obtuse, pilose for half their length, pubescent between the nerves toward the base.

Labrador to Alaska, south to Quebec, Lake Superior, and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

7. Poa cenísia All. Arctic Spear-grass.  
(Fig. 465.)


Smooth and glabrous, culms 4'-15' tall, erect, slender, simple. Sheaths shorter than the internodes; ligule 1'' long or less, truncate; leaves 1'-4' long, ½''-1'' wide; panicle 1'-4' in length, open, the branches generally widely spreading and more or less flexuous, 1'-2½' long; spikelets 3-5-flowered, 2½''-3½'' long; lower scales acute or acuminate, 1-3-nerved; flowering scales about 2'' long, faintly 5-nerved, the nerves short-pilose on the lower half, minutely pubescent between the nerves, somewhat webbed at the base.

Greenland and Labrador to Alaska. Also in Europe. Summer.
8. *Poa pratensis* L. Kentucky Blue-grass. June Grass. (Fig. 466.)

*Poa pratensis* L. Sp. Pl. 67. 1753.

*Poa pratensis* var. *angustifolia* Knuth, Enum. 1: 353, 1833.

Glabrous, culms 1°-4° tall, from long running rootstocks, erect, simple, smooth. Sheaths often longer than the internodes; ligule ½'-⅛' long or less, truncate; leaves smooth or rough, ½'-3⅛' wide, those of the culm 2'-6' in length, the basal much longer; panicle 2½'-8' in length, usually pyramidal, the branches spreading or ascending, sometimes flexuous, 1'-3' long, divided and spikelet-bearing above the middle; spikelets 3-5-flowered, 2½'-2½½' long, exceeding their pedicels; scales acute, the lower unequal, glabrous, rough on the keel, the lower 1-nerved, the upper 3-nerved; flowering scales 1½'-⅞' long, webbed at the base, 5-nerved, the marginal nerves and midnervous silky-pubescent below, the intermediate ones naked.


9. *Poa pseudopratensis* Scribn. & Ryd. Prairie Meadow-grass. (Fig. 467.)

Culms 1°-2⅛° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, smooth or slightly rough; ligule 2'-⅛' long, acute, decurrent; leaves 1½'-3⅛' wide, smooth beneath, a little rough above and on the margins, those of the culm 1'-3½' long, the basal 6'-10' in length; panicle 2'-5' long, open, the branches spreading or ascending, 1'-2' long; spikelets 3-5-flowered, 3½'-4½' long, exceeding their pedicels; lower scales nearly equal, acute, 3-nerved; flowering scales acutish, about 1½'-⅞' long, rough above, 5-nerved, pubescent between the nerves below, the marginal nerves and midnerves silky-pubescent about half their length.

Manitoba and Assiniboia to Nebraska and Colorado.

10. *Poa trivialis* L. Roughish Meadow-grass. (Fig. 468.)

*Poa trivialis* L. Sp. Pl. 67. 1753.

Culms 1°-3° tall, usually more or less decumbent at the base, simple, smooth or slightly scabrous. Sheaths usually shorter than the internodes, rough; ligule 2½'-3⅛' long, acutish; leaves 2'-7' in length, 1½'-2½' wide, generally very rough; panicle 4'-6½' long, open, the branches usually spreading or ascending, 1'-2' long; spikelets 2- or sometimes 3-flowered, 1½'-⅞' long, exceeding their pedicels; scales acute, the empty basal ones rough on the keel, the lower 1-nerved, shorter than the 3-nerved upper; flowering scales 1½'-1½½' long, webbed at the base, 5-nerved, the midnervous silky-pubescent below, the lateral nerves naked, the intermediate ones prominent.

11. Poa glauca Vahl. Glaucous Spear-grass.  (Fig. 469.)


Culms 6'-2° tall, erect, simple, rigid, glabrous, somewhat glaucous. Sheaths overlapping, confined to the lower half of the culm; ligule 1° long; leaves 1'-2' long, 1° wide or less, smooth beneath, scabrous above; panicle 1'-3' in length, open, the branches erect or ascending, ½'-1½' long; spikelets 2-4-flowered, 2½'-3' long; empty basal scales acute, 3-nerved, glabrous, rough on the upper part of the keel; flowering scales 1½'-1¾' long, obtuse or acuteish, rough, not webbed at the base, the lower half of the midnerv and the marginal nerves silky-pubescent, the intermediate nerves obscure and occasionally sparingly pubescent at the base.

White Mountains of New Hampshire. Also in Europe. Summer.

12. Poa nemoralis L. Wood Meadow-grass. Northern Spear-grass. (Fig. 470.)

Poa nemoralis L. Sp. Pl. 69. 1753.
Poa caesia var. strictior A. Gray, Man. Ed. 5, 629. 1867.

Culms 6'-2° tall, erect, simple, slender, sometimes rigid, smooth and glabrous. Sheaths usually shorter than the internodes; ligule ½°-1° long, truncate; leaves 1'-4' long, 1° wide or less, erect, smooth or rough; panicle 2'-5' in length, open, the branches erect or ascending, rarely spreading, 1'-2° long; spikelets 2-5-flowered, 1½'-2½' long; lower scales acute or acuminate, 1-3-nerved; flowering scales obtuse or acute, 1°-1¾' long, faintly 5-nerved, somewhat webby at base, the midnerv and the marginal nerves silky-pubescent on the lower half.

Anticosti Island to British Columbia, south to Maine, Minnesota, South Dakota, and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

13. Poa flava L. False Red-top. Fowl Meadow-grass. (Fig. 471.)

Poa flava L. Sp. Pl. 69. 1753.
Poa serotina Ehrh. Beitr. 6: 83. 1791.

Culmis 1½'-5° tall, erect, simple or rarely branched, smooth, glabrous. Sheaths usually shorter than the internodes, smooth and glabrous; ligule 1°-2° long; leaves 2'-6' long, 1°-2° wide, smooth or rough; panicle 6°-1½' in length, open, the branches spreading or ascending, 2°-5° long, divided and spikelet-bearing above the middle; spikelets 3-5-flowered, 1½'-2° long, exceeding their pedicels; lower scales acute, glabrous, rough above on the keel, the lower usually 1-nerved, the upper 3-nerved; flowering scales obtuse, somewhat webby at the base, 1°-1½° long, silky-pubescent on the lower half of the marginal nerves and the midnerv, the intermediate nerves obscure or wanting.

In swampy places, Nova Scotia and New Brunswick to Vancouver Island, south to New Jersey, Illinois and Nebraska. Also in Europe and Asia. July-Aug.
14. Poa débilis Torr. Weak Spear-grass. (Fig. 472.)


Culms 1°-2½° tall, erect, slender, simple, somewhat flattened, smooth and glabrous. Sheaths compressed, much shorter than the internodes; ligule ½"-1" long; leaves 1"-4½" long, 1" wide or less, erect, smooth beneath, rough above; panicle 2'-6' in length, open, often nodding at the top, the branches erect or ascending, sometimes spreading, 1½'-3' long; spikelets 2-4-flowered, 1½''-2'' long; their pedicels longer; empty scales unequal, acute, the first 1-nerved, shorter than the 3-nerved second one; flowering scales 1½'' long, obtuse, sparingly webbed at the base, 5-nerved, the nerves naked.


15. Poa autumnàlis Muhl. Flexuous Spear-grass. (Fig. 473.)


Culms 1°-3° tall, erect, slender, simple, smooth and glabrous. Sheaths usually much shorter than the internodes; ligule ½'' long; leaves 1'' wide or less, smooth beneath, rough above, those of the culm 1½'-6' long, the basal much longer; panicle 3'-9' in length, the branches long and slender, spikelet-bearing at the extremities, 2'-5' long; spikelets 3-5-flowered, 2½''-5'' long; empty basal scales acute, the first 1-nerved, narrow, shorter than the broad 3-nerved second; flowering scales rounded or retuse at the apex, 1½''-2'' long, not webbed at the base, pubescent on the lower part, 5-nerved, the midnerve silky-pubescent for three-fourths its length.

In woods, New Jersey and Pennsylvania to Kentucky, south to Florida and Texas. March-May.

16. Poa sylvéstris A. Gray. Sylvan Spear-grass. (Fig. 474.)

Poa sylvéstris A. Gray, Man. 596. 1848.

Culms 1°-3° tall, erect, slender, simple, slightly flattened, smooth, glabrous. Sheaths shorter than the internodes; ligule ½'' long or less; leaves smooth beneath, rough above, 1''-3'' wide, those of the culm 1½'-6' in length, the basal much longer; panicle 3'-7' in length, the branches spreading or ascending, 1½'-3' long, spikelet-bearing at the extremities; spikelets 2-4-flowered, 1½''-2'' long; empty basal scales acute, the lower 1-nerved, the upper longer and 3-nerved; flowering scales about 1½'' long, webbed at the base, obtuse, often pubescent below, 5-nerved, the midnerves pubescent nearly its entire length and the marginal nerves below the middle.

17. Poa alsodes A. Gray. Grove Meadow-grass. (Fig. 475.)


Culms 8'-2½' tall, erect, slender, simple, smooth and glabrous. Sheaths usually longer than the internodes; ligule ½'' long; leaves usually rough, 1''-2'' wide, those of the culm 2'-8' in length, the basal longer; panicle 3½'-8' in length, the branches spreading or ascending, 1½'-3' long, spikelet-bearing at the ends; spikelets 2-3-flowered, about 2½'' long; scales very acute, the empty basal ones unequal, the lower 1-nerved, the upper 3-nerved; flowering scales about 2'' long, webbed at the base, the midnerved pubescent near the base, the marginal nerves naked, the intermediate ones very faint.

In woods and thickets, Nova Scotia to Ontario and Minnesota, south to North Carolina and Tennessee. May-June.

18. Poa Wolfii Scribn. Wolf's Spear-grass. (Fig. 476.)


Culms 2'-3° tall, erect, slender, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule yz''-½'' long; leaves smooth beneath, rough above, those of the culm 2'-4' in length, the basal much longer; panicle 3'-6' in length, lax, its branches erect or ascending, flexuous, 1½'-2½' long; spikelets 2-4-flowered, 2½''-3'' long; scales acute, the lower unequal, 3-nerved, glabrous, rough on the keel, the first shorter than the second; flowering scales about 2'' long, copiously webbed at the base, 5-nerved, the marginal and midnerves silky-pubescent for more than half their length, the intermediate nerves prominent, naked.

Illinois, Tennessee and Kansas.

19. Poa brevifolia Muhl. Short-leaved Spear-grass. (Fig. 477.)


Culms 1°-3° tall, erect or spreading, slender, smooth, glabrous. Sheaths often shorter than the internodes; ligule ½''-1½'' long; leaves smooth beneath, rough above, 1''-2'' wide, abruptly acute, those of the culm ½'-4' long, the uppermost sometimes almost wanting; basal leaves usually equaling or nearly as long as the culm; panicle 2½'-5' in length, open, the branches ascending, widely spreading or often reflexed, 1½'-3' long, spikelet-bearing at the ends; spikelets 3-6-flowered, 2½''-3½'' long; empty basal scales unequal, acute, glabrous, the lower 1-nerved, the upper 3-nerved; flowering scales slightly webbed at the base, 2½''-3½'' long, obtuse, 5-nerved, the keel and marginal nerves sparingly pubescent, the intermediate nerves prominent, naked.

In rocky woods, New Jersey and Pennsylvania to Illinois, south to North Carolina and Tennessee. April-June.
20. Poa árida Vasey. Prairie Spear-grass. (Fig. 478.)


Culms 1°–2° tall, erect, rigid, simple, smooth and glabrous. Sheaths usually overlapping, smooth or somewhat roughish; ligule 1”–2” long, acute; leaves smooth beneath, rough above, ½”–1” wide, flat or folded, pungently pointed, those of the culm ½”–1” long, erect, the basal leaves 3’–6’ long; panicle contracted, 2’–5’ in length, the branches erect, spikelet-bearing nearly to the base, 1½’ long or less; spikelets 4–7-flowered, 2½’–3½’ long; lower scales nearly equal, acute, 3-nerved; flowering scales 1½’–2½’ long, crose-truncate at apex, strongly silky-pubescent on the nerves for half their length, the lower part very pubescent between the nerves; intermediate nerves very obscure.


21. Poa Buckleyana Nash. Buckley’s Spear-grass. (Fig. 479.)

Not A. Rich. 1851.

Culms 6’–2° tall, erect, rigid, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule 2’–3’ long, acute; leaves 1’–4’ long, about 1’ wide, erect, flat, or becoming involute, smooth or rough; panicle 1’–4’ in length, contracted, the branches erect, 1½’ long or less, spikelet-bearing nearly to the base; spikelets 2–5-flowered, 2½’–3½’ long; scales acute, the lower nearly equal, scabrous on the keel; flowering scales about 2’ long, obtuse or acutish, sparingly pubescent on the nerves below, sometimes slightly hispid toward the base between the nerves.

Kansas to California, north to British America. July–Aug.

22. Poa glumàris Trin. Large-flowered Spear-grass. (Fig. 480.)


Smooth and glabrous, culms 6’–3° tall, erect or asurgent, simple. Sheaths loose, usually shorter than the internodes; ligule ½’ long, truncate; leaves 4’–10’ long, 1’–4’ wide; panicle 4’–10’ in length, the branches erect or ascending, 1’–2’ long; spikelets 3–5-flowered, 4’–5’ long; lower scales about equal, acute, slightly scabrous on the keel, the first 1–3-nerved, the second 3-nerved, rarely 5-nerved; flowering scales 3’–4’ long, usually acutish, scabrous, 5–7-nerved, pubescent at base and on the lower part of the midnervc and lateral nerves, not webbed.

Anticosti Island and Nova Scotia to Quebec and Alaska. Summer.

Low grasses, with flat leaves and generally narrow panicles. Spikelets 2-4-flowered, the flowers all perfect. Two lower scales empty, extending beyond the flowering scales, membranous; flowering scales entire, membranous, with a tuft of hairs at the base. Stamens 3. Styles distinct. Stigmas plumose. [Name in honor of J. D. Dupont, French botanist.]

Two arctic species, both circumboreal.

### i. Dupontia Fisheri R. Br. Fisher's Dupontia. (Fig. 481.)


Smooth and glabrous, culms 5'-12' tall, erect, simple. Sheaths overlapping; ligule 1'' long or less; leaves 1'-6' long, 1'/2'-2' wide, flat; panicle usually contracted, 1'/2'-3'/2' long, the branches less than 1'/2' long, erect, or sometimes ascending; spikelets few, about 2-flowered, 3'/4'-4'/2' long; empty basal scales thin, generally acute, the first 1-nerved, somewhat shorter than the second, which is usually 3-nerved, the lateral nerves often vanishing at about the middle; flowering scales 2'/2'-3'' long, 1-nerved or obscurely 3-nerved; basal hairs about 3/4' long.

Arctic regions of northeastern America. Also in arctic Europe and Asia. Summer.


Tall aquatic or marsh grasses, with flat leaves and ample panicles. Spikelets 2-4-flowered, the flowers perfect. Two lower scales empty, thin-membranous, 3-5-nerved; flowering scales rigid, with a tuft of hairs at the base, rounded on the back, 5-7-nerved, some of the nerves usually excurrent as short points; palets about equalling the scales, 2-nerved. Stamens 3. Styles very short. Stigmas plumose. Grain hairy at the apex. [Greek, referring to the rickle-like projecting nerves of the flowering scales.]

Species 2, in the north temperate zones of both continents.

### i. Scolochloa festucacea (Willd.) Link. Fescue Scolochloa. (Fig. 482.)


*Scolochloa festucacea* Link, Hort. Berol. i: 137. 1827.


Culms 3°-5° tall, erect, smooth and glabrous. Sheaths often overlapping; ligule 1'/2'-2' long; leaves 7'-1° long or more, 2'/2'-4'/2' wide, flat, scabrous on the margins; panicle 8'-12' in length, usually open, the branches ascending, naked at the base, the lower 3'-4' long; spikelets 3'/4'-4'' long; empty basal scales acute, the first shorter than the second; flowering scales scabrous, 7-nerved.

Iowa and Nebraska, north to Manitoba and Assiniboia. July-Aug.

Slender erect grasses, with flat leaves and a usually contracted nodding panicle. Spikelets 2-4-flowered, flattened, the rachilla hisurate and extending beyond the flowers. Two lower scales empty; somewhat shorter than the flowering scales, thin-membranous, acute, keeled; flowering scales membranous, obscurely nerved, entire, sometimes short-awned just below the apex. Stamens 3. Styles distinct. Stigmas plumose. Grain glabrous. [Greek, pencil-bearing, referring to the tuft of hairs at the end of the rachilla.]

Two known species, natives of northern North America. Other Mexican grasses are referred to this genus by authors.

1. **Graphephorum melicoides** (Michx.) Beauv. Graphephorum. (Fig. 483.)


*Graphephorum melicoides* Beauv. Agrost. 164. pl. 15. f. 8. 1812.


Culms 1°-2½° tall, erect, simple, rough just below the panicle. Sheaths usually shorter than the internodes, smooth, or the lower often villous; ligule 1½" long or less, truncate; leaves 1½'-9' long, 1½'-2½ wide, long-acuminate, rough; panicle 2'-6' in length, the top usually nodding, the branches erect, 1'-2' long; spikelets 2-4-flowered, 2½'-3' long; scales scabrous on the keel, the empty ones unequal, the first 1-nerved or obscurely 3-nerved, shorter than the 3-nerved second; flowering scales 3-5-nerved, acute.

In wet soil, Anticosti Island to Ontario, south to Maine and Michigan. Aug.-Sept.


Mostly perennial grasses, often tall, with flat leaves and paniculate inflorescence. Spikelets few-many-flowered, terete or somewhat flattened. Two lower scales empty, obtuse or acute, 1-3-nerved; flowering scales membranous, rounded on the back, 5-9-nerved, the nerves disappearing in the hyaline apex. Palets scarcely shorter than the scales, rarely longer, 2-keeled. Stamens 2 or 3. Styles distinct. Stigmas plumose. Grain smooth, enclosed in the scale and palet, free, or when dry slightly adhering to the latter. [Latin, referring to the panicled spikelets.]

About 16 species, widely distributed in North America, a few in Europe and Asia.

Spikelets ovate or oblong, 4½" long or less.

Flowering scales very broad, obscurely or at least not sharply nerved.

Panicle open, the branches ascending or spreading, often drooping.

Spikelets 3-5-flowered; lowest flowering scale about 1½" long.

Spikelets 5-12-flowered; lowest flowering scale about 1½" long.

Panicle contracted, the branches erect.

Flowering scales narrow, sharply and distinctly 7-nerved.

Panicle elongated, its branches erect or appressed.

Panicle not elongated, open, its branches spreading or drooping, rarely erect.

Scales about 1½" long, obtuse or rounded at the apex.

Spikelets 1½" long or less; branches of the panicle often drooping.

Spikelets 2½'-3½" long; branches of the panicle ascending or spreading.

Scales 1½"-1½" long, truncate and denticulate at the apex.

Spikelets linear, 6½" long or more.

Flowering scales 1½"-2½" long, obtuse, longer than the obtuse palet.

Flowering scales about 4½" long, acute, much shorter than the long-acuminate palet.

1. **P. lutea.**

2. **P. Canadensis.**

3. **P. obtusa.**

4. **P. elongata.**

5. **P. nervata.**

6. **P. Americana.**

7. **P. pallida.**

8. **P. fluviatilis.**

9. **P. acutiflora.**
1. Panicularia laxa Scribn. Northern Manna-grass. (Fig. 484.)


Culms 2°-4° tall, erect, simple, smooth or slightly scabrous. Sheaths overlapping, rough; ligule ½'-1' long; leaves 8'-15' long, 2°-4° wide, very rough; panicle 7'-9' in length, the branches spreading or ascending, the lower 3'-6' long; spikelets 3-5-flowered, about 2' long; empty scales unequal, scarios, acute, i-nerved, the first one-half to two-thirds the length of the second; flowering scales broad, about 1'' long, twice the length of the second scale, obtuse, obscurely 7-nerved.

In water or wet soil, Maine to Pennsylvania. Aug.

2. Panicularia Canadensis (Michx.) Kuntze. Rattlesnake Grass. (Fig. 485.)


Culms 2°-3° tall, erect, simple, smooth or slightly scabrous. Sheaths shorter than the internodes, those at the base of the culm overlapping; ligule 1'' long, truncate; leaves 6'-10' long or more, 2°-4° wide, rough; panicle 5½'-10' in length, the branches spreading, ascending or often drooping, 3½'-5' long; spikelets 5-12-flowered, 2½''-4'' long, flattened, tur- gid; empty scales unequal, acute, i-nerved; flowering scales, broad, 1½''-2'' long, obtuse or acutish, obscurely 7-nerved.

In swamps and marshes, Newfoundland and New Brunswick to Ontario and Minnesota, south to New Jersey, Ohio and Kansas. The handsomest species of the genus. Ascends to 5000 ft. in the Adirondacks. July-Aug.

3. Panicularia obtusa (Muhl.) Kuntze. Blunt Manna-grass. (Fig. 486.)

Poa obtusa Muhl. Gram. 147. 1817.


Panicularia obtusa Kuntze, Rev. Gen. Pl. 783. 1891.

Culms 1°-3° tall, erect, simple, smooth and glabrous. Sheaths sometimes rough, strongly striate, the lower overlapping; ligule very short; leaves 6'-15' long, 2''-4'' wide, usually stiff, erect or ascending, smooth beneath, more or less scabrous above; panicle 3'-8' in length, contracted, dense, the branches erect; spikelets 3-7-flowered, 2''-3'' long; empty scales acute, scarios, i-nerved; flowering scales about 1½'' long, broad, obtuse, obscurely 7-nerved.

In swamps, New Brunswick to New York and central Pennsylvania, south to Delaware and Maryland. Ascends to 2300 ft. in the Catskill Mountains. July-Aug.
4. **Panicularia elongata** (Torr.) Kuntze. Long Manna-grass. (Fig. 487.)


Culms 2°–3° tall, erect, simple, slender, smooth and glabrous. Sheaths often shorter than the internodes; ligule \( \frac{3}{2}'' \) long; leaves 6°–12° long, \( 1\frac{1}{2}''/2'' \) wide, long-acuminate, smooth beneath, rough above; panicle elongated, contracted, narrow, usually nodding at the summit, 6°–12° in length, the branches erect or appressed, 1°–2\( \frac{1}{2}'' \) long; spikelets 3–4-flowered, 1\( \frac{1}{2}''/2'' \) long; empty scales unequal, acute, 1-nerved; flowering scales narrow, about 1'' long, obtuse or acutish, distinctly 7-nerved.

In wet woods, Newfoundland to Quebec and Minnesota, south to North Carolina and Kentucky. Ascends to 4000 ft. in the Adirondacks. Aug.–Sept.

5. **Panicularia nervata** (Willd.) Kuntze. Nerved Manna-grass. (Fig. 488.)


Culms 1°–3° tall, erect, slender, simple, smooth and glabrous. Sheaths often shorter than the internodes, usually more or less rough; ligule \( \frac{3}{2}'' \) long, truncate; leaves 6°–12° long, \( 2\frac{1}{2}''/5'' \) wide, acute, smooth beneath, rough above; panicle 3°–8° in length, open, the branches filiform, spreading, ascending or often drooping, rarely erect, \( 2\frac{1}{2}''/5'' \) long; spikelets 3–7-flowered, 1°–1\( \frac{1}{2}'' \) long; empty scales obtuse, 1-nerved; flowering scales about \( \frac{3}{4}'' \) long, obtuse or rounded, with 7 sharp distinct nerves and evident furrows between.

In wet places, Newfoundland to British Columbia, south to Florida and Mexico. Ascends to 4000 ft. in Virginia. Panicle often purple. June–Sept.

6. **Panicularia Americana** (Torr.) MacM. Reed Meadow-grass. Tall Manna-grass. (Fig. 489.)


*Glyceria grandis* S. Wats. in A. Gray, Man. Ed. 6, 667. 1890.

*Panicularia Americana* MacMillan, Mem. Minn. 81. 1892.

Culms 3°–5° tall, erect, stout, simple, smooth and glabrous. Sheaths loose, smooth, or sometimes rough; ligule 1°–2° long, truncate; leaves 7°–10° long or more, \( 3\frac{1}{2}''/8'' \) wide, usually smooth beneath, rough above; panicle 8°–15° in length, its branches spreading, ascending or rarely erect, 4°–8° long; spikelets 4–7-flowered, \( 2\frac{1}{2}''/3'' \) long; empty scales acute, 1-nerved; flowering scales about 1'' long, obtuse or rounded at the apex, sharply and distinctly 7-nerved, the furrows between the nerves evident.

In wet soil, New Brunswick to Alaska, south to Tennessee, Nebraska, Colorado and Nevada. Ascends to 2100 ft. in Pennsylvania. June–Aug.
7. **Panicularia pallida** (Torr.) Kuntze. Pale Manna-grass. (Fig. 490.)


Pale green, culms 1°–3° long, assurgent, simple, smooth and glabrous. Sheaths loose, shorter than the internodes; ligule 2°–3° long, acute; leaves 2°–6° long, 1°–2° wide, smooth beneath, rough above; panicle 1½°–2° in length, the branches spreading, ascending or rarely erect, often flexuous, 1°–2° long; spikelets 4–8-flowered, 2½°–3½° long; empty scales unequal, the first 1-nerved, obtuse, shorter than the 3-nerved and truncate second; flowering scales 1½°–2° long, truncate and denticulate at the apex, sharply and distinctly 7-nerved, with plain furrows between the nerves.


8. **Panicularia fluitans** (L.) Kuntze. Floating Manna-grass. (Fig. 491.)

*Festuca fluitans* L. Sp. Pl. 75. 1753.


*Panicularia fluitans* Kuntze, Rev. Gen. Pl. 782. 1891.

Culms 2°–5° long, flattened, erect or decumbent, usually stout, simple, smooth and glabrous, often rooting from the lower nodes. Sheaths loose, generally overlapping, smooth or rough; ligule 2°–3° long; leaves 5°–10° long or more, 2°–6° wide, scabrous, often floating; panicle 9°–1½° long, the branches, at least the lower ones, at first appressed, later ascending, and 3°–6° long; spikelets linear, 7–13-flowered, 4°–12° long; empty scales unequal, 1-nerved, the lower acute or obtuse, the upper obtuse or truncate; flowering scales 1½°–3° long, oblong, obtuse or truncate, more or less scabrous, sharply 7-nerved.

In wet places or in water, Newfoundland to British Columbia, south to New Jersey, Kentucky, Iowa and California. Also in Europe. July–Sept.

9. **Panicularia acutiflora** (Torr.) Kuntze. Sharp-scaled Manna-grass. (Fig. 492.)


Culms 1°–2° tall, flattened, erect from a decumbent base, simple, smooth and glabrous. Sheaths loose, generally a little exceeding the internodes, smooth and glabrous; ligule 2° long, truncate; leaves 3°–6° long, 2°–3° wide, smooth beneath, rough above; panicle 6°–12° in length, the branches erect or appressed, 2°–4° long; spikelets linear, 5–12-flowered, 1°–1½° long; empty scales acute, smooth; flowering scales about 4° long, lanceolate, acute, scabrous, exceeded by the long-acuminate palets.

In wet places, Maine to southern New York, Ohio and Tennessee. Local. June–Aug.

Perennial grasses, with flat or involute leaves and contracted or open panicles. Spikelets 3–several-flowered. Lower scales empty, obtuse or acute, unequal; flowering scales obtuse or acute, rounded on the back, 5-nerved, the nerves very obscure or almost wanting. Palet about equaling the scale. Stamens 3. Styles wanting. Stigmas sessile, simply plumose. Grain compressed, usually adhering to the palet. [Name in honor of Benedetto Puccinelli, Italian botanist.]

About 14 species, in all temperate regions.

Panicle open, its branches spreading or ascending, rarely erect.

Lower flowering scales 1½″–2″ long; plant stoloniferous.

Second empty scale less than the half the length of the flowering scales, broad, obtuse or truncate; spikelets crowded.

Panicle contracted, its branches erect, rarely ascending; northern species.

1. Puccinellia maritima (Huds.) Parl. Goose-grass. Sea Spear-grass. (Fig. 493.)

Poa maritima Huds. Fl. Angl. 35. 1762.


Stoloniferous, smooth, glabrous, culms 6″–2″ tall, erect, or decumbent at the base, simple. Sheaths usually exceeding the internodes; ligule ½″–1″ long; leaves ½″–5″ long, 1″ wide or less, flat to involute; panicle 2″–6″ in length, open, the branches ascending, or rarely erect, 1″–2″ long; spikelets 3–10-flowered, 3″–6″ long; empty scales unequal, the first usually 1-nerved, the second 3-nerved; flowering scales 1½″–2″ long, broad, obtuse or truncate.

In salt marshes and on sea beaches, Nova Scotia to Rhode Island. Also on the Pacific coast, and on the coasts of Europe and Asia. July-Aug.

2. Puccinellia distans (L.) Parl. Spreading Meadow-grass. (Fig. 494.)

Poa distans L. Mant. 32. 1767.


Culms 1½–2½″ tall, erect, or sometimes decumbent at the base, tufted, smooth and glabrous. Sheaths often shorter than the internodes, smooth and glabrous; ligule ½″–1″ long; leaves ½″–6″ long, 1″–2″ wide, flat or folded, usually stiff and erect, smooth beneath; panicle 2″–7″ in length, open, rarely contracted, the branches spreading or ascending, whorled, the lower 1½″–4½″ long, sometimes reflexed; spikelets crowded, 3–6-flowered, 1½″–2½″ long; empty scales obtuse or acute, 1-nerved, the second exceeding the first and less than half the length of the obscurely nerved and obtuse flowering scales, which are ½″–1″ long.

3. **Puccinellia airoides** (Nutt.) Wats. & Coult. Slender Meadow-grass.  
(Fig. 495.)

*Poa airoides* Nutt. Gen. 1: 68. 1818.  
*Puccinellia airoides* Wats. & Coult. in A. Gray, Man. Ed. 6, 668. 1890.

Culms 1'-4' tall, erect, simple, smooth and glabrous. Sheaths usually longer than the internodes; ligule 1/2" long; leaves 2'-6' long, 1 1/2'' wide or less, flat or involute, usually erect, smooth beneath, rough above; panicle open, its branches slender, spreading or ascending, rarely erect, the lower 2'-3 1/2' long and often reflexed; spikelets scattered, 1-7-flowered, 1 1/2''-3'' long; empty scales unequal, the first acute, 1-nerved, the second obtuse or acute, 3-nerved, more than half the length of the obtuse flowering scales, which are 1''-1 1/2'' long.


(Fig. 496.)

*Puccinellia maritima* var. minor Wats. in A. Gray, Man. Ed. 6, 668. 1890.  

Smooth and glabrous, culms 4'-12' tall, erect. Sheaths usually overlapping; ligule 1'' long; leaves 1/2'-2 1/2' long, 1'' wide or less; panicle 1'-2' in length, contracted, the branches short and erect or appressed; spikelets 2-7-flowered, 3''-4'' long; empty scales obtuse or rounded at the apex, the first 1-nerved, the second 3-nerved; flowering scales 1 1/2''-1 1/2'' long, usually purplish, rounded at the apex.

Greenland and Hudson Bay to Alaska, south to Maine. Also in Europe and Asia. Summer.

83. **FESTUCA** L. Sp. Pl. 73. 1753.

Mostly tufted perennial grasses, with flat or convolute leaves and paniculate inflorescence. Spikelets 2-7-flowered. Two lower scales empty, more or less unequal, acute, keeled; flowering scales membranous, narrow, rounded on the back, 5-nerved, usually acute, and generally awned at the apex. Palet scarcely shorter than the scale. Stamens 1-3. Styles very short, distinct. Stigmas plumose. Grain glabrous, elongated, often adherent to the scale or palet. [Latin, stalk or straw.]

A genus of about 80 species, widely distributed, particularly numerous in temperate regions. Besides the following, some 15 others occur in the western parts of North America.

Leaves 1/2'' wide or less.

- **Annuals; flowering scales awned.**  
  - First scale more than half as long as the second; awn short.  
  - First scale less than half as long as the second; awn long.

- **Perennials; flowering scales short-awned or bristle-pointed.**  
  - Basal leaves filiform or setaceous, 1/2'' wide.
  - Culms from a rootstock or with stolons.
  - Culms densely tufted, no rootstocks.
  - Basal leaves flat, about 1'' wide, becoming involute in drying.

Leaves 1'' wide or more, flat.

- **Flowering scales unawned or short-awned.**  
  - Flowering scales 2 1/2''-3 1/2'' long; spikelets 5-10-flowered.
  - Flowering scales 2'' long or less; spikelets 3-6-flowered.
  - Spikelets very broad; branches of the panicle spikelet-bearing from the middle or below; flowering scales obtuse.
  - Spikelets lanceolate; branches elongated; spikelets at ends; scales acute.

7. **F. Shorttii.**  
6. **F. elatior.**  
5. **F. scabrella.**  
4. **F. ovina.**  
3. **F. ruhbra.**  
2. **F. Myuros.**  
1. **F. octoflora.**

- **Flowering scales long-awned.**  
  - Spikelets 5-10-flowered.
  - Flowering scales 2'' long or less; spikelets 3-6-flowered.
  - Spikelets very broad; branches of the panicle spikelet-bearing from the middle or below; flowering scales obtuse.

8. **F. nutans.**  
9. **F. gigantea.**
1. Festuca octoflora Walt. Slender Fescue-grass. (Fig. 497.)

Festuca octoflora Walt. Fl. Car. 81. 1788.
Festuca tenella Willd. Enum. i: 113. 1809.

Culms 4'-18' tall, erect, from an annual root, slender, rigid, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short; leaves 1 1/2'-5' long, involute, bristle-form; raceme or simple panicle often one-sided, 1'-6' in length, contracted, its branches erect, or rarely ascending; spikelets 6-13-flowered, 3'-5' long; empty scales acute, smooth, the first 1-nerved, more than half the length of the 3-nerved second one; flowering scales, exclusive of awns, 1 1/2"-2 1/2" long, usually very scabrous, acuminate into an awn nearly as long as the body or shorter, or sometimes awnless; stamens 2.

Dry sandy soil, Quebec to British Columbia, south to Florida, Texas and California. Leaves sometimes pubescent. June-Aug.

2. Festuca Myuros L. Rat’s-tail Fescue-grass. (Fig. 498.)

Festuca Myuros L. Sp. Pl. 74. 1753.

Smooth, glabrous, culms 1°-2° tall, erect from an annual root, slender, simple. Sheaths often shorter than the internodes, the upper sometimes enclosing the base of the panicle; ligule 1/2' long, truncate; leaves 2'-5' long, subulate, involute, erect; panicle usually one-sided, 4'-12' in length, contracted, sometimes curved, its branches appressed; spikelets 3-6-flowered; empty scales very unequal, acute, smooth, the first 1-nerved, less than half as long as the 3-nerved second one; flowering scales, exclusive of the awns, 2'-3' long, narrow, scabrous, acuminate into an awn much longer than the body; stamen 1.

In waste places and fields, eastern Massachusetts to New Jersey and Florida. Also on the Pacific coast. Naturalized from Europe. June-July.

3. Festuca rubra L. Red Fescue-grass. (Fig. 499.)

Festuca rubra L. Sp. Pl. 74. 1753.

Culms 1 1/2°-2 1/2° tall, from running rootstocks, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short, truncate; basal leaves involute-filiform, 3'-6' long; culm leaves shorter, erect, flat or involute in drying, minutely pubescent above; panicle 2'-5' in length, sometimes red, open at flowering time, contracted in fruit; spikelets 3-10-flowered, 4'-6' long; lower scales acute, unequal, the first 1-nerved, shorter than the 3-nerved second; flowering scales about 3' long, obscurely 5-nerved, sometimes scabrous, bearing awns of less than their own length.

Labrador to Alaska, south, especially on the mountains, to Tennessee and Colorado. Also in Europe and Asia. Summer.
4. Festuca ovina L. Sheep's Fescue-grass. (Fig. 500.)

_Festuca ovina_ L. Sp. Pl. 73. 1753.

Smooth, glabrous, culms 6'-14' tall, erect, tufted, slender, rigid, simple; no rootstocks. Sheaths usually crowded at the base of the culm; ligule auriculate, short; leaves filiform or setaceous, those of the culm few, 1'-3' long, erect, the basal ones numerous; panicle 1'/2'-3' long, often one-sided, narrow, its branches short, usually erect or appressed; spikelets 3-5-flowered; empty scales unequal, acute, the first 1-nerved, the second 3-nerved; flowering scales 1'/2'-2'' long, smooth, acute, usually short-awned.

In fields and waste places, Labrador to British Columbia, south to New Jersey, Colorado and California. Variable. Probably indigenous northward, but mostly naturalized from Europe. Native also of Asia. The subarctic and Rocky Mountain var. _brevifolia_ S. Watson, may be a distinct species. June-July.

The so-called var. _virgata_, a state of this grass with the scales wholly or partly transformed into small leaves, is found on the mountains of New England and in arctic America.


_Festuca duriuscula_ L. Sp. Pl. 74. 1753.

Culms taller and stouter, the panicle usually more open and the flowering scales about 3'' long. Newfoundland to the Rocky Mountains, south to Virginia and Colorado. Naturalized from Europe.

5. Festuca scabrella Torr. Rough Fescue-grass. (Fig. 501.)


Culms 1'-3' tall, erect, simple, usually rough, below the panicle. Sheaths overlapping, smooth; ligule a ring of very short hairs; leaves rough, 1'' wide or less, those of the culm 1'-3' long, erect, the basal flat, much longer and readily deciduous from the sheaths, involute in drying; panicle 3'-4' in length, open, its branches ascending or the lower widely spreading; spikelets 3-5-flowered, about 4'' long; empty scales scarious, unequal, smooth, the first 1-nerved, the second longer, 3-nerved; flowering scales about 3'' long, scabrous, often bearing a short awn 1'' long or less.

Labrador and Quebec to Manitoba and British Columbia, south to California. Summer.

6. Festuca elatior L. Tall or Meadow Fescue-grass. (Fig. 502.)

_Festuca elatior_ L. Sp. Pl. 75. 1753.

_Festuca pratensis_ HUDS. Fl. Angl. 37. 1762.

_Festuca elatior_ var. _pratensis_ A. Gray; Man. Ed. 5, 634. 1867.

Culms 2°-5° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule very short; leaves 4''-15'' long, 2''-4'' wide, flat, smooth beneath, more or less rough above; panicle 4'-14' in length, often nodding at the top, simple to very compound, the branches ascending or erect, 2'-8' long; spikelets 5-9-flowered, 4'/2'-6'' long; empty scales acute, the first 1-3-nerved, the second 3-5-nerved; flowering scales acute or short-pointed, smooth and glabrous, 2'/2'-3'' long, indistinctly 5-nerved.

7. Festuca Shortii Kunth. Short’s Fescue-grass.  (Fig. 503.)


Festuca nutans var. palustris Wood, Bot. & Fl. 399.  1873.

Culms 2°-4° tall, erect, simple, smooth and glabrous. Sheaths much shorter than the internodes; ligule very short; leaves 5'-10' long, 1''-3'' wide, flat, smooth beneath, rough above; panicle 3'-7' in length, open, the branches spreading or ascending, rarely erect, spikelet-bearing from the middle or below, the lower 1 1/2'-3 1/2' long; spikelets broadly obovate, when mature, 3-6flowered, 2 1/2''-3'' long; empty scales acute, unequal, scabrous on the nerves, the first 1-3-nerved, the second 3-nerved; flowering scales about 2'' long, smooth, obtuse or acutish, faintly nerved.

In woods and thickets, Pennsylvania (according to Porter) and Illinois to Kansas, south to Mississippi and Texas. July-Aug.

8. Festuca nutans Willd. Nodding Fescue-grass.  (Fig. 504.)


Culms 2°-3° tall, erect, simple, slender, glabrous or sometimes pubescent. Sheaths much shorter than the internodes, glabrous or pubescent; ligule very short; nodes black; leaves 4'-12' long, 2''-3'' wide, rather dark green, flat, smooth beneath, rough above; panicle 4'-9' in length, its branches at first erect, the lower 2 1/2'-5' long, finally spreading and nodding, spikelet-bearing only at the ends; spikelets lanceolate, 3-5-flowered, 2 1/2''-3'' long; empty scales acute, scabrous on the keel, the the first 1-nerved, shorter than the 3-nerved second; flowering scales about 2'' long, smooth, acute, very faintly nerved.

In rocky woods, Nova Scotia to Ontario and Nebraska, south to Florida and Texas. Ascends to 2300 ft. in Virginia. June-Aug.

9. Festuca giganticæ (L.) Vill. Great Fescue-grass.  (Fig. 505.)

Bromus giganticæ L. Sp. Pl. 77.  1753.

Culms 2°-4° tall, erect, simple, smooth and glabrous. Sheaths usually overlapping; ligule 1'' long; leaves 5'-10' long or more, bright green, 2''-6'' wide, flat, rough; panicle 7'-12' in length, loose, narrow, the branches erect or ascending, the lower 2'-4' long; spikelets 3-7-flowered; empty scales acuminate, smooth and glabrous, the first 1-3-nerved, shorter than the 3-5-nerved second; flowering scales, exclusive of awns, about 3'' long, faintly 5-nerved, slightly scabrous, minutely 2-toothed at the apex, bearing an awn 6''-8'' long.

84. BRÖMUS L. Sp. Pl. 76. 1753.

Annual or perennial grasses, with flat leaves and terminal panicles, the pedicels thickened at the summit. Sheaths sometimes not split. Spikelets few—many-flowered. Two lower scales empty, unequal, acute; flowering scales rounded on the back, or sometimes compressed—keeled, 5—9-nerved, the apex usually 2—toothed, generally bearing an awn just below the summit; palet shorter than the scale, 2—keeled. Stamens usually 3. Stigmas sessile, plumose, inserted below a hairy cushion-like appendage at the top of the ovary. Grain adherent to the palet. [Greek name for a kind of oats.]

About 40 species, most numerons in the north temperate zone. Besides the following, some 14 others occur in the western parts of North America.

Lower empty scale 1—nerved, the upper 3—nerved.

Tall perennials, 2—4' high.
Sheaths glabrous or softly pubescent, the lower sometimes sparingly hirsute.
Leaves 2—6' wide; culms stoutish; branches of the panicle more or less spreading or drooping.
Leaves less than 2' wide; culms slender; branches of the panicle erect.

Sheaths strongly retrorse—hirsute.
Low annuals, 1—2' high; spikelets drooping.
Spikelets numerous, on slender recurved unilateral pedicels; flowering scales 3—6' long. 1. B. ciliatus.

Spikelets few, the pedicels not unilateral; flowering scales 6—8' long. 5. B. siliquosus.
Lower empty scale 3—nerved, the upper 5—9—nerved (3—nerved in No. 6).
Flowering scales rounded on the back, at least below.
Flowering scales awned.

Flowering scales pubescent.
Pubescence dense, consisting of long silky hairs.
Second empty scale 3—nerved; flowering scales 5—6' long. 6. B. Potori.
Second empty scale 5—7—nerved; flowering scales about 4' long. 7. B. Kalmii.
Pubescence of short appressed soft hairs, not dense.
Flowering scales glabrous or minutely roughened.

Awns straight.
Nerves of the turgid flowering scales obscure; palet about equalling the scale, which is 3—4' long. 9. B. secatus.
Nerves of the flowering scale prominent; palet considerably shorter than the scale, which is 4—5' long. 10. B. racemosus.
Awns strongly bent near the base, divergent. 11. B. squalorus.
Flowering scales not awned, nearly as broad as long.
Flowering scales compressed—keeled.
Flowering scales pubescent; awn 2—3' long. 13. B. brianristatus.
Flowering scales minutely roughened; awn less than 1' long, or none. 14. B. unioloides.

1. Bromus ciliatus L. Fringed Brome—grass. Wood Chess. (Fig. 506.)

Bromus purgans L. Sp. Pl. 76. 1753?
Bromus ciliatus L. Sp. Pl. 76. 1753.

Culms 2—4' tall, erect, simple, glabrous or pubescent. Sheaths often shorter than the internodes, smooth or rough, often softly pubescent, or the lower sometimes sparingly hirsute; ligule very short; leaves 4—12' long, 2—6' wide, smooth beneath, scabrous and often pubescent above; panicle open, 4—10' in length, its branches lax, widely spreading or often drooping; spikelets 5—10—flowered, 1' long or less; empty scales very acute, glabrous, rough on the keel, the first 1—nerved, the second longer, 3—nerved; flowering scales 4—5—6' long, obtuse or acute, 5—7—nerved, appressed—pubescent on the margins or over the entire surface; awn 2—4' long.

In woods and thickets, Newfoundland to Manitoba and British Columbia, south to Florida and Texas. Variable. The form known as var. purgans (B. pubescens Muhl.) with the flowering scales pubescent all over, may be distinct. July—Aug.
2. *Bromus erectus* Huds. Upright Brome-grass. (Fig. 507.)


Culms 2°-3° tall, erect, simple, slender, smooth and glabrous. Sheaths shorter than the internodes, smooth and glabrous, or slightly pubescent; ligule ½” long, erose-truncate; leaves sparingly pubescent, 1°-2” wide, those of the culm 4°-8° long, the basal about 1° long, very narrow; panicle 3°-7” in length, the branches erect or ascending, the lower 1°-3° long; spikelets ½°-1½° long, sometimes purplish, 5-10-flowered; empty scales acuminate, the first 1-nerved, the second longer, 3-nerved; flowering scales 5°-6” long, acuminate, very rough-pubescent, 5-nerved, the intermediate nerves faint; awn 2°-3° long.


3. *Bromus asper* Murr. Hairy Brome-grass. (Fig. 508.)


Culms 2°-6° tall, erect, simple, rough. Sheaths shorter than the internodes, strongly retrorse-hirsute, especially the lower; ligule ½” long; leaves 8°-1° long or more, 3°-6” wide, rough or often hirsute; panicle 6°-12” in length, open, the branches usually drooping; spikelets 5-10-flowered 1°-1½” long; empty scales acute, scabrous on the nerves, the first 1-nerved, the second longer, 3-nerved; flowering scales about 6” long, acute, hispid near the margins and on the lower part of the keel; awn 3°-4” long.


4. *Bromus tectorum* L. Downy Brome-grass. (Fig. 509.)

*C. tectorum* L. Sp. Pl. 77. 1753.

Culms 6°-2° tall, erect from an annual root, simple, smooth and glabrous. Sheaths usually longer than the internodes, at least the lower ones softly pubescent; ligule 1°-2” long; leaves 1°-4” long, 1°-2” wide, softly pubescent; panicle 2°-6” in length, open, the branches slender and drooping, somewhat one-sided; spikelets numerous, 5-8-flowered, on capillary recurved slender pedicels; empty scales acuminate, usually rough or hirsute, the first 1-nerved, the second longer, 3-nerved; flowering scales 4°-6” long, acuminate, 7-nerved, usually rough or hirsute; awn 6°-8” long.

In fields and waste places, Rhode Island to Ontario, south to Maryland and Ohio. Naturalized from Europe. Sometimes a troublesome weed. May-July.
5. *Bromus stérilis* L. Barren Brome-grass. (Fig. 510.)

*Bromus stérilis* L. Sp. Pl. 77. 1753.

Culms 1⁰-2⁰ tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, smooth or rough, the lower sometimes pubescent; ligule 1" long; leaves 3'-9' long, 1'-2" wide, usually more or less pubescent; panicle 5'-10' in length, the branches ascending or often widely spreading, not one-sided, stiff; spikelets few, 5-10-flowered, spreading or pendulous; empty scales acuminate, glabrous, the first 1-nerved, the second longer, 3-nerved; flowering scales long, acuminate, 7-nerved, scabrous on the nerves, the awn 7'-12" long.

In waste places and ballast, eastern Massachusetts to Pennsylvania and Ohio. Locally naturalized or adventive from Europe. Native also of Asia. June-July.

6. *Bromus Pòrteri* (Coulter) Nash. Porter's Chess. (Fig. 511.)

*Bromus Kalmii* A. Gray. Kalm's Chess. (Fig. 512.)


Culms 1½⁰-3⁰ tall, erect, simple, pubescent below the nodes. Sheaths shorter than the internodes, glabrous or sometimes softly pubescent; ligule ½" long, truncate; leaves 1½'-3" wide, rough, those of the culm 4'-9' long, the basal narrow and about one-half of the length of the culm; panicle 3'-6' in length, its branches drooping and flexuous, at least when old, the nodes of the axis pubescent; spikelets 5-10-flowered, 9'-15" long, on slender flexuous pedicels; empty scales pubescent, the first narrower than the second, both 3-nerved; flowering scales 5'-6" long, obtuse, 5-7-nerved, densely pubescent with long silky hairs; awn 1'-2" long.

In dry soil, South Dakota to Montana, south to western Nebraska, New Mexico and Arizona. July-Aug.

7. *Bromus Kalmii* A. Gray. Kalm's Chess. (Fig. 512.)

*Bromus purgans* L. Sp. Pl. 76. 1753?

*Bromus Kalnii* A. Gray, Man. 600. 1848.

Culms 1½⁰-3⁰ tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, more or less pubescent; ligule very short; leaves 2½'-7' long, 1'-4" wide, sparingly pubescent; panicle 2'-6' in length, open, its branches usually flexuous; spikelets 6-10-flowered, 6'-12" long, on slender flexuous pedicels; empty scales pubescent, the first narrow, acute, 3-nerved, the second longer, broad, obtuse or mucronate, 5-7-nerved; flowering scales about 4' long, 7-9-nerved, densely silky pubescent, the awn 1'-1½" in length.

In woods and thickets, Quebec to Manitoba, south to Massachusetts, Pennsylvania, Illinois and Iowa. July-Aug.
8. *Bromus hordeaceus* L. Soft Chess. (Fig. 513.)

*Bromus hordeaceus* L. Sp. Pl. 77. 1753.


Culms 8'-3° tall, erect, often slender, usually pubescent below the panicle. Sheaths shorter than the internodes, mostly pubescent; ligule ½'' long; leaves 1'-7'' long, 1'-3'' wide, pubescent; panicle generally contracted, its branches erect or ascending, 1'-2' long; spikelets appressed-pubescent, on short pedicels; empty scales acute, the first 3-nerved, the second longer, 5-7-nerved; flowering scales broad, obtuse, 3½''-4½'' long, 7-9-nerved, bearing an awn 3''-4'' in length between the obtuse or acute teeth.


9. *Bromus secalinus* L. Cheat. Chess. (Fig. 514.)

*Bromus secalinus* L. Sp. Pl. 76. 1753.

Culms 1°-3° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, generally glabrous; ligule ½'' long, erose; leaves 2'-9' long, 1''-3'' wide, smooth or rough, sometimes hairy; panicle 2'-8' in length, open, its branches ascending or drooping; spikelets turgid, glabrous, erect or somewhat pendulous, 6-10-flowered; empty scales scabrous toward the apex, the first 3-nerved, acute, the second longer and broader, 7-nerved, obtuse; flowering scales 3''-4'' long, broad, turgid, obtuse, rough toward the apex, the nerves obscure aewnless, or bearing a straight awn 4'' long or less between the obtuse short teeth; palea about equalling the scale.


10. *Bromus racemosus* L. Upright Chess. Smooth Brome-grass. (Fig. 515.)


Culms 1°-3° tall, erect, simple, smooth and glabrous, or sparingly pubescent below the panicle. Sheaths shorter than the internodes, glabrous or pubescent; ligule 1'' long; leaves 1'-9' long, ½''-4'' wide, pubescent; panicle 1'-10' in length, the branches erect or ascending, the lower sometimes 2½'' long; spikelets erect, 5-11-flowered; empty scales acute, the first 3-nerved, the second longer and broader, 5-9-nerved; flowering scales broad, 3½''-4½'' long, obtuse, smooth and shining, the nerves prominent; awn straight, 3''-4'' in length; palea considerably shorter than the scale.

In fields and waste places all over the eastern United States and British America; also on the Pacific Coast. Naturalized from Europe. Native also of Asia. June-Aug.
11. **Bromus squarrosus** L. Corn Brome. (Fig. 516.)

*Bromus squarrosus* L. Sp. Pl. 76. 1753.

Culms 8'-18' tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes, softly pubescent; ligule ½' long; leaves 1'-5' long, 1'/2'-2' wide, softly pubescent; panicle 2'-6' in length, open, the branches ascending or drooping, often flexuous; spikelets nodding, 6-12-flowered, on slender pedicels; empty scales obtuse or acutish, the first 5-nerved, the second longer, 7-9-nerved; flowering scales 4½'-5½' long, obtuse, shining, minutely scabrous; awn inserted below the apex, about as long as the scale, bent at the base and divergent.

In ballast and waste places about the eastern sea-ports. Fugitive or adventive from Europe. July-Aug.

12. **Bromus brizaeformis** Fisch. & Mey. Quakegrass Brome. (Fig. 517.)


Culms 8'-20 tall, erect, simple, often slender, smooth and glabrous. Sheaths shorter than the internodes, the lower pubescent with soft villous hairs; ligule 1' long, erose-truncate; leaves 1'-3' long, 1'/2'-3' wide, pubescent; panicle 1½'-8' in length, open, the branches ascending or often drooping, flexuous; spikelets few, ½'-1' long, laterally much compressed; empty scales very obtuse, often purplish, glabrous or minutely pubescent, the first 3-5-nerved, the second larger, 5-9-nerved; flowering scales 3½'-4½' long, very broad, obtuse, 9-nerved, shining, glabrous or sometimes minutely pubescent, unawned.

Sparingly introduced into Pennsylvania; also from Montana to California. Native of northern Europe and Asia. July-Aug.

13. **Bromus breviaristatus** (Hook.) Buckl. Short-awned Chess. (Fig. 518.)


Culms 1°-4° tall, erect, simple, smooth or rough, sometimes pubescent below the panicle. Sheaths pubescent, at least the lower ones, which are often overlapping; ligule 1' long, truncate; leaves 6'-1° long or more, 2'-6° wide, rough and often pubescent; panicle 4'-15' in length, its branches erect or ascending, the lower 2'-6' long; spikelets 5-10-flowered; empty scales acute, pubescent, the first 3-5-nerved, the second longer, 5-9-nerved; flowering scales compressed, keeled, 6'-7° long, acute, 7-9-nerved, appressed-pubescent; awn 2'-3'-5' long.

In dry soil, Manitoba to British Columbia, south to Nebraska, Arizona and California. July-Aug.
14. **Bromus unioloides** (Willd.) H.B.K. Schrader’s Brome-grass. Southern Chess. (Fig. 519.)


Bromus Schraderi Kunth, Enum. 1: 416. 1833.

Culms 6'-3' tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, the lower often overlapping, smooth or rough, and glabrous or frequently pubescent; ligule 1'-2' long; leaves 3'-13' long, 1'-4' wide, usually rough, at least above; panicle 2'-10' in length, the branches erect or ascending, or the lower branches of the larger panicles widely spreading; spikelets much compressed, 6-10-flowered; empty scales acute, the first 3-5-nerved, the second longer, 5-9-nerved; flowering scales 6'-8' long, very acute, minutely sebrous, bearing an awn less than 1' long or awnless. Kansas (?) to the Indian Territory, Texas and Mexico. Widely distributed in South America. May-July.


A low perennial tufted grass, with setaceous rigid leaves and a terminal one-sided slender spike. Spikelets 1-flowered, narrow, sessile and single in each notch of the rachis. Scales 2, the lower empty, adnate to the rachis, or almost wanting, the upper flower-bearing, narrow, with involute and hyaline margins; palet narrow, 2-nerved. Stamens 3. Style elongated, undivided. Stigma elongated, short-papillose. Grain linear, glabrous, enclosed in the scale, usually free. [Name Greek, of uncertain application.]

A monotypic genus of the Old World.

1. **Nardus stricta** L. Wirebent. Mat-grass. Nard. (Fig. 520.)

*Nardus stricta* L. Sp. Pl. 53. 1753.

Culms 5'-15' tall, erect, simple, rigid, roughish. Sheaths usually at the base of the culm; ligule ½' long, rounded; leaves setaceous, stiff, rough, the 1 or 2 culm leaves about 1' long, erect, the basal ones numerous, 2'-5' long; spike 1'-3' in length, strict; spikelets 1-flowered, 3'-4' long, arranged alternately in 2 rows on one side of the erect slender rachis, often purplish; lower scale empty, very short, adnate to the rachis, sometimes almost wanting; flowering scale 3'-4' long, sebrous, long-aeuminate or short-awned.

GRASS FAMILY.

86. LÖLIUM L. Sp. Pl. 83. 1753.

Annual or perennial grasses, with flat leaves and terminal spikes. Spikelets several-flowered, solitary, sessile and alternate in the notches of the usually continuous rachis, compressed, the edge of the spikelet (backs of the scales) turned toward the rachis. Scales rigid; lower scale empty in the lateral spikelets, and the 2 lower empty in the terminal; flowering scales rounded on the back, 5–7-nerved; palets 2-keeled. Stamens 3. Styles distinct, very short. Stigmas 2, plumose. Grain adherent to the palet. [Latin name for Darnel.]

About 6 species, natives of the Old World.

Empty scale shorter than the spikelet.

Empty scale equalling or extending beyond the flowering scales.

1. Lolium perenne L. Ray-grass.

Rye-grass. (Fig. 521.)

Lolium perenne L. Sp. Pl. 83. 1753.

Smooth and glabrous, culms 6'–2½' tall, erect, simple. Sheaths shorter than the internodes; ligule very short; leaves 2'–5' long, 1"–2" wide; spike 3'–8' in length; spikelets 5–10-flowered, 4"–6' long, the empty scale shorter than the spikelet, strongly nerved; flowering scales 2'–3' long, obscurely nerved, acuminate or awned, the awn sometimes nearly as long as the body of the scale.

In waste places and cultivated grounds almost throughout the northern United States and southern British America. Naturalized from Europe. Native also of Asia. Erro

2. Lolium temulentum L. Darnel.

Ivray. (Fig. 522.)

Lolium temulentum L. Sp. Pl. 83. 1753.

Glabrous, culms 2°–4° tall, erect, simple, smooth. Sheaths overlapping; ligule 1' long or less; leaves 4'–10' in length, 1"–3" wide, smooth beneath, rough above; spike 4'–12' in length; spikelets 4–8-flowered, 5'–9' long, the strongly nerved empty scale equalling or extending beyond the obscurely nerved flowering scales, which are awned or awnless.


Usually low annual grasses, with narrow leaves and strict or curved elongated slender spikes. Spikelets 1–2-flowered, sessile and single in alternate notches of the jointed rachis. Empty scales 2, rarely 1, narrow, rigid, acute, 5-nerved; flowering scales much shorter, hyaline, keeled, one side turned to the rachis. Palets hyaline, 2-nerved. Stamens 3, or fewer. Styles short, distinct. Stigmas 2, plumose. Grain narrow, glabrous, free, enclosed in the scale. [Greek, referring to the narrow spikes.]

Species 5 or 6, natives of the Old World.
1. *Lepturus filiformis* (Roth) Trin.
   Slender Hardgrass.  (Fig. 523.)


Culms 3'-12' long, decumbent, much branched, smooth and glabrous. Sheaths loose, shorter than the internodes; ligule 1/2'' long, auriculate; leaves 1/2'-2' long, 1'' wide or less, usually involute, smooth beneath, rough above; spikes 1'-6' in length, slender, strict or curved; spikelets 2''-21/2'' long; empty scales acute; flowering scales about 11/2'' long, 1-nerved.

In waste places, southern Pennsylvania to Virginia, near or along the coast. Adventive from Europe. Summer.


Annual or perennial grasses, with flat or involute leaves and terminal spikes. Spikelets 3-many-flowered, sessile, single and alternate at each notch of the usually continuous rachis, the side of the spikelet turned toward the rachis. Two lower scales empty; flowering scales rigid, rounded on the back, 5-7-nerved, usually acute or awned at the apex; palets 3-keeled, the keels often ciliate. Stamens 3. Styles very short, distinct. Stigmas plumose. Grain pubescent at the apex, usually adherent to the palet. [Greek, referring to the growth of these grasses in wheat fields.]

About 32 species, in all temperate regions. Besides the following, some 5 others occur in the western parts of North America.

Plants with running rootstocks.
Flowering scales glabrous.
Flowering scales villous.
Plants without running rootstocks.
Flowering scale terminating in an awn shorter than its body.
Flowering scale terminating in an awn longer than its body.

1. *A. repens.*
2. *A. dasystachyum.*
3. *A. violaceum.*
4. *A. tenerum.*
5. *A. canarium.*

1. **Agropyron repens** (L.) Beauv. Couch-grass. Quitch-grass.  (Fig. 524.)

*Triticum repens* L. Sp. Pl. 86. 1753.
*Agropyron repens* Beauv. Agrost. 146. 1812.

Culms 1''-4'' tall, from a long jointed running rootstock. Sheaths usually shorter than the internodes, smooth and glabrous; ligule very short; leaves 3'-12' long, 1''-5'' wide, smooth beneath, rough above; spike 2'-8' in length, strict; spikelets 3-7-flowered; empty scales strongly 5-7-nerved, usually acute or awn-pointed, sometimes obtuse; flowering scales smooth and glabrous, acute or short-awned at the apex.


*Agropyron glaucum* R. & S. Syst. 2: 752. 1817.

Larger and stouter, pale green or glaucous; spikelets 5-15-flowered, the empty scales long-acuminate. Minnesota and Manitoba to Alaska, south to Missouri, Texas and Arizona. Reported from New England. Probably a distinct species.
2. *Agropyron dasystachyum* (Hook.) Vasey. Northern Wheat-grass. (Fig. 525.)


Glaucous, culms 1°-3° tall, erect, from long running rootstocks, simple, smooth and glabrous; sheaths shorter than the internodes; ligule very short; leaves 2'-9' long, 1''-3'' wide, flat, or becoming involute in drying, smooth beneath, rough above; spike 2 1/2'-7' in length; spikelets 4-8-flowered; empty scales 3-5-nerved, lanceolate, acuminate or short-awned, 3"-4 1/4" long; flowering scales broadly lanceolate, 5-nerved, 4 1/2"-6" long, acute or short-awned, densely villous.

Hudson Bay to the Northwest Territory and Wyoming and to the shores of Lakes Huron and Superior. Summer.

3. *Agropyron violaceum* (Hornem.) Vasey. Purplish Wheat-grass. (Fig. 526.)


Culms 6'-2° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short; leaves 2'-6' long, 1''-3'' wide, flat or involute, rough or sometimes smooth beneath; spike 1'-4' in length, occasionally longer, 2''-3'' broad; spikelets 3-6-flowered; empty scales broad, usually purplish, scarious on the margins, 5-7-nerved, 4''-6'' long, acute or acuminate, sometimes awn-pointed, rarely long-awned; flowering scales often purplish, 5-7-nerved, scarious on the margins, 4''-6'' long, acuminate or short-awned, the awn rarely as long as the body.

Quebec to western Ontario and British Columbia, south to the mountains of New England, New York and Pennsylvania, and in the Rocky Mountains to Colorado. Ascends to 5000 ft. in the White Mountains. Also in northern Europe and Asia. Summer.

4. *Agropyron tenerum* Vasey. Slender Wheat-grass. (Fig. 527.)


Glabrous, culms 2°-3° tall, erect, simple, often slender, smooth. Sheaths usually shorter than the internodes, glabrous; ligule very short; leaves 3'-10' long, 1''-2'' wide, flat or involute, rough; spike 3'-7' in length, usually narrow and slender; spikelets 3-5-flowered; empty scales 4''-6'' long, acuminate or short-awned, 3-5-nerved, scarious on the margins; flowering scales 5''-6'' long, 5-nerved, awn-pointed or short-awned, scarious on the margins, often rough toward the apex.

In dry soil, Manitoba and Minnesota to British Columbia, south to Nebraska, Colorado and California. Reported from the Northeast Territory. July-Aug.
5. **Agropyron caninum** (L.) R. & S. Awned Wheat-grass. Fibrous-rooted Wheat-grass. (Fig. 528.)

*Triticum caninum* L. Sp. Pl. 86. 1753.

*Agropyron caninum* R. & S. Syst. 2: 756. 1817.


Culms 1°–3° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, smooth, the lower sometimes pubescent; ligule short; leaves 3°–9° long, 1°–3° wide, smooth beneath, rough above; spike 3°–8° in length, sometimes one-sided, often nodding at the top; spikelets 3-6-flowered; empty scales 4½°–6° long; 3-5-nerved, acuminate, awn-pointed or bearing an awn 1°–3° long; flowering scales 4°–5° long, usually scabrous toward the apex, acuminate into an awn sometimes twice their own length.


89. **HÖRDEUM** L. Sp. Pl. 84. 1753.

Annual or perennial grasses, with flat leaves and terminal cylindric spikes. Spikelets 1-flowered, usually in 3’s at each joint of the rachis, the lateral generally short-stalked and imperfect; rachilla produced beyond the flower, the lower empty scales often reduced to awns and forming an apparent involucre around the spikelets. Empty scales rigid; flowering scales rounded on the back, 5-nerved at the apex, awned; palet scarcely shorter than the scale, 2-keeled. Stamen 3. Styles very short, distinct. Grain usually adherent to the scale, hairy at the summit. [Latin name for Barley.]

About 16 species, widely distributed in both hemispheres.

Flowering scales, exclusive of awns, 3°–4° long.

- Awn of the flowering scale ½° long or less.
- All the empty scales of each cluster bristle-like.
- Four of the empty scales of each cluster dilated above the base.
- Awn of the flowering scale 1° long or more.
- Flowering scales, exclusive of awns, about 6° long.

1. **Hordeum nodosum** L. Meadow Barley. (Fig. 529.)


Culm 6°–2° tall, erect, or sometimes decumbent, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule ¼° long, truncate; leaves 1½°–5° long, 1°–3° wide, flat, rough; spike 1°–3½° in length; spikelets usually in 3’s, the central one containing a palet and perfect flower, the lateral enclosing a staminate or rudimentary flower, or a palet only; empty scales of each cluster awn-like; flowering scale of the central spikelet 3°–4° long exclusive of the awn, which is 3°–6° long, the corresponding scale in the lateral spikelets much smaller and short-stalked.

In meadows and waste places, Indiana to Minnesota, British Columbia and Alaska, south to Texas and California. Also in Europe and Asia. June–July.
2. *Hordeum pusillum* Nutt. Little Barley. (Fig. 530.)


Culms 4'-15' tall, erect, or decumbent at the base, smooth and glabrous. Sheaths loose, usually shorter than the internodes, smooth and glabrous, the upper often enclosing the base of the spike; ligule very short; leaves ½'-3' long, ½''-2'' wide, erect, smooth beneath, rough above; spike 1'-3' in length; spikelets usually in 3's, the central one containing a palet and perfect flower, the lateral imperfect; scales awned, the empty ones scabrous, those of the central spikelet and the lower ones of the lateral spikelets dilated above the base; flowering scale smooth, that of the central spikelet 3'-4'' long, short-awned, the corresponding scale in the lateral spikelets smaller and very short-stalked.

In dry soil, Ontario to British Columbia, south to Nebraska, Arkansas, Texas and California; also sparingly introduced along the coast from Virginia to Florida. June-July.

3. *Hordeum jubatum* L. Squirrel-tail Grass. (Fig. 531.)


Culms 10'-2½' tall, erect, simple, usually slender, smooth and glabrous. Sheaths usually shorter than the internodes, generally loose, smooth and glabrous; ligule ½'' long or less; leaves 1'-5' long, 1''-2'' wide, erect, rough; spike 2'-4' in length; spikelets usually in 3's, the central one containing a palet and perfect flower, the lateral imperfect; empty scales consisting of slender rough awns 1'-2½' long; flowering scale of the central spikelet 3'-4'' long, scabrous at the apex, bearing a slender rough awn 1'-2½' long; the corresponding scale in the lateral spikelets short-awned, about 3'' long including its pedicel, sometimes reduced to a rudiment.

In dry soil, Ontario to Alaska, south to Kansas, Colorado and California. Naturalized in the east from Labrador and Quebec to New Jersey and Pennsylvania. July-Aug.

4. *Hordeum murinum* L. Wall Barley. (Fig. 532.)


Culms 6'-2'' tall, erect, or decumbent at the base, smooth and glabrous. Sheaths loose, shorter than the internodes on the long culms, overlapping on the short ones, the uppermost often inflated and enclosing the base of the spike; ligule very short; leaves 1'-6' long, 1''-3'' wide, rough; spikes 2'-4' in length; spikelets usually in 3's; scales awned, the empty ones awn-like, scabrous, those of the central spikelet broader and ciliate on the margins, bearing awns 9''-12'' long, those of the lateral spikelets similar, with the exception of the second scale, which is not ciliate; flowering scales scabrous at the apex, bearing an awn about 1' long, those of the lateral spikelets about 6'' long, the corresponding scale in the central spikelet somewhat smaller.

On ballast and sparingly in waste places, southern New York and New Jersey. Also from Arizona to California. Adventive or naturalized from Europe. June-July.
90. **ELYMUS** L. Sp. Pl. 83. 1753.

Tall grasses, with usually flat leaves and dense terminal spikes. Spikelets 2-several-flowered, (rarely 1-flowered) sessile, usually in pairs, occasionally in 3’s or more, in alternate notches of the continuous or jointed racis, the empty spikelets forming an apparent involucre to the cluster. Two lower scales empty, narrow, acute or awned, entire or rarely cleft; flowering scales shorter, rounded on the back, 5-nerved, usually bearing an awn. Palet a little shorter than the scale, 2-keeled. Stamens 3. Styles very short, distinct. Stigmas plumose. Grain sparsely hairy at the summit, adherent to the palet. [Greek, to roll up, referring to the involute palet.]

About 30 species, natives of temperate regions. Besides the following, some 10 others occur in the western parts of North America.

Joints of the racis tardily separating at maturity; awns ascending or none.

Flowering scales conspicuously awned (rarely awnless in No. 2).

Spikelets divergent from the racis of the broad spike.

Empty scales awl-shaped; spikes slender.

Empty scales not awl-shaped; spikes stout.

Empty scales lanceolate, 5-7-nerved; awn short; spike erect.

Empty scales narrowly lanceolate, 3-5-nerved; awn about the length of the scale; spike usually nodding.

Spikelets appressed to the racis of the narrow spike.

Empty scales narrowly lanceolate, acuminate or awn-pointed.

Empty scales awl-shaped, bearing awns equaling or exceeding their length.

Flowering scales unaawned or awn-pointed.

Flowering scales glabrous.

Flowering scales villous.

Joints of the racis early separating; awns widely diverging.

1. **Elymus striatus** Willd. Slender Wild Rye. (Fig. 533.)


*Elymus striatus* var. *villosus* A. Gray, Man. 603. 1848.

Culms 2°-3° tall, erect, slender, simple, smooth, glabrous. Sheaths usually shorter than the internodes, glabrous or hisrous; ligule very short; leaves 5'-6' long, 2'-5' wide, smooth or slightly rough beneath, pubescent above; spike 2½'-4½' in length, broad, slender, dense; spikelets divergent from the racis, 1-3-flowered; empty scales awl-shaped, 9'-12' long, including the slender rough awn, 1-3-nerved, the nerves, and often the whole scale, rough, hispid or hisrous; flowering scales about 3' long, smooth, scabrous or hispid, bearing a slender rough awn 8'-15' in length.

In woods and on banks, Maine and Ontario to Tennessee and Kansas. Spike often nodding. June-July.

2. **Elymus Virginicus** L. Terrell-grass. Virginia Wild Rye. (Fig. 534.)

*Elymus Virginicus* L. Sp. Pl. 84. 1753.


Culms 2°-3° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes, often overlapping on the lower part of the culm, smooth, sometimes pubescent, the uppermost often inflated and enclosing the peduncle and the base of the spike; ligule very short; leaves 5'-14' long, 2'-8' wide, rough; spike 2'-7' in length, broad, stout, upright; spikelets divergent from the racis, 2-3-flowered; empty scales thick and rigid, lanceolate, 8'-12' long, including the short awn, 5-7-nerved; flowering scales 3'-4' long, smooth, rarely sparingly scabrous, bearing a rough awn 2'-9' in length, or rarely awnless.

In moist soil, especially along streams, Nova Scotia and New Brunswick to Manitoba, south to Florida and Texas. Ascends to 2000 ft. in North Carolina. July-Aug.
3. Elymus Canadensis L. Nodding Wild Rye. (Fig. 535.)

Elymus Canadensis L. Sp. Pl. 83. 1753.

Culms 2½°-5° tall, erect, simple, smooth and glabrous. Sheaths usually overlapping; ligule very short; leaves 4°-1° long or more, 2°'-10° wide, rough, sometimes glaucous; spike 4°-12° in length, broad, stout, often nodding; its peduncle much exserted; spikelets divergent from the rachis, 3-5-flowered; empty scales narrowly lanceolate or awl-shaped, rigid, 3-5-nerved, 8°'-16° long, including the long slender rough awns; flowering scales 4°'-7° long, nearly smooth to hirsute, bearing a slender scabrous straight or divergent awn 10°'-25° in length.

On river banks, Nova Scotia and New Brunswick to Alberta, south to Georgia, Texas and New Mexico. Ascends to 2100 ft. in Virginia. July-Aug.

4. Elymus glaucus Buckl. Smooth Wild Rye. (Fig. 536.)

Elymus Sibericus var. Americanus Wats. & Coult. in A. Gray, Man. Ed. 6, 673. 1890.

Culms 2°-5° tall, erect, simple, smooth and glabrous. Sheaths often shorter than the internodes, usually glabrous, rarely pubescent; ligule 1° long or less; leaves 4°-12° long, 2°'-8° wide, smooth beneath, sometimes rough above; spike 3°-8° in length, narrow, slender; spikelets appressed to the rachis, 3-6-flowered; empty scales narrowly lanceolate, 4°'-6° long, acuminate or awn-pointed, rigid, 3-5-nerved; flowering scales smooth or slightly rough, 5°'-6° long, bearing a slender straight rough awn 6°'-9° in length.


5. Elymus Macounii Vasey. Macoun's Wild Rye. (Fig. 537.)


Culms 1°-3° tall, erect, simple, smooth and glabrous. Sheaths shorter than the internodes; ligule very short, truncate; leaves 2°'-6° long, 1°'-2½° wide, rough, especially above; spike 2°'-5° in length, narrow, slender, often somewhat flexuous; spikelets appressed to the rachis, single at each node, or the lower sometimes in pairs, 1-3-flowered; empty scales (occasionally 3) awl-shaped, 3-nerved, rough, 3°'-4° long, bearing a slender straight rough awn, 3°'-5° in length; flowering scales 3½°'-5° long, rough toward the apex, bearing a slender straight awn 3°'-5° long.

Prairies, Manitoba and Assiniboia, south to Nebraska and New Mexico. July-Aug.
6. **Elymus condensatus** Presl. Smooth Lyme-grass. (Fig. 538.)


Culms 2°-10° tall, erect, simple, smooth and glabrous. Sheaths smooth and glabrous, the upper ones shorter than the internodes; ligule 2°-3° long, truncate; leaves 6°-1° long or more, 3°-12° wide, scabrous, at least above; spike 4°-15° in length, usually stout, strict, often interrupted below, sometimes compound at the base; spikelets 3-6-flowered, 2-several at each node of the rachis; empty scales awl-shaped, 4°-5°-6° long, 1-nerved, usually rough; flowering scales 4°-5° long, generally awn-pointed, usually rough, sometimes smooth.

In wet saline situations, Alberta to British Columbia, south to northwestern Nebraska, Arizona and California. July-Aug.

7. **Elymus arenarius** L. Downy Lyme-grass. Sea Lyme-grass. (Fig. 539.)

*Elymus arenarius* L. Sp. Pl. 83. 1753.

Culms 1°-5°-8° tall, erect, simple, usually softly pubescent at the summit. Sheaths smooth and glabrous, often glaucous, those at the base overlapping, the upper shorter than the internodes; ligule very short; leaves 3°-1° long or more, 1°-5°-5° wide, flat, or becoming involute, smooth beneath, rough above; spike 3°-10° in length, usually strict; spikelets 3-6-flowered, frequently glaucous; empty scales 8°-14° long, 3-5-nerved, acuminate, more or less villous; flowering scales 8°-10° long, acute or awn-pointed, 3-7-nerved, usually very villous.

On shores, Greenland and Labrador to the Northwest Territory and Alaska, south to Maine, Lake Superior and Washington. Also in Europe and Asia. Summer.

8. **Elymus elymoides** (Raf.) Swezey. Long-bristled Wild Rye. (Fig. 540.)

*Sitanion elymoides* Raf. Journ. Phys. 89: 103. 1819. 0

*Elymus Sitanion* Schultes, Mant. 2: 426. 1824.

*Elymus elymoides* Swezey, Neb. Fl. Pl. 15. 1891.

Culms 6°-2° tall, erect, simple, smooth, glabrous. Sheaths smooth or rough, sometimes hirsute, usually overlapping, the upper one often inflated and enclosing the base of the spike; ligule short; leaves 2°-7° long, 2°-2° wide, often stiff and erect, usually rough, sometimes hirsute, flat or involute; spike 2°-6° in length; spikelets 1-5-flowered; empty scales entire or divided, often to the base, the divisions awl-shaped and bearing long unequal slender awns, 1°-3° in length; flowering scales 3°-5° long, 5-nerved, scabrous, at least toward the apex, bearing a long slender divergent awn 1°-3° in length, the apex of the scale sometimes 2-toothed, the teeth often produced into short awns; joints of the rachis separating at maturity.

In dry soil, South Dakota to Oregon, south to Kansas, Texas, Arizona and California. July-Aug.
91. HYSTRIX Moench, Meth. 294. 1794.

Usually tall grasses, with flat leaves and terminal spikes. Spikelets 2–several-flowered, in pairs, rarely in 3’s, at each node of the rachis. Empty scales wanting, or sometimes appearing as mere rudiments; flowering scales narrow, convolute, rigid, rounded on the back, 5-nerved above, terminating in an awn; palet scarcely shorter than the scale, 2-keeled. Stamens 3. Styles very short, distinct. Stigmas plumose. Grain oblong, adhering to the palet when dry. [Greek name of the Porcupine, referring to the long awns.]

Four known species, the following and a Californian one occurring in North America.

1. Hystrix Hystrix (L.) Millsp.
Bottle-brush Grass. (Fig. 541.)

Asprella Hystrix Willd. Enum. 132. 1809.


Culms 2°–4° tall, erect, simple, smooth and glabrous. Sheaths usually shorter than the internodes; ligule very short; leaves 4½–9’ long, 3°–6° wide, smooth beneath, rough above; spike 3°–7’ in length, spikelets at length widely spreading, 4°–6° long, exclusive of the awns; empty scales awn-like, usually present in the lowest spikelet; flowering scales 4°–6° long, acuminate into an awn about 1° in length.

In rocky woods, New Brunswick to Ontario, south to Georgia, Illinois and Minnesota. Ascends to 2100 ft. in Virginia. Spikelets very easily detached, even when young. June–July.


Arborescent or shrubby grasses, with simple or branched culms and flat short-petioled leaves which are articulated with the sheath. Spikelets borne in panicles or racemes, 2–many-flowered, large, compressed. Empty scales 1 or 2, the first sometimes wanting; flowering scales longer, not keeled, many nerved; palets scarcely shorter than the scales, prominent 2-keeled. Lodicules 3. Stamens 3. Styles 2 or 3. Stigmas plumose. Grain furrowed, free, enclosed in the scale and palet. [From Arundo, the Latin name of the Reed.]

About 24 species, natives of Asia and America. Two are found in the southern United States.

1. Arundinaria técta (Walt.) Muhl.
Scutch Cane. Small Cane. (Fig. 542.)

Arundo técta Walt. Fl. Car. 81. 1788.
Arundinaria macroserpema var. suffraticosa Munro, Trans. Linn. Soc. 26: 15. 1866.

Culms 3°–15° tall, erect, shrubby, branching at the summit, smooth and glabrous. Sheaths longer than the internodes, smooth or rough, ciliate on the margins; ligule bristly; leaves lanceolate, 3½–8’ long, 4°–12° wide, flat, more or less pubescent beneath, glabrous above; racemes terminal, or on short leafless culms; spikelets 7–10-flowered, 1°–1½’ long, on pedicels ½ in length or less, which are sometimes pubescent; empty scales unequal, the first usually very small, sometimes wanting; flowering scales 6°–10° long, acute or acuminate, smooth, scabrous or pubescent.

In swamps and moist soil, Maryland to Indiana and Missouri, Florida and Texas. May–July.

Sedge Family.

Grass-like or rush-like herbs. Stems (culms) slender, solid (rarely hollow), triangular, quadrangular, terete or flattened. Roots fibrous (many species perennial by long rootstocks). Leaves narrow, with closed sheaths. Flowers perfect or imperfect, arranged in spikelets, one (rarely 2) in the axil of each scale (glume, bract), the spikelets solitary or clustered, 1-many-flowered. Scales 2-ranked or spirally imbricated, persistent or deciduous. Perianth hypogynous, composed of bristles, or interior scales, rarely calyx-like, or entirely wanting. Stamens 1–3, rarely more. Filaments slender or filiform. Anthers 2-celled. Ovary 1-celled, sessile or stipitate. Ovule 1, anatropous, erect. Style 2–3-cleft or rarely simple or minutely 2-toothed. Fruit a lenticular plano-convex or trigonous achene. Endosperm mealy. Embryo minute.

About 65 genera and 3000 species, of very wide geographic distribution. The dates given below indicate the time of perfecting fruit.

Flowers of the spikelets all, or at least one of them, perfect; spikelets all similar.

Scales of the spikelets 2-ranked.

Perianth none; spikelets in solitary or umbelled terminal heads.

Spikelets with 2–several perfect flowers; scales several to numerous.

Flowers but 1 perfect flower; scales 2–4.

Perianth of 6–9 bristles; inflorescence axillary.

Scales of the spikelets spirally imbricated all around.

Spikelets with several to many perfect flowers.

Base of the style swollen, persistent as a tubercle on the achene.

Leaves reduced to basal sheaths; bristles usually present; spikelet solitary.

Culm leafy; bristles none; spikelets 1-numerous.

Flowers with no broad sepals nor interior perianth-scales.

Style swollen at the base; bristles none.

Style not swollen at the base; bristles usually present.

Spikelets solitary–many; bristles 1–6, rarely none.

Spikelets solitary or few; bristles 6–many, soft, smooth, very long, slender, much exserted.

Flowers with a perianth of 3 stalked sepals or of 1 or 2 interior hyaline scales.

Perianth of 3 broad stalked sepals, usually alternating with as many bristles.

Perianth of 1 or 2 hyaline scales (sepals?): bristles none.

Perianth of a single minute posterior scale.

Perianth of 2 scales, convolute around the ovary.

Spikelets 1–4-flowered, some of the flowers imperfect.

Style or its base, persistent as a tubercle on the achene.

Style wholly deciduous.

Flowers all monoeocious or dioecious, usually borne in separate small spikelets.

Achene not enclosed in a utricle (perigynium).

Achene enclosed in a utricle (perigynium).

Axis of the pistillate flower conspicuous, subulate, often exserted beyond the perigynium.

Axis of the pistillate flower rudimentary or none, not exserted.

I. CYPERUS L. Sp. Pl. 44. 1753.

Annual or perennial sedges. Culms in our species simple, triangular, leafy near the base, and with 1 or more leaves at the summit, forming an involucre to the simple or compound, umbellate or capitulate inflorescence. Rays of the umbel sheathed at the base, usually very unequal, one or more of the heads or spikes commonly sessile. Spikelets flat or subterete, composed of few or many scales, the scales falling away from the wingless or winged rachis as they mature (nos. 1–19), or persistent and the spikelets falling away from the axis of the head or spike with the scales attached (nos. 20–32). Scales concave, conduplicate or keeled, 2-ranked, all flower-bearing or the lower ones empty. Flowers perfect. Perianth none. Stamens 1–3. Style 2–3-cleft, deciduous from the summit of the lenticular or 3-angled achene. [Ancient Greek name for these sedges.]

About 650 species, of wide distribution in tropical and temperate regions. Besides the following, some 40 others occur in the southern United States. The English names Galingale and Street Rush are sometimes applied to all the species.
SEDGE FAMILY.

Style 2-cleft; achene lenticular, not 3-angled; scales falling from the rachis; spikelets flat.
Achene one-half as long as the scale; umbel nearly or quite simple.
Spikelets yellow; superficial cells of the achene oblong.
Spikelets green or brown; superficial cells of the achene quadrate.
Scales obtuse or obtusish, appressed.
Scales membranous, dull; style much exserted.
Scales subcoriaceous, shining; style scarcely exserted.
Scales acute, somewhat spreading at maturity.
Spikelets narrowly obovate; spikelets 3/4-11/4 long.
Achene linear-oblong; spikelets 3'-9' long.
Achene nearly as long as the scale; umbel sometimes much compound.
Style 3-cleft; achene 3-angled.
Spikelets falling away from the persistent rachis of the flattened spikelets.
Wings of the rachis, if present, permanently adnate to it.
Scales tipped with recurved awns; low annual, 1'-6' tall.
Scales acute or obtuse, not awned.
Wings of the rachis none or very narrow.
Stamens 3; spikelets linear-oblong, 4'-12' long; scales acute.
Annual; culms smooth, 2'-10' long.
Perennial; culms rough, 1'-21/4' tall.
Stamens 1; spikelets ovate, 2'-4' long.
Tall perennial; achene linear; scales acutish.
Low annual; achene oblong; scale-tips recurved.
Wings of the rachis distinct.
Low annual, adventive from Europe; scales broad.
Tall indigenous perennials (no. 13 sometimes annual 7).
Lower leaves reduced to pointed sheaths.
Leaves all elongated-linear.
Scales mucronate, reddish brown or green.
Scales acute or obtuse, not mucronate.
Scales wholly or partly purple-brown; achene linear.
Scales tightly appressed.
Rays of the scales free.
Scales straw-colored; achene obtovoid.
Wings of the rachis separating from it as interior scales; annuals.
Spikelets loose; spikelets 3'-10' long.
Spikelets densely, cylindric; spikelets 11/4'-13/4' long.
Spikelets falling away from the axis of the spikes, the lower pair of scales commonly persistent.
Annuals; spikelets elongated, nearly terete.
Scales imbricated; achene obovoid.
Scales thin, dull brown; spikelets very slender.
Scales rigid, yellow-brown; spikelets stout.
Scales distant; achene linear-oblong.
Perennial by hard, tuber-like basal corns; spikelets more or less flattened.
Achene narrowly linear-oblong, 3'-4' times as long as thick.
Spikelets flat, several-many-flowered.
Spikelets subterete, few-flowered.
Spikelets 6'-12' long, loosely spicate; lower reflexed.
Spikelets 11/4'-6' long, densely capitate or spicate.
Spikelets all reflexed; culms rough.
Spikelets spreading or only the lower reflexed; culms smooth.
Heads oblong or cylindric.
Heads 2'-4' long, the lower reflexed.
Spikelets 11/4'-5' long, the lower spreading.
Heads globose.
Achene oblong or obovoid, about twice as long as thick.
Rachis wingless or very narrowly winged.
Scales pale green, membranous, dull.
Scales chestnut-brown, firm, shining.
Rachis-wings membranous, broad.
Spikelets firm, not appressed; spikelets loosely capitate.
Scales thin, closely appressed; spikelets densely capitate.

1. Cyperus flavescens L. Yellow Cyperus. (Fig. 543.)

Cyperus flavescens L. Sp. Pl. 46. 1753.
Annual, culms very slender, tufted, leafy below, 3'-12' tall, mostly longer than the leaves. Leaves 1'-11/4' wide, smooth, the longer usually exceeding the inflorescence; clusters terminal and sessile or on 1-4 short rays; spikelets in 3's-6's, linear, subacute, yellow, many-flowered, flat, 4'-9' long, 11/4'-2' broad; scales ovate, obtuse, 1-nerved, appressed, twice as long as the orbicular-ovobvate black obtuse lenticular shining achene; stamens 3; style deeply 2-cleft, its branches slightly exserted; superficial cells of the achene oblong.

In marshy ground, Maine to Michigan, Florida and Mexico. Also in the Old World. Aug.-Oct.
2. Cyperus diandrus Torr. Low Cyperus. (Fig. 544.)

Cyperus diandrus Torr. Cat. Pl. N. Y. 90. 1819.

Annual, culms tufted, slender, 2'-15' tall. Leaves about 1" wide, those of the involucre usually 3, the longer much exceeding the spikelets; clusters sessile and terminal, or at the ends of 1-3 rays; spikelets 4'-6' long, linear-oblong, acute, flat, many-flowered; scales ovate, green, brown, or with brown margins, obtuse, 1-nerved, appressed, membranous, dull; stamens 2 or 3; style 2-cleft, its branches much exserted; achene lenticular, oblong, subacute, gray, not shining, one-half as long as the scale, its superficial cells quadrate, about as long as wide.


The var. elongatus is only a form with longer spikelets, found in southern New York and New Jersey.

3. Cyperus rivularis Kunth. Shining Cyperus. (Fig. 545.)

Cyperus rivularis Kunth, Enum. 2: 6. 1837.

Similar to the preceding species, culms slender, tufted, 4'-15' tall. Umbel usually simple; spikelets linear or linear-oblong, acutish, 4'-10' long; scales green or dark brown or with brown margins, appressed, firm, subcoriaceous, shining, obtuse; stamens mostly 3; style 2-cleft, scarcely exserted; achene oblong or oblong-obovate, lenticular, somewhat pointed, dull, its superficial cells quadrate.

In wet soil, especially along streams and ponds, Maine to southern Ontario and Michigan, south to Virginia and Missouri. Aug.-Oct.

4. Cyperus Nuttallii Eddy. Nuttall’s Cyperus. (Fig. 546.)

Cyperus Nuttallii Eddy; Spreng. Nene Entd. 1: 240. 1820.

Annual. culms slender, tufted, 4'-18' tall, equaling or often longer than the leaves. Leaves of the involucre 3-5, spreading, the larger often 5' long; umbel simple or slightly compound, 3-7-rayed; spikelets rather loosely clustered, linear, very acute, flat, spreading, 1/2'-1 1/2' long, 1'-1 1/2' wide; scales yellowish-brown with a green keel, oblong, acute, rather loosely spreading at maturity; stamens 2; style 2-cleft, its branches somewhat exserted; achene lenticular, narrowly obovate, obtuse or truncate, dull, light brown, one-third to one-half as long as the scale, its superficial cells quadrate.

5. **Cyperus microdontus** Torr. Coast Cyperus. (Fig. 547.)


Annual, similar to the preceding species, culms very slender, tufted, sometimes 20' high, usually lower. Leaves about 1" wide, those of the involucre much elongated; umbel commonly simple, sessile, capitate, or 1-6-rayed; spikelets linear, acute, 3'-9' long, less than 1" wide, yellowish-brown; scales ovate, acute, thin, appressed when young, spreading at maturity; stamens 2; style 2-cleft, its branches much exserted; achene lenticular, linear-oblong, short-pointed, light brown, one-half as long as the scale, its superficial cells quadrate.

In wet soil, on or near the coast, Virginia to Florida and Texas. Aug.-Oct.

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6. **Cyperus flavicomus** Michx. Elegant Cyperus. (Fig. 548.)


Annual, culms stout or slender, 1'-5' tall, leafy below. Leaves smooth, or rough-margined, 2'-3' wide, those of the involucre 3-8, the longer ones much exceeding the inflorescence; umbels few-several-rayed, often compound; primary rays 1'/2-2'/2 long; spikelets numerous, usually densely clustered, linear, acute, 4'-10' long, 1'-1'/2" wide, flat, many-flowered, spreading; scales oblong, obtuse, thin, dull, yellowish-brown, scarious-margined, faintly 3-nerved; stamens 3; style 2-cleft, little exserted; achenes obovate, lenticular, black, mucronate, not shining, nearly as long as the scales and often persistent on the rachis after these have fallen away.

In wet or moist sandy soil, Virginia to Florida and Louisiana. Aug.-Oct.

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7. **Cyperus inflexus** Muhl. Awned Cyperus. (Fig. 549.)


Annual, culms slender or almost filiform, tufted, 1'-6' tall, about equalled by the leaves. Leaves 1" wide or less, those of the involucre 2-3, exceeding the umbel; umbel sessile, capitate, or 1-3-rayed; spikelets linear-oblong, 6-10-flowered, 2'-3' long; scales light brown, lanceolate, rather firm, strongly several-nerved, tapering into a long, recurved awn, falling from the rachis at maturity; stamen 1; style 3-cleft; rachis narrowly winged, the wings persistent; achene 3-angled, brown, dull, narrowly obovoid or oblong, obtuse, mucronulate.

In wet, sandy soil, Vermont to the Northwest Territory and Oregon, south to Florida, Texas, California and Mexico. Fragrant in drying. July-Sept.
8. **Cyperus compressus** L.  Flat Cyperus. (Fig. 550.)

*Cyperus compressus* L. Sp. Pl. 46. 1753.

Annual, tufted, culms slender, erect or reclining, smooth, 3'–10' long. Leaves light green, about 1" wide, those of the involucre 2–3, the longer exceeding the spikelets; umbel capitate or with 2–3 short rays; spikelets narrowly lanceolate, acute, 4'–10' long, 13/4'–2' wide, very flat, many-flowered; scales light green with a yellow band on each side, ovate, acuminate, firm, keeled, several-nerved, falling away from the narrowly-winged rachis at maturity; stamens 3; style 3-cleft; achene sharply 3-angled, obovoid, obtuse, dull, brown, about one-third as long as the scale.

In fields, Maryland to Florida, west to Missouri and Texas. Also in tropical America and in the warmer parts of Asia and Africa. Aug.–Oct.

9. **Cyperus Schweinitzii** Torr.  Schweinitz’s Cyperus. (Fig. 551.)


Perennial by the thickened corm-like bases of the culms, tufted, culm rather slender, rough, at least above, 1°–2½° tall, about equalled by the light green leaves. Leaves 1½'–2½' wide, rough-margined, those of the involucre 3–7, erect, the longer exceeding the inflorescence; umbel simple, 3–9-rayed, the rays erect, sometimes 4' long; spikelets flat, in rather loose ovoid spikes, which are sessile and at the ends of the rays, linear-oblong, 6–12-flowered, 4'–8' long; scales convex, light green, ovate, acute or acuminate, 9–13-nerved, falling away from the rachis at maturity; stamens 3; style 3-cleft; achene sharply 3-angled, oblong, brown, acute at each end, nearly as long as the scale, its superficial cells quadrature.

In sandy soil, especially along lakes and streams, western New York and southern Ontario to the Northwest Territory, Minnesota and Kansas. Aug.–Oct.

10. **Cyperus pseudovégetus** Steud.  Marsh Cyperus. (Fig. 552.)


Perennial by thickened tuber-like joints of the rootstocks, culm rather stout, 1°–4° high, often equalled by the leaves. Leaves 1½'–2' wide, smooth, nodulose, the midvein prominent; leaves of the involucre 4–6, spreading, the longer much exceeding the inflorescence; umbel several-rayed, compound, the primary rays often 4' long; spikelets ovate, flat, many-flowered, light green, densely capitate, 2'–3' long; scales keeled, conduplicate, 1-nerved, curved, acute, longer than the linear 3-angled slightly stalked achene; stamen 1; style 3-cleft.

In marshes, Delaware to Florida, west to Kansas and Texas. July–Sept.
Short-pointed Cyperus. (Fig. 553.)  

Annual, culms very slender, tufted, 3'-15' tall, longer than or equaling the leaves. Leaves light green, usually less than 1" wide, those of the involucre much elongated; umbel 1-4-rayed, simple; rays short; spikelets flat, ovate-oblong, obtuse, 2'-4' long, many-flowered, densely capitate; scales oblong, pale green, 3-nerved, coarsely cellular, conduplicate, with a short sharp more or less recurved tip; stamen 1; style 3-cleft; achene sharply 3-angled, gray, oblong, narrowed at each end, about one-half as long as the scale.

In moist soil, Illinois to Louisiana, west to Kansas, Oregon, Texas and California. July-Oct.

12. Cyperus fuscus L.  Brown Cyperus. (Fig. 554.)  
*Cyperus fuscus* L. Sp. Pl. 46. 1753.  

Annual, culms slender, tufted, 6'-15' high, longer than or equalled by the leaves. Leaves rather dark green, about 1" wide, those of the involucre 4-6, the longer much exceeding the inflorescence; umbel several-rayed, somewhat compound, the rays short; spikelets linear, 2'-7' long, less than 1" wide, many-flowered, acute; scales ovate, subacute, becoming dark brown or remaining greenish on the keel, faintly about 3-nerved on the back, separating from the narrowly winged rachis as they mature; stamens 2 or 3; style 3-cleft; achene sharply 3-angled, oblong, pointed at each end, nearly as long as the scale.

Revere Beach, Mass., and New London, Conn. Adventive or fugitive from Europe. Also in ballast about the eastern seaports. July-Sept.

13. Cyperus Haspan L.  Sheathed Cyperus. (Fig. 555.)  
*Cyperus Haspan* L. Sp. Pl. 45. 1753.  

Perennial by short rootstocks (sometimes annual?); roots fibrous, culms slender, weak, tufted, 1'-3' high. Lower leaves reduced to membranous acminate sheaths, those of the involucre about 2, usually less than 1" wide, commonly little exceeding or shorter than the inflorescence; umbel several-rayed, simple or compound, the longer rays 1'-2' long; spikelets few, capitate, linear, acute, many-flowered, 3'-6' long, about 1/2" wide; scales oblong or oblong-lanceolate, reddish-brown, acute, mucronulate, keeled, 3-nerved; rachis narrowly winged; stamens 3; style 3-cleft; scarcely exserted; achene 3-angled, broadly obvoid, obtuse, nearly white, very much shorter than the scale.

In swamps, Virginia to Florida and Texas, mostly near the coast. Also in tropical America and in the warmer parts of Europe, Asia and Australia. July-Sept.
14. *Cyperus dentatus* Torr. Toothed Cyperus. (Fig. 556.)


Perennial by scaly rootstocks which sometimes bear small tubers, culms rather stiff, 8'-20' tall, longer than or equalled by the leaves. Leaves keeled, 1½-2½ wide, those of the involucre 3-5, one or two of them usually exceeding the inflorescence; umbel several-rayed, somewhat compound; longer rays 1'-3' long; spikelets linear, very flat, many-flowered, mostly blunt, 5'-10' long, nearly 2'' wide; scales light reddish-brown, ovate-lanceolate, thin, keeled, 5-7-nerved, mucronate, separating from the rachis when mature, their tips spreading, causing the spikelet to appear toothed; stamens 3; style 3-cleft, the branches exserted; achene 3-angled, obtuse, mucronate, light brown, much shorter than the scale.

In sandy swamps and on river shores, Maine to northern New York, south to West Virginia and South Carolina. Scales often modified into tufts of small leaves. Aug.-Oct.

15. *Cyperus rotundus* L. Nut-grass. (Fig. 557.)

*Cyperus rotundus* L. Sp. Pl. 45. 1753.

Perennial by scaly tuber-bearing rootstocks, culm rather stout, 6'-20' high, usually longer than the leaves. Leaves 1½-3' wide, those of the involucre 3-5, the longer equally or exceeding the inflorescence; umbel compound or nearly simple, 3-8-rayed, the longer rays 2'-4½' long; spikelets linear, closely clustered, few in each cluster, acute, 4½'-10½' long, 1½'-1½' wide; scales dark purple-brown or with green margins and centre, ovate, acute, closely appressed when mature, about 3-nerved on the keel; stamens 3; style 3-cleft, its branches exserted; achene 3-angled, about one-half as long as the scale.

In fields, Virginia to Florida, west to Kansas and Texas. Adventive in or about ballast deposits at the eastern seaports. Also in tropical America, and widely distributed in the Old World. July-Sept.

16. *Cyperus Hallii* Britton. Hall’s Cyperus. (Fig. 558.)


Perennial by scaly rootstocks, culm rather stout, 2'-3' tall, about equalled by the leaves. Basal leaves 2½'-3½' wide; involucral leaves 3-6, the longer very much exceeding the inflorescence; umbel compound, its longer rays 3'-4' long, the raylets sometimes 1' long; spikelets numerous, loosely clustered, linear, 7-15-flowered, 5½'-8½' long, 1½'-1½' wide; involucral setaceae; scales ovate, acute, strongly 7-9-nerved, dark reddish-brown or with lighter margins, their tips not appressed; stamens 3; style 3-cleft, its branches much exserted; achene linear-oblong, 3-angled, about one-half as long as the scale.

Kansas and the Indian Territory to Texas. July-Sept.
17. *Cyperus esculentus* L. Yellow Nut-grass. (Fig. 559.)

*Cyperus esculentus* L. Sp. Pl. 45. 1753.
*Cyperus phymatodes* Muhl. Gram. 23. 1817.

Perennial by scaly horizontal tuber-bearing rootstocks, culm usually stout, 1°-2½° tall, commonly shorter than the leaves. Leaves light green, 2½"-4" wide, the midvein prominent; those of the involucre 3-6, the longer much exceeding the inflorescence; umbel 4-10-rayed, often compound; spikelets numerous in loose spikes, straw-color or yellowish-brown, flat, spreading, 6°-12° long, 1½"-2" wide, many-flowered; scales ovate-oblong, subacute, 3-5-nerved; rachis narrowly winged; stamens 3; style 3-cleft; achene obovoid, obtuse, 3-angled.

In moist fields, New Brunswick to Minnesota, south to Florida and Texas. Also on the Pacific Coast from California to Alaska, in tropical America, and widely distributed in the Old World. Sometimes a troublesome weed. Aug.-Oct.


Spikelets very slender, 1½" wide or less. Massachusetts to South Carolina and Missouri.

18. *Cyperus erythrorhizos* Muhl. Red-rooted Cyperus. (Fig. 560.)

*Cyperus erythrorhizos* Muhl. Gram. 20. 1817.

Annual, culms tufted, stout or slender, 3-2½° tall. Leaves 1½"-4" wide, rough-margined, the lower longer than or equaling the culm, those of the involucres 3-7, some of them 3-5 times as long as the inflorescence; umbel mostly compound, several-rayed; spikelets linear, subacute, 3½"-10½" long, less than 1½" wide, compressed, many-flowered, clustered in oblong, nearly or quite sessile spikes; scales bright chestnut brown, oblong-lanceolate, mucronulate, appressed, separating from the rachis at maturity, the membranous wings of the rachis separating as a pair of hyaline interior scales; stamens 3; style 3-cleft; achene sharply 3-angled, oblong, pointed at both ends, pale, one-half as long as the scale.

In wet soil, especially along streams, southern Ontario to Massachusetts and Florida, west to Missouri, Kansas, Texas and California. Aug.-Oct.


*(Fig. 561.*)


Annual, culm stout, 2°-3° tall, about equaled by the leaves. Leaves 3½"-4½" wide, very rough-margined, those of the involucres 5-8, much elongated; umbel compound, several-rayed; spikes cylindrical, sessile or very nearly so, exceedingly dense, ½"-1½" long; spikelets very numerous, linear, 1½"-2½" long, ½" wide, spreading; scales brown, keeled, indistinctly 5-nerved, oblong, mucronulate, separating from the rachis at maturity, the wings of the rachis separating as a pair of hyaline scales, as in the preceding species; stamens 3; style 3-cleft; achene 3-angled, minute.

In swamps, southern Missouri to Tennessee, Louisiana and Florida. July-Sept.
20. *Cyperus speciosus* Vahl. Michaux’s Cyperus. (Fig. 562.)

*Cyperus speciosus* Vahl, Enum. 2: 364. 1806.
*Cyperus Michauxianus* Schultes, Mant. 2: 123. 1824.

Annual, culms stout or slender, usually tufted, 5’-2° tall, reddish toward the base. Leaves rough-margined, \(\frac{1}{2}\)’-2° wide, shorter than or equaling the culm, the midvein prominent; leaves of the involucre much exceeding the umbel; umbel compound or nearly simple, 3-7-rayed, the primary rays 1’-5½” long; involucels narrow; spikelets suberete, very narrowly linear, loosely or densely clustered, 4’-12’ long, less than 1” thick, 10-30-flowered, falling away from the axis at maturity; scales dull brown, thin, appressed, densely imbricated, ovate, obtuse, faintly 3-5-nerved on the back; rachis-wings broad, clasping the achene, persistent; stamens 3; style 3-cleft, slightly exserted; achene pale, 3-angled, about one-half as long as the scale, its superficial cells nearly quadrate.

In marshes, Rhode Island to Ohio and Minnesota, south to Florida, Texas and California. July-Sept.

*Cyperus ferruginescens* Boeckl. Linnaea, 36: 396. 1869-70.

Scales spreading or slightly recurved, reddish. Missouri to Texas and New Mexico.

*Cyperus parvus* Boeckl. Linnaea, 36: 397. 1869-70.

Culm 1’-3’ high; umbel very simple, generally of but a single cluster of short spikelets. Missouri to New Mexico.

21. *Cyperus ferox* Vahl. Coarse Cyperus. (Fig. 563.)

*Cyperus ferox* Vahl, Enum. 2: 357. 1806.

Annual, closely related to the preceding species, but with smooth-margined, shorter and broader leaves, those of the involucres sometimes but little exceeding the inflorescence. Umbel simple or somewhat compound, often compact, the rays mostly short; spikelets linear, suberete, 10-20-flowered, 8’-12’ long, about 1” thick, falling away from the axis at maturity; scales ovate-oblong, appressed, imbricated, obtuse, rather firm, green and 7-9 nerved on the back, yellowish on the sides; stamens 3; style 3-cleft; rachis broadly winged; achene 3-angled, narrowly obovoid, obtuse.

In wet soil, Missouri to California and widely distributed in tropical America. Aug.-Oct.
22. *Cyperus Engelmanni* Steud. Engelmann’s Cyperus. (Fig. 564.)


Annual, culms slender, 6'-2½' tall. Leaves elongated, 2"-3' wide, flaccid, roughish on the margins, those of the involucre 4-6, the longer exceeding the umbel; umbel often compound, the raylets very short; spikelets often densely crowded, very narrowly linear, subterete, 6"-12" long, 5-15-flowered; rachis narrowly winged; scales greenish-brown, oblong, obtuse, thin, faintly 3-5-nerved on the back, distant, the successive ones on each side of the spikelet separated by a space of about one-half their length; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, two-thirds as long as the scale.

In wet soil, Massachusetts to southern Ontario and Wisconsin, south to New Jersey and Missouri. Aug.–Oct.

23. *Cyperus strigosus* L. Straw-colored Cyperus. (Fig. 565.)

*Cyperus strigosus* L. Sp. Pl. 47. 1753.

Perennial by basal tuber-like corms, culm rather stout, 1½-3½' tall. Leaves somewhat rough-margined, 2½'-3' wide, the longer ones of the involucre much exceeding the umbel; umbel several-rayed, compound or nearly simple, some of the primary rays often 4'-6' long, their sheaths terminating in 2 bristles; involucels setaceous; heads oblong or ovoid; spikelets flat, linear, 4'-9' long, 1½' wide or less, 7-15-flowered, separating from the axis at maturity; scales straw-colored, oblong-lanceolate, subacute, strongly several-nerved, appressed or at length somewhat spreading; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, acute, about one-third as long as the scale.

In moist meadows, swamps or along streams, Maine and Ontario to Minnesota, south to Florida and Texas. Aug.–Oct.

Among the numerous forms of this species the following may be defined as varieties:

*Cyperus strigosus capitatus* Boeckl. Linnæa, 36: 347. 1869-70. Umbel simple or nearly so; spikelets 4'-7' long, densely capitate in subglobose heads. Range of the type.


*Cyperus strigosus robustior* Kunth, Enum. 2: 88. 1837. Umbel compound; spikelets 8'-12' long, 10-25-flowered. Range of the type.
24. **Cyperus refractus** Engelm. Reflected Cyperus. (Fig. 566.)


Perennial by tuber-like corms, culm stout, smooth, 1°-3° tall. Leaves 2½"-4" wide, rough-margined, crenated; umbel 6-13-rayed, usually compound, the longer rays sometimes 8' long, their sheaths terminating in 1 or 2 short teeth; involucels setaceous; raylets filiform; spikelets very narrowly linear, loosely spicate, acute, flattish, 5'/-12' long, ½" thick, 3-6-flowered, the upper spreading, the lower reflexed; scales yellowish-green, oblong-lanceolate, obtuse, closely appressed, 9-11-nerved, thin; stamens 3; style 3-cleft, its branches much exserted; achene narrowly linear, obtuse, apiculate, about 5 times as long as thick, and one-half as long as the scale.

In dry fields, New Jersey to North Carolina and Missouri. July-Sept.

25. **Cyperus retrofractus** (L.) Torr. Rough Cyperus. (Fig. 567.)

*Scirpus retrofractus* L. Sp. Pl. 50. 1753.

*Cyperus retrofractus* Torr.; A. Gray, Man. 519. 1848.

Perennial by tuber-like corms, culm slender, rough-puberulent, at least above, mostly longer than the puberulent leaves, 1°-3° tall. Leaves 1½"-2½" wide, those of the involucre 4-7, the longer not greatly exceeding the umbel, sometimes shorter; umbel simple; rays very slender, nearly erect, or spreading, 2'-6' long, their sheaths 2-toothed; heads oblong or obovoid; spikelets linear-subulate, 3'/-6' long, about ½" thick, 1-2-flowered, all soon strongly reflexed, separating from the axis at maturity; flowering scales lanceolate, acute, the upper one subulate, all strongly several-nerved; stamens 3; style 3-cleft; achene linear, 3-angled, obtuse, apiculate, two-thirds as long as the scale.

In dry, sandy soil, southern New Jersey to Florida, west to Kentucky, Arkansas and Texas. July-Sept.

26. **Cyperus Lancastriensis** Porter. Lancaster Cyperus. (Fig. 568.)

*Cyperus Lancastriensis* Porter; A. Gray, Man. Ed. 5. 555. 1867.

Perennial by ovoid or oblong corms, culm slender, smooth, mostly longer than the leaves, 1°-2½° tall. Leaves 2'-3' wide, those of the involucre 4-7, the longer much exceeding the inflorescence; umbel simple, 5-9-rayed, the longer rays 2'-4' long, their sheaths nearly truncate; heads oval, obtuse, ½'-1' long; spikelets densely clustered, 4'-5' long, linear, subterete, 2-4-flowered, the lower reflexed, the middle ones spreading, all separating from the axis at maturity; scales green, strongly several-nerved, the flowering ones lanceolate, subacute; stamens 3; style 3-cleft; achene linear, obtuse, apiculate, 2-3 times as long as thick, two-thirds as long as the scale.

27. Cyperus cylindricus (Ell.) Britton. Pine-barren Cyperus. (Fig. 569.)


_**Cyperus filiculmis**_ Vahl. Slender Cyperus. (Fig. 571.)


_Perennial by small hard corms, culms slender, smooth, usually tufted, 4'-18' tall, longer than the leaves. Leaves smooth, 1'/'-1'/2'' wide, the longer ones of the involucre much exceeding the umbel; umbel simple, several-rayed, the rays short, or the longer 1'/2'-'2' long, the sheaths 2-toothed; heads very dense, cylindric, 1/2'-1/2'' long, 2''-4'' in diameter; spikelets 1'/2''-2'' long, flatish, 1-2-flowered, spreading or the lower reflexed; scales green, oblong; rachis winged; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, apiculate, slightly more than one-half as long as the scale.

In sandy pine barrens and on the sea shore, southern New York to Florida, west to Texas, mostly near the coast. July–Sept.

28. Cyperus ovularis (Michx.) Torr. Globose Cyperus. (Fig. 570.)


_Perennial by hard tuber-like corms, stem usually strict, smooth, 8'-2'-1'/2'' tall, longer than the leaves. Leaves smooth, 2''-3'' wide, the longer ones of the involucre much exceeding the umbel; umbel simple, few-rayed, the rays rarely more than 2'/2'' long; sheath of the rays truncate or slightly toothed; heads globose or sometimes a little longer than thick, 4'/''-7'' in diameter, very dense, the spikelets radiating in all directions; spikelets 2''-3'/2'' long, usually 3-flowered, separating from the axis and leaving a scar at maturity; rachis winged; scales ovate or ovate-lanceolate, obtuse or subacute, green, strongly several-nerved; stamens 3; style 3-cleft; achene linear-oblong, 3-angled, 2-3 times as long as thick.

In dry fields and on hills, southern New York to Florida, west to Illinois, Kansas and Texas. July–Sept.

29. Cyperus filiculmis Vahl. Slender Cyperus. (Fig. 571.)


_Perennial by hard oblong corms, culm smooth, slender or almost filiform, ascending or reclined, 6'-18' long, usually longer than the rough-margined leaves. Leaves 1'-2'' wide, keeled, those of the involucre, or some of them, much exceeding the inflorescence; spikelets densely clustered in 1-7 globose heads, linear, acute, 5-11-flowered, subterete or compressed, 2'/2''-6'' long, 1'' wide or less, tardily falling away from the axis at maturity; rachis wingless; scales ovate, acute or obtuse, pale green, strongly 7-11-nerved, appressed; stamens 3; style 3-cleft; achene oblong or obovoid, 3-angled, obtuse, apiculate, dull gray, two-thirds as long as the scale, about twice as long as thick.

In dry fields and on hills, Rhode Island to Ontario and Minnesota, south to Florida, Kansas, Texas and northern Mexico. June–Aug.
30. Cyperus Houghtoni Torr. Houghton's Cyperus. (Fig. 572.)


Perennial by tuber-like corms, culms very slender, smooth, erect, 1'-2' tall. Leaves shorter than the culm, 1' wide or less, smooth, those of involucre 3-5, the longer much exceeding the umbel; umbel simple, 1-5-rayed, the rays mostly short, their sheaths 2-toothed; spikelets loosely capitulate, linear, compressed, acute, 4'/5'-8' long, about 1' wide, 11-15-flowered, falling away from the axis when mature; scales chestnut brown, firm, somewhat spreading, shining, oblong, obtuse, truncate or apiculate, strongly about 11-nerved; rachis very narrowly winged; stamens 3; style 3-cleft; achene broadly oblong, less than twice as long as thick, 3-angled, brown, apiculate, nearly as long as the scale.

In sandy soil, Massachusetts to Minnesota, Kansas and Oregon. July-Aug.


Perennial by thick hard oblong or ovoid corms, culms tufted, ascending or reclined, stiff, smooth, very slender, 6'-20' long. Leaves shorter than the culm, bright green, 1' wide or less, those of the involucre 4-8, the longer somewhat exceeding the umbel; umbel 4-10-rayed, simple, the longer rays 3'-4' long; sheaths of the rays truncate or nearly so; spikelets 2'/3'-5' long, loosely capitulate, compressed, linear, rigid, spreading; scales green, ovate, obtuse or subacute, strongly 13-15-nerved, rather widely spreading when old; joints of the rachis broadly winged; stamens 3; style 3-cleft; achene oblong or oblong-obovoid, obtuse, apiculate, about two-thirds as long as the scale.

In sands of the sea shore and in pine barrens, Massachusetts to Florida. July-Sept.

32. Cyperus echinatus (Ell.) Wood. Baldwin's Cyperus. (Fig. 574.)


Perennial by tuber-like corms, culm slender, smooth, erect, mostly longer than the leaves. Leaves pale green, 1'/2'-2' wide, those of the involucre 5-10, the longer usually much exceeding the umbel; umbel simple, 6-13-rayed; the rays filiform, their sheaths short, mucronate; spikelets 1'/3'-3' long, linear, flat, densely or loosely capitulate in globose heads; scales thic, pale green, appressed, ovate-lanceolate, acute, 9-13-nerved, with narrow scarious margins; joints of the rachis broadly winged; stamens 3; style 3-cleft; achene oblong-obovoid, obtuse, one-half as long as the scale, about twice as long as thick.

In dry soil, sometimes a weed in cultivated fields, North Carolina to Florida, west to Missouri and Texas. July-Aug.

Annual or perennial sedges, with slender triangular culms, leafy below, and with 2 or more leaves at the summit forming an involucre to the strictly sessile, simple or compound dense head of spikelets. Spikelets numerous, compressed, falling away from the axis of the head at maturity, consisting of only 3 or 4 scales, the 1 or 2 lower ones small and empty, the middle one fertile, the upper empty or staminate. Joints of the rachis wingless or narrowly winged. Scales 2-ranked, keeled. Perianth none. Stamens 1–3. Style 2–3-cleft, deciduous from the summit of the achene. Achene lenticular or 3-angled. [In honor of Peter Kylling, a Danish botanist of the seventeenth century.]

About 20 species, natives of tropical and temperate regions. Besides the following, 2 others occur in the southern United States.

1. **Kyllinga pumila** Michx. Low Kyllinga. (Fig. 575.)


Annual, culms densely tufted, filiform, erect or reclined, 2–15’ long, mostly longer than the leaves. Leaves light green, roughish on the margins, usually less than 1” wide, those of the involucre 3–5, elongated, spreading or reflexed; head oblong or ovoid-oblong, 3’–4’ long, simple or commonly with 1 or 2 smaller ones at the base; spikelets about 1½’ long, flat, 1-flowered, the 2 empty lower scales more or less persistent on the rachis after the fall of the rest of the spikelet; scales ovate, acuminate or acute, thin, about 7-nerved; stamens 2; style 2-cleft; achene lenticular, obtuse.

In moist or wet soil, Virginia to Florida, west to Illinois, Missouri, Texas and Mexico. Aug.–Sept.


A tall perennial sedge, with terete hollow jointed culms, leafy to the top, the lower leaves reduced to sheaths. Spikes axillary, peduncled, simple or compound. Spikelets 2-ranked, flat, linear, falling away from the axis at maturity (?) many-flowered. Scales 2-ranked, carinate, conduplicate, decurrent on the joint below. Flowers perfect. Perianth of 6–9 retrorsely barbed bristles. Stamens 3. Style 2-cleft at the summit, persistent as a beak on the summit of the achene. Achene linear-oblong. [Name said to be from *Dulichium*, a Latin name for some sedge.]

A monotypic genus of eastern North America.

1. **Dulichium arundinaceum** (L.)
   Britton. Dulichium. (Fig. 576.)

*Cyperus arundinaceus* L. Sp. Pl. 44. 1753.
*Cyperus spathaceus* L. Syst. Ed. 12, 2: 735. 1767.

Culm stout, 1°–3° tall, erect. Leaves numerous, flat, 1’–3’ long, 2’–4’ wide, spreading or ascending, the lower sheaths bladeless, brown toward their summits. Spikes shorter than or the uppermost exceeding the leaves; peduncles 2’–12’ long; spikelets narrowly linear, spreading, 6’–12’ long, about 1’ wide, 6–12-flowered; scales lanceolate, acuminate, strongly several-nerved, appressed, brownish; bristles of the perianth rigid, longer than the achene; style long-exserted, persistent.

In wet places, Nova Scotia to Ontario and Minnesota, south to Florida and Texas. Aug.–Oct.

Annual or perennial sedges. Culms simple, triangular, quadrate, terete, flattened or grooved, the leaves reduced to sheaths or the lowest very rarely blade-bearing. Spikelets solitary, terminal, erect, several—many-flowered, not subtended by an involucr. Scales con-cave, spirally imbricated all around. Perianth of 1-12 bristles, usually retrorsely barbed, wanting in some species. Stameus 2-3. Style 2-cleft and achene lenticular or biconvex, or 3-cleft and achene 3-angled, but sometimes with very obtuse angles and appearing turgescent. Base of the style persistent on the summit of the achene, forming a terminal tubercle. [Greek, referring to most of the species in marshy ground.]

About 100 species, widely distributed. Besides the following, some 15 others occur in the southern and western parts of North America. Spikelet scarcely or not at all thicker than the culm.

Culm stout; spikelet many-flowered.
Culm quadrate, continuous. 3. *E. Robbinsii.*
Culm slender, triangular, continuous; spikelet few-flowered, subulate. Spikelet manifestly thicker than the culm.

Style mostly 2-cleft; achene lenticular or biconvex.

Upper sheath scarious, hyaline; plants perennial by slender rootstocks.

Scales pale green or nearly white; achene 1/4" long. 4. *E. ochreata.*
Scales dark reddish-brown; achene 1/2" long. 5. *E. olivacea.*

Upper sheath truncate, oblique or toothed, not scarious. Annual, with fibrous roots.

Achene jet black.
Culms 1-3" tall; achene 1/4" long; bristles 2-4. 6. *E. atropurpurea.*

Culms 3'-10" tall; achene 1/2" long; bristles 3-8.

Achene pale brown.

Spikelet ovoid or oblong; tubercle deltoid, acute. 7. *E. capillata.*

Spikelet oblong-cylindric; tubercle broad, low. 8. *E. ovata.*

Perennial by horizontal rootstocks.

Style 3-cleft; achene 3-angled or turgescent.

Achene reticulated or cancellate.
Achene smooth or papillose.
Achene smooth, white; culms capillary.

Spikelet compressed; culm filiform.

Achene reticulated; culm slender.

Achene smooth; culm capillary.

Spikelet terete; culm slender.

Achene papillose or smooth; brown, black or yellow.

Spikelet ovoid-conic, acute, contracted at the base.

Tubercle depressed or short-conic.

Spikelet ovoid, conic, acute.

Achene papillose.

Tubercle flat, covering the top of the black achene. 16. *E. melanocarpa.*

Tubercle flat, covering the top of the black achene. 17. *E. atibida.*

Achene papillose.

Achene ribbed on the angles.

Achene obtuse-angled, not ribbed. 18. *E. tricosata.*

Culm filiform; scales obtuse. 19. *E. tenus.*

Culm flat; scales acute. 20. *E. acuminata.*

Achene smooth or papillose on the angles.

Tubercle subulate or narrowly pyramidal.

Tubercle filiform, wavy, densely tufted, 3'-10' long. 21. *E. intermedia.*

Culms flattened, slender, 1'-2" long. 22. *E. rostellata.*

1. **Eleocharis interstincta** (Vahl) R. & S. Knotted Spike-rush. (Fig. 577.)


Perennial by stout rootstocks, culms terete, hollow, nodose, papillose, 1'-2" tall, the sterile ones sharp-pointed. Sheaths oblique, membranous, brown or green, the lower sometimes bearing short blades; spikelet terete, cylindric, many-flowered, subacute, 1'-1'/2" long, 2" in diameter, not thicker than the culm; scales ovate, orbicular or obovate, obtuse or the upper acute, narrowly scarious-margined, faintly many-nerved, persistent; bristles about 6, rigid, retrorsely barbed, as long as the body of the achene or shorter; stamens 3; style 3-cleft, exserted; achene obovoid, brown, shining, with minute transverse ridges, convex on one side, very obtusely angled on the other, 3 or 3 times as long as the conic acute black broad-based tubercle.

In water, Massachusetts to Michigan, the West Indies and Mexico. July-Sept.
2. Eleocharis mutata (L.) R. & S. Quadrangular Spike-rush. (Fig. 578.)

*Scirpus mutatus* L. Am. Acad. 5: 391. 1760.


Perennial by stout rootstocks, culms sharply 4-angled, stout, not nodose, papillose, 2°-4° tall. Sheaths purplish-brown or green, membranous, sometimes bearing short blades; spikelet terete, acute, cylindrical, 1'-2' long, 2'' in diameter, many-flowered, about as thick as the culm; scales coriaceous, broadly ovate or obovate, obtuse or the upper subacute, scarious-margined and sometimes with a narrow brown band within the margins, faintly many-nerved, persistent; bristles about 6, rigid, retrorsely barbed, about as long as the achene; stamens 3; style 3-cleft; achene obovoid, biconvex or slightly angled on the back, minutely cancellate, about twice as long as the conic acute tubercle, which is truncate or contracted at the base.

In ponds, streams and swamps, northern New Jersey to Michigan, south to Alabama, Missouri, Texas and Guatemala. Also in the West Indies and South America. July-Sept.

3. Eleocharis Robbinsii Oakes. Robbins' Spike-rush. (Fig. 579.)

*Eleocharis Robbinsii* Oakes, Hovey's Mag. 7: 178. 1841.

Perennial by slender rootstocks, culms slender, 3-angled, continuous, 6'-2° long, sometimes producing numerous filiform flaccid sterile branches from the base. Sheaths appressed, obliquely truncate; spikelet subulate, few-flowered, not thicker than the culm, 6''-10'' long, 1'' in diameter; scales lanceolate or oblong-lanceolate, obtuse or subacute, strongly concave, faintly several-nerved, persistently clasping the rachis, narrowly scarious-marginated; style 3-cleft; bristles 6, equaling the achene and tubercle, retrorsely barbed; achene obovoid, light brown, biconvex or very obtusely angled on the back, somewhat longer than the conic-subulate flattened tubercle, which has a raised ring around its base.

In shallow water, New Brunswick to Michigan, south to Florida. Aug.-Sept.

4. Eleocharis ochreata (Nees) Steud. Pale Spike-rush. (Fig. 580.)

*Eleogenus ochreatus* Nees in Mart. Fl. Bras. 2: Part 1, 102. 1842.


Perennial by very slender rootstocks, culms very slender, or filiform, erect, pale green, 3-angled, 2''-10'' tall. Upper sheath with a white, hyaline, scarious limb; spikelet oblong or ovoid, subacute, 2-3 times as thick as the culm, about 2'' long, 1 1/2'' in diameter, several-flowered; scales pale green, oblong-lanceolate, obtuse or the upper acute, thin, hyaline with a faint midvein; style 2-cleft; bristles about 6, slender, retrorsely barbed, somewhat longer than the achene; achene 3/4'' long, lenticular, obovate, smooth, brown, 2-4 times as long as the conic acute tubercle, which is often constricted at the base.

In wet soil, southern Virginia to Florida and Mississippi. Also in Wyoming and Montana and in tropical America. Aug.-Sept.
5. **Eleocharis olivacea** Torr.  
Bright green Spike-rush.  (Fig. 581.)


Perennial by running rootstocks, often tufted and matted, culms very slender, bright green, erect or reclining; flattened, 1-4' long. Upper sheath with a white hyaline limb; spikelet ovoid, acute or obtuse, much thicker than the culm, several-many-flowered, about 2" long, 1" in diameter; scales ovate, thin, acute, reddish-brown, with a green midvein and narrow, scarious margins; stamens 3; style 2-cleft; bristles 6-8, slender, retrorsely barbed, longer than the achene and tubercle; achene obovoid, similar to that of the preceding species but twice as large, 3-4 times the length of the conic acute tubercle.

In wet soil, Maine to southern Ontario and Pennsylvan ia, south to South Carolina, mostly near the coast.  Aug.-Sept.

6. **Eleocharis atropurpurea** (Retz) Kunth.  
Purple Spike-rush.  (Fig. 582.)

*Scirpus atropurpureus* Retz, Obs. 5: 14. 1789.

*Eleocharis atropurpurea* Kunth, Enum. 2: 151. 1837.

Annual, roots fibrous, culms tufted, very slender, 1-3½' high. Upper sheath 1-toothed; spikelet ovoid, many-flowered, subacute, 1½"-2" long, 1" in diameter or less; scales minute, ovate-oblong, obtuse or the upper acute, persistent, purple-brown with green midvein and very narrow scarious margins; stamens 2 or 3; style 2-3-cleft; bristles 2-4, fragile, white, minutely downwardly hispid, about as long as the achene; achene jet black, shining, ½" long, smooth, lenticular; tubercle conic, minute, depressed but rather acute, constricted at the base.

In moist soil, Nebraska and eastern Colorado to Central America, east to Florida; widely distributed in tropical America.  July-Sept.

7. **Eleocharis capitata** (L.) R. Br.  
Capitate Spike-rush.  (Fig. 583.)

*Scirpus capitatus* L. Sp. Pl. 48. 1753.


Annual, roots fibrous, culms densely tufted, nearly terete, almost filiform, rather stiff, 2'-10' tall. Upper sheath 1-toothed; spikelet ovoid, obtuse, much thicker than the culm, 1½"-2½" long, 1½"-1½" thick, many-flowered; scales broadly ovate, obtuse, firm, pale or dark brown with a greenish midvein, narrowly scarious-margined, persistent; stamens mostly 2; style 2-cleft; bristles 5-8, slender, downwardly hispid, as long as the achene; achene obovate, jet black, smooth, shining, nearly ½" long; tubercle depressed, apiculate, constricted at the base, very much shorter than the achene.

In moist soil, Maryland to Florida, west to Indiana and Texas. Widely distributed in tropical regions.  July-Sept.
8. Eleocharis ovata (Roth) R. & S. Ovoid Spike-rush. (Fig. 584.)

Eleocharis ovata R. & S. Syst. 2: 152. 1817.

Annual, roots fibrous, culms tufted, slender or filiform, rather deep green, nearly terete, mostly erect, 2'-16' tall. Upper sheath 1-toothed; spikelet ovoid or oblong, obtuse, many-flowered, 2'/-5' long, 1'/-11/2' in diameter; scales thin, oblong-ovate, brown, rather scarious margins; bristles 6-8 (sometimes fewer or wanting), deciduous, usually longer than the achene; stamens 2 or 3; spikelet oblong-cylindric or ovoid-cylindric, obtuse or subacute, 2'/-3'/ long, 1'/-11/2' in diameter, many-flowered; scales ovate brown with a green midvein and narrow scarious margins, ovate, obtuse, deciduous; bristles about 6, not longer than the achene; achene broadly obovate, brown, smooth, lenticular; tubercle broad, covering the top of the achene, less than one-fourth its length.

In wet soil. New Brunswick to Ontario and British Columbia, south to Florida, Oregon, Nebraska and Texas. Also in Europe. July-Sept.

9. Eleocharis Engelmání Steud. Engelmann’s Spike-rush. (Fig. 585.)


Annual, similar to the preceding species, but culms commonly taller, sometimes 18' high. Upper sheath obliquely truncate or 1-toothed; spikelet ovoid-cylindric or ovoid-cylindric, obtuse or subacute, 2'/-3'/ long, 1'/-11/2' in diameter, many-flowered; scales brown with a green midvein and narrow scarious margins, ovate, obtuse, deciduous; bristles about 6, not longer than the achene; achene broadly obovate, brown, smooth, lenticular; tubercle broad, covering the top of the achene, less than one-fourth its length.

In wet soil. Massachusetts to southern New Jersey, west to Indiana, Arkansas, Texas and California. July-Sept.

10. Eleocharis palûstris (L.) R. & S. Creeping Spike-rush. (Fig. 586.)

Scirpus palustris L. Sp. Pl. 47. 1753.
Eleocharis palustris R. & S. Syst. 2: 151. 1817.
Eleocharis palustris var. virgins Bailey, Britton, Journ. N. Y. Micros. Soc. 5: 104. 1889.

Perennial by horizontal rootstocks, culms stout, terete or somewhat compressed, striate, 1'-5' tall. Basal sheaths brown, rarely bearing a short blade, the upper one obliquely truncate; spikelet ovoid-cylindric, 3'/-12' long, 1'/-2' in diameter, many-flowered, thicker than the culm; scales ovate-oblong or ovate-lanceolate, purplish-brown with scarious margin and a green midvein, or pale green all over; bristles usually 4, slender, retrorsely barbed, longer than the achene and tubercle, sometimes wanting; stamens 2-3; style 2-3-cleft; achene lenticular, smooth, yellow, over 3/2' long; tubercle conic-triangular, constricted at the base, flattened, one-fourth to one-half as long as the achene.

In ponds, swamps and marshes, Labrador to British Columbia, south to Florida, Texas and California. Also in Europe and Asia. Aug.-Sept.
Eleocharis palustris glaucescens (Willd.) A. Gray, Man. Ed. 5. 558. 1867.

Scirpus glaucescens Willd. Enum. 76. 1809.

Culms slender or nearly filiform, 8'-18' tall; spikelet oblong, 2'-5' long; achene smaller; tubercle narrower. In wet meadows and marshes, range nearly of the type in North America. Perhaps a distinct species.

The so-called variety calva is a form without bristles.


Culms stout, 6'-10' tall; spike ovoid; scales dark purple-brown. Labrador and Prince Edward Island to Hudson Bay.

11. Eleocharis acicularis (L.) R. & S. Needle Spike-rush. (Fig. 587.)


Perennial by filiform stolons or rootstocks, culms tufted, finely filiform or setaceous, obscurely 4-angled and grooved, weak, erect or reclining, 2'-8' long. Sheaths truncate; spikelet compressed, narrowly ovate or linear-oblong, acute, broader than the culm, 3-10-flowered, 1½'-3' long, ½' wide; scales oblong, obtuse or the upper subacute, thin, pale green, usually with a narrow brown band on each side of the midvein, deciduous, many of them commonly sterile; bristles 3-4, fragile, fugacious, shorter than the achene; stamens 3; style 3-cleft; achene obovoid-oblong, pale, obscurely 3-angled with a rib on each angle and 6-9 lower intermediate ribs connected by fine ridges; tubercle conic, acute, one-fourth as long as the achene.

In wet soil, throughout North America, except the extreme north. Also in Europe and Asia. Sometimes entirely sterile. July-Sept.

12. Eleocharis Wölfi A. Gray. Wolf's Spike-rush. (Fig. 588.)


Eleocharis Wölfi A. Gray; Britton, Journ. N. Y. Micros. Soc. 5: 105. 1889.

Perennial by short rootstocks, culms very slender, erect, flattened and 2-edged, 8'-18' tall. Upper sheath oblique, scarious, hyaline-tipped; spikelet oblong or ovoid-oblong, terete, acute, thicker than the culm, 2'-3'' long, nearly 1'' in diameter; scales ovate, obtuse or the upper acute, thin, pale green with purplish-brown bands, tardily deciduous; bristles none (or perhaps early deciduous); style 3-cleft; achene obovoid, obscurely 3-angled, longitudinally 9-ribbed, the ribs transversely connected by minute ridges; tubercle depressed-conic, much shorter than the achene.

13. **Eleocharis tortilis** (Link) Schultes. Twisted Spike-rush. (Fig. 589.)

*Scirpus tortilis* Link, Jahrb. 3: 78. 1820.
*Eleocharis tortilis* Schultes, Mant. 2: 92. 1824.

Annual, roots fibrous, culms tufted, filiform, sharply 3-angled, pale green, erect or reclining, twisting when old, 1\(^{\circ}\)–1\(\frac{1}{2}\)\(^{\circ}\) long. Sheaths obliquely truncate, 1-toothed; spikelet ovoid or oblong, subacute, several-flowered, 2\('\)–3\('\) long, about 1\('\) thick, much thicker than the culm; scales firm, pale, ovate, mostly obtuse; bristles 4–6, rigid, retrorsely barbed, about equalling the achene and tubercle; stamens 3; style 3-cleft; achene obovoid, obscurely 3-angled, strongly reticulated, longitudinally about 18-ribbed; tubercle cap-like or conic, truncate at the base, one-fourth to one-half as long as the achene.

In wet soil, Delaware to Florida and Texas, near the coast. July–Sept.

14. **Eleocharis tuberculosa** (Michx.) R. & S. Large-tubercled Spike-rush. (Fig. 590.)

*Eleocharis tuberculosa* R. & S. Syst. 2: 152. 1817.

Annual, culms tufted, slightly compressed, very slender, rather stiff, striate, bright green, 8\('\)–2\(\circ\) tall. Upper sheath obliquely truncate or 1-toothed; spikelet ovoid, obtuse or subacute, many-flowered, 3\('\)–5\('\) long, nearly 2\('\) in diameter; scales broadly ovate, obtuse, pale greenish-brown with a darker midvein, broadly scarious-margined, firm, tardily deciduous; bristles 6, rigid, downwardly or rarely upwardly barbed, about as long as the achene and tubercle; stamens 3; style 3-cleft; achene obovoid, pale, trigonous, strongly reticulated, longitudinally about 18-ribbed; tubercle cap-like or conic, nearly or quite as large as the achene.

In wet soil, Massachusetts to Florida and Texas, near the coast. July–Sept.

15. **Eleocharis microcarpa** Torr. Small-fruited Spike-rush. (Fig. 591.)


Annual, culms finely filiform, densely tufted, somewhat 4-sided, erect or reclining, often proliferous by developing secondary culms in the axils of the spikelet, sometimes rooting at the summit, 2\('\)–8\('\) long. Upper sheath obliquely truncate; spikelet oblong, subacute, terete or nearly so, much thicker than the culm, many-flowered, 1\(\frac{1}{2}\)\('\)–2\(\frac{1}{2}\)\('\) long; scales ovate, acute, brownish-red with a green midvein and lighter margins, early deciduous except the lowest which is commonly larger than the others, persistent and bract-like; bristles 3–6, slender, shorter than or equalling the achene; stamens 3; style 3-cleft; achene white, 3-angled, obovoid, smooth, minute; tubercle conic-pyramidal, much shorter than the achene.

In wet sandy soil, southern New Jersey to Florida and Texas, mostly near the coast. Also in Cuba. June–Aug.
16. Eleocharis melanocarpa Torr. Black-fruited Spike-rush. (Fig. 592.)


Perennial by short rootstocks, culms flattened, striate, tufted, slender, erect, wiry, 10'-20' tall. Upper sheath truncate, 1-toothed; spikelet oblong or cylindrical-oblong, obtuse, 3'-6' long, 1½'-2' in diameter, many-flowered, thicker than the culm; scales ovate, obtuse, brown, with a lighter midvein and scarious margins; bristles 3-4, fragile, downwardly hispid, equaling or longer than the achene, fugacious or perhaps sometimes wanting; stamens 3; style 3-cleft; achene 3-angled, obpyramidal, black, smooth, its superficial cells nearly quadrate; tubercle depressed, covering the summit of the achene, light brown, pointed in the middle.

In wet sandy soil, eastern Massachusetts and Rhode Island to Florida, near the coast. Also in northern Indiana. July-Sept.

17. Eleocharis albida Torr. White Spike-rush. (Fig. 593.)


Annual, roots fibrous, culms very slender, tufted, nearly terete, striate, erect, 4'-8' tall. Upper sheath very oblique and toothed on one side; spikelet ovoid-globose or oblong, obtuse, 2'-4' long, 1½'-2' in diameter, many-flowered, thicker than the culm; scales pale green or nearly white, rather firm, ovate, obtuse, deciduous; bristles about 6, downwardly barbed, persistent, as long as the achene; stamens 3; style 3-cleft; achene broadly obovoid, nearly black when ripe, 3-angled, smooth; tubercle ovoid-conic, contracted or truncate at the base, about one-fourth as long as the achene.

In wet soil, Maryland to Florida, Texas and eastern Mexico, near the coast. June-Aug.

18. Eleocharis tricostata Torr. Three-ribbed Spike-rush. (Fig. 594.)


Perennial by short rootstocks, culms very slender, erect, compressed, striate, 1'-2' tall. Upper sheath obliquely truncate, toothed on one side; spikelet oblong, becoming oblong-cylindric, obtuse, many-flowered, 5'-9' long, 1½'-1½' in diameter; scales ovate, thin, deciduous, obtuse, brown with a green midvein and scarious margins; bristles none; stamens 3; style 3-cleft; achene obovoid, 3-angled, brown, dull, papillose, strongly ribbed on each of its angles; tubercle conic, acute, light brown, constricted at the base, minute, very much shorter than the achene.

In wet soil, southern New York to Florida. July-Sept.
19. Eleocharis tenuis (Willd.) Schultes. Slender Spike-rush. (Fig. 595.)

_Scirpus tenuis_ Willd. Enum. 1: 76. 1809.
_Eleocharis tenuis_ Schultes, Mant. 2: 92. 1824.

Perennial by rootstocks, culms tufted, filiform, mostly erect, 4'-16' tall. Upper sheath obliquely truncate, toothed on one side; spikelet narrowly oblong, mostly acute, many-flowered, thicker than the culm, 3'-5' long, about 1' in diameter; scales thin, obovate or ovate-oblong, obtuse, the midvein greenish, the margins scarious; bristles 2-4, shorter than the achene, fugacious or wanting; achene obovoid, obtusely 3-angled, yellowish-brown, papillose; stamens 3; style 3-cleft; tubercle conic, short, acute.

In wet soil, Cape Breton Island to Ontario and Manitoba, south to Florida and Texas. The achenes are more or less persistent on the rachis of the spikelet after the fall of the scales. May-July.

20. Eleocharis acuminata (Muhl.) Nees. Flat-stemmed Spike-rush. (Fig. 596.)

_Scirpus acuminatus_ Muhl. Gram. 27. 1817.
_Eleocharis acuminata_ Nees, Linnaea, 9: 294. 1835.

Perennial by stout rootstocks, similar to the preceding species but stouter, culms flattened, striate, slender but rather stiff, tufted, 8'-20' tall. Upper sheath truncate, sometimes slightly 1-toothed; spikelet ovoid or oblong, obtuse, thicker than the culm, many-flowered, 3'-6' long; scales oblong or ovate-lanceolate, acute or the lower obtusish, purple-brown with a greenish midvein and hyaline white margins, deciduous; bristles 1-5, shorter than or equaling the achene, fugacious, or wanting; stamens 3; style 3-cleft, exserted; achene obovoid, very obtusely 3-angled, light yellowish brown, papillose, much longer than the depressed-conic acute tubercle.

In wet soil, Anticosti to Manitoba, south to Georgia, Louisiana and Missouri. Achenes persistent on the rachis as in _E. tenuis_. June-Aug.

21. Eleocharis intermedia (Muhl.) Schultes. Matted Spike-rush. (Fig. 597.)

_Scirpus intermedius_ Muhl. Gram. 31. 1817.
_Eleocharis intermedia_ Schultes, Mant. 2: 91. 1824.

Annual, roots fibrous, culms filiform, densely tufted, diffusely reclining or ascending, usually matted, grooved, 4'-12' long. Upper sheath obliquely truncate, toothed on one side; spikelet ovoid-oblong, acute, 8-20-flowered, thicker than the culm; scales oblong-lanceolate, obtuse or the upper subacute, light purple-brown with a green midvein, tardily deciduous or the lower one persistent; bristles persistent, downwardly barbed, longer than the achene and tubercle; stamens 3; style 3-cleft; achene 3-angled, obovoid, light brown, finely reticulated; tubercle conic-subulate, very acute, slightly constricted at the base, one-fourth to one-half as long as the achene.

In marshes, Ontario to Minnesota, south to New Jersey, Ohio, Illinois and Iowa. July-Sept.

Leafy-stemmed sedges, perennial by rootstocks, the spikelets crowded in a terminal head involucrate by the upper leaves, which are often white at the base. Spikelets compressed, several—many-flowered. Scales spirally imbricated all around, several of them with imperfect flowers, or empty. Perianth none. Stamens 3. Style 2-cleft, its branches subulate. Achene leucentic, transversely rugose, crowned with the broad persistent base of the style (tubercle). [Greek, alluding to the two-colored involucral leaves.]

About 8 species, natives of America. Besides the following, another occurs in the southwestern United States.

Leaves of the involucre linear; tubercle truncate at the base.

1. D. colorata.

Leaves of the involucre lanceolate, long- acuminate; tubercle decurrent on the edges of the achene.

2. D. latifolia.

1. Dichromena colorata (L.) A. S. Hitchcock. Narrow-leaved Dichromena. (Fig. 599.)

Schoenus coloratus L. Sp. Pl. 43. 1753.


Glabrous, culm slender, erect, rather sharply triangular, 1°-2° tall. Leaves distant, narrowly linear, about 1" wide, much shorter than the culm, those of the involucre 4-6, reflexed when mature, yellowish white at the base; head globose, 6°-10° in diameter; spikelets narrowly oblong, acute; scales membranous, lanceolate, nearly white, 1-nerved, subacute at the apex; achene obovate, brown, papillose or wrinkled transversely, nearly truncate at the summit, compressed, covered by the tubercle which is not decurrent on its edges.

In moist sandy soil, pine-barrens of New Jersey to Florida and Texas. Also in tropical America. June—Sept.
2. **Dichromena latifolia** Baldw. Broad-leaved Dichromena.  
(Fig. 600.)


Similar to the preceding species but the culm stouter, obtusely triangular or nearly terete, the leaves lanceolate or linear-lanceolate, tapering gradually to a long-acuminate apex from a broad base, 1½"-4" wide, sometimes overtopping the culm, but the lowest much shorter, those of the involucre 7-10, strongly reflexed when old. Head globose, 6"-9" in diameter; spikelets oblong, subacute; scales ovate-lanceolate, nearly white, rather obtuse; achene nearly orbicular in outline, pale brown, faintly wrinkled transversely and longitudinally, so as to appear reticulated; tubercle decurrent on the margins of the achene.

In wet pine barrens, Virginia to Florida and Texas. June-Aug.


Annual sedges, with fibrous roots, slender leafy stems and ovoid or oblong, many-flowered terete spikelets in terminal and axillary, mostly compound umbels, the rays and raylets bracted at the base. Scales of the spikelets spirally imbricated all around, all fertile, deciduous. Flowers perfect. Perianth none. Stamens 1 or 2. Style 2-cleft, enlarged at the base. Achene lenticular or biconvex, smooth or transversely wrinkled, capped by the persistent base of the style (tubercle), or nearly the whole style persistent as a beak. [Greek, referring to the absence of perianth-bristles.]

About 10 species, natives of temperate and tropical America. Besides the following, another occurs in the southeastern United States.

Achene strongly wrinkled, much longer than the subacute tubercle.
Achene smooth or but little wrinkled; tubercle subulate.

(Fig. 601.)

*Scirpus nitens* Vahl, Enum. 2: 272. 1806.


Glabrous, culms tufted, slightly angled, 3'-15' tall. Leaves narrowly linear, about 1½ wide, smooth, sometimes overtopping the culm, sheathing at the base, the midvein prominent; umbels mostly loose; spikelets ovoid, 2½'-3½' long, rather less than 1" in diameter; scales brown, broadly ovate, thin, 1-nerved, obtuse, acute or apiculate; achene lenticular, nearly orbicular, light brown, strongly wrinkled transversely; tubercle shorter than the achene, subacute, 2-lobed at the base.

In wet soil, Long Island, N. Y., and Delaware to Florida and Texas, near the coast. July-Oct.
2. **Psilocarya scirpoides** Torr. Long-beaked Bald-rush. (Fig. 602.)


*Rhynchospora scirpoides* A. Gray, Man. Ed. 5. 568. 1867.

Similar to the preceding species and perhaps not specifically distinct. Umbels commonly more numerous; spikelets oblong or ovoid-oblong; achene nearly orbicular in outline, biconvex, not as flat as that of *P. nitens*, dark brown, faintly transversely wrinkled or smooth, sometimes longitudinally striate, slightly contracted at the base into a short stipe; tubercle subulate, as long as or sometimes longer than the achene, its base decurrent on the edges.

In wet soil, eastern Massachusetts and Rhode Island. July-Sept.


Mostly annual sedges, with slender erect culms, leafy below, the leaves narrowly linear or filiform, with ciliate or pubescent sheaths. Spikelets umbellate, capitulate or solitary, subtended by a 1-several-leaved involucre, their scales spirally imbricated all around, mostly deciduous. Flowers perfect. Perianth none. Stamens 2 or 3. Style 2-3-cleft, glabrous, its base much swollen and persistent as a tubercle on the achene as in *Eleocharis*. Achene 3-angled, turgid or lenticular. [Greek, referring to the narrow leaves.]

A genus of some 20 species, natives of temperate and warm regions. Besides the following, 5 others occur in the southern United States.

1. **Stenophyllus capillaris** (L.) Britton. Hair-like Stenophyllus. (Fig. 603.)

*Scirpus capillaris* L. Sp. Pl. 49. 1753.

*Fimbrisula capillaris* A. Gray, Man. 530. 1848.


Annual, roots fibrous, culms filiform, densely tufted, erect, grooved, smooth, 2′-10′ tall. Leaves filiform, roughish, much shorter than the culm, their sheaths more or less pubescent with long hairs; involucral leaves 1-3, setaceous, shorter than, or one of them exceeding the inflorescence; spikelets narrowly oblong, somewhat 4-sided, 2½′-4′ long, less than 1′ thick, several in a terminal simple or sometimes compound umbel, or in depauperate forms solitary; scales oblong, obtuse or emarginate, puberulent, dark brown with a green keel; stamens 2; style 3-cleft; achene yellow-brown, narrowed at the base, very obtuse or truncate at the summit, ¾′ long, 3-angled, transversely wrinkled; tubercle minute, depressed.

In dry or moist soil, throughout North America except the extreme north. Also in tropical America. July-Sept.

Annual or perennial sedges. Culms leafy below. Spikelets umbellate or capitate, terete, several to many-flowered, subtended by a 1-many-leaved involucre, their scales spirally imbricated all around, mostly deciduous, all fertile. Perianth none. Stamens 1–3. Style 2–3-cleft, pubescent or glabrous, its base much enlarged, falling away from the summit of the achene at maturity. Achene lenticular, biconvex, or 3-angled, reticulated, cancellate, or longitudinally ribbed or striate in our species. [Greek, in allusion to the fringed style of some species.]

A large genus, the species widely distributed in temperate and tropical regions. Besides the following, some 4 others occur in the southern and western parts of North America.

**Fimbristylis spadicea** (L.) Vahl. Stiff Fimbristylis. (Fig. 604.)


Perennial by a thickened base, glabrous, culms stiff, slender, 3-angled, wiry, 1 1/2–3' tall, usually longer than the strongly involute rigid leaves. Leaves about 1” wide when unrolled, their sheaths dark brown; leaves of the involucres 3–6, erect, the longer sometimes exceeding the usually compound umbel; umbel several-rayed, the rays nearly erect, 2”–6’ long; central spikelets of the umbels and umbellets sessile, the others pedicelled; spikelets ovoid or ovoid-cylindric, acute, 2 1/2”–6’ long, about 1” in diameter; scales oval, obovate, or orbicular, obtuse or subacute, coriaceous, glabrous, shining, dark brown with a green midvein; stamens 2; style 2-cleft; achene lenticular, obovate, brown, reticulated.

In marshes and shallow water, Virginia to Florida, near the coast. Widely distributed in tropical America. July–Sept.

2. **Fimbristylis castanea** (Michx.) Vahl. Marsh Fimbristylis. (Fig. 605.)


Perennial by a thick base, culms slender, 3-angled, 8”–6’ tall, usually exceeding the leaves. Leaves involute, less than 1” wide when unrolled, their sheaths green and more or less pubescent; leaves of the involucres 2–4, short; umbel simple or compound, the rays 1 1/2–2’ long; central spikelets sessile; spikelets oblong, obtuse or subacute, 3”–5’ long, 1 1/2”–1 1/2” in diameter; scales thin, brown with a lighter midvein, broadly oblong or nearly orbicular, dull, puberulent, obtuse or mucronate; stamens 2–3; style 2-cleft; achene obovate or oblong, biconvex, pale brown, longitudinally striate and reticulated.

On salt meadows, southern New York to Florida and Louisiana. Also in wet soil in the interior from Michigan and Illinois to Kansas and Texas, and in tropical America. July–Sept.
3. *Fimbristylis laxa* Vahl. Weak Fimbristylis. (Fig. 606.)


Annual, roots fibrous, culms slender, flattened, striate, densely tufted, erect or ascending, 2'-15' long, usually longer than the leaves. Leaves flat, about ½" wide, glabrous or sparingly ciliate, pale green and appearing glaucous, those of the involucre 3-5, one of them often exceeding the umbel; umbel simple or slightly compound, the central spikelet sessile; spikelets ovoid or ovoid-oblong, 3'-.6' long, about 1" in diameter; scales ovate, thin, pale greenish-brown, subacute or mucronulate; stamen 1; style 2-cleft, pubescent; achene biconvex, obovoid, light brown, longitudinally ribbed, the ribs tubercled and connected by very fine cross-lines.

In moist soil, southern Pennsylvania to Florida, west to Illinois, Missouri and Texas. Also in tropical America. July–Sept.

4. *Fimbristylis Vahlii* (Lam.) Link. Vahl's Fimbristylis. (Fig. 607.)

*Scirpus Vahlii* Lam. Tabl. Encycl. 1: 139. 1791.

Annual, culms very slender, densely tufted, compressed, striate, erect or ascending, 1'-4' high, longer than or equaling the leaves. Leaves setaceous or almost filiform, rough, those of the involucre 3-5, erect, much exceeding the simple capitate cluster of 3-8 spikelets; spikelets obovoid-cylindric, obtuse, 2'-4" long, about ½" thick, many-flowered; scales lanceolate, pale greenish-brown, acuminate; stamen 1; style 2-cleft, glabrous below; achene minute, biconvex, yellowish-white, cancellate by longitudinal and transverse ridges.

In moist soil, Missouri to Texas, east to North Carolina and Florida. Also in ballast about the eastern seaports. July–Oct.

5. *Fimbristylis autumnalis* (L.) R. & S. Slender Fimbristylis. (Fig. 608.)

*Scirpus autumnalis* L. Mant. 2: 180. 1771.

Annual, roots fibrous, culms very slender, densely tufted, flat, roughish on the edges or smooth, erect, ascending or spreading, 3'-15' long, usually much exceeding the leaves. Leaves narrowly linear, flat, ½'-.1" wide, long-acuminate, glabrous, those of the involucre 2-3, usually all shorter than the umbel; umbel compound or decompound, the primary rays ½'-.1½' long, the secondary filiform; spikelets linear-oblong, acute, 2'-5" long, ½" thick or less, several—many flowered; scales ovate-lanceolate, subacute, strongly mucronate, greenish-brown, the midvein prominent; stamens 1-3; style 3-cleft; achene obovoid, usually white, 3-angled with a ridge on each angle, very finely reticulated and sometimes roughened.

In moist soil, Maine to Michigan, south to Florida and Louisiana. Also in tropical America. June–Sept.

Annual or perennial very small or very large sedges, with leafy culms or the leaves reduced to basal sheaths. Spikelets terete or somewhat flattened, solitary, capitate, spicate or umbellate, subtended by a 1- several-leaved involucre or the involucre wanting in some species. Scales spirally imbricated all around, usually all fertile, the 1-3 lower sometimes empty. Flowers perfect. Perianth of 6- , slender or rigid, short or elongated, barbed, pubescent or smooth bristles, or none in some species. Stamens 2-3. Style 2-3-cleft, not swollen at the base, wholly deciduous from the achene, or its base persistent as a subulate tip. Achene triangular, lenticular or plano-convex. [Latin name of the Bulrush, said to be from SIRS, the Celtic word for rushes.]

About 200 species of very wide geographic distribution. Besides the following, some 6 others occur in the southern and western parts of North America.

Spikelet solitary, terminal, bractless or subtended by a single bract or short leaf.

No involucral bract.

1. Culms 1'-2' high; achene smooth; plant of saline soil.
   7. S. Hallii.

2. Culms 3'-10' high; achene reticulated; plant of fresh-water marshes.
   8. S. debilis.
   9. S. Smithii.

Involucral bract present.

Bract shorter than or but little exceeding the spikelet; plants not aquatic.

3. Culm terete; leaf of upper sheath subulate; bristles smooth.
   6. S. subterminalis.

4. Culms triangular; leaf of upper sheath linear; bristles upwardly barbed.
   5. S. paniculatus.

Leaves shorter than the culm; scales acute.

5. Leaves about as long as the culm; scales cuspidate.

Bract at least twice as long as the spikelet; plant aquatic.

Spikelets usually more than 1, usually several or numerous, often appearing lateral; involucral bract only 1.

6. Spikelets few, 1-12, appearing lateral.
   10. S. Americanus.

Spikelets not sharply 3-angled; achene plano-convex; annuals.

7. Achene strongly transversely rugose.
   11. S. Olneyi.

8. Achene smooth or very slightly roughened.
   12. S. T. Torreyi.

Bristles downwardly barbed, about equalling the achene.

9. Bristles minute or wanting.
   13. S. mucronatus.

Spikelets several or numerous, umbellate; tall sedges.

10. Culm sharply triangular, equalled by the long leaves.
   14. S. cylindricus.

11. Culm terete; leaves reduced to sheaths.

12. Bristles downwardly barbed; achene gray, abruptly mucronate.
   15. S. lacustris.

13. Bristles short-plumose below; achene nearly white, narrowed above.
   16. S. Californicus.

14. Spikelets obtuse; involucral leaf short, stout; scales mucronulate.
   17. S. rufus.

Achene 3-angled, ridged on the back.

15. Bristles longer than the achene; involucral leaf erect.
   18. S. campestris.

16. Bristles as long as the achene; involucral leaf abruptly bent.
   19. S. polyphyllus.

Spikelets several or compound, capitate or umbellate, large; involucral leaves 2 or more.

17. Achene lenticular or plano-convex; spikelets capitate.
   20. S. flaviatilis.

18. Capitate cluster simple; achene obovate-oblong, pale brown.
   21. S. sylvaticus.

19. Capitate cluster often compound; achene orbicular-obovate, dark brown.
   22. S. robustus.

20. Spikelets very numerous in compound umbels or umbelled heads, small; involucral leaves several; tall sedges.

   22. Spikelets ovoid or oblong, 1'-2'-2 1/2' long.
       Style 3-cleft; achene 3-angled; bristles 6.
   23. Spikelets 3-8 in each head; bristles barbed throughout; scales obtuse.


25. Bristles flexuous, twice as long as the achene; leaves 2'-3' wide.

26. Spikelets cylindric, 1'-1 1/2' long.
   27. Bristles smooth or slightly pubescent; umbel mostly compound.

28. Bristles shorter than or scarcely exceeding the scales.
   29. Bristles about as long as the achene; scales subacute.
   30. Bristles much longer than the achene; scales mucronate.
   31. Bristles much exerted beyond the scales when mature.

29. S. italicus.

30. S. cyperinus.
1. Scirpus nanus Spreng. Dwarf Club-rush. (Fig. 609.)


Annual, roots fibrous, culms filiform, flattened, grooved, tufted, erect or ascending, 1'-2' high, bearing a scariosus bladeless sheath near the base. Spikelet solitary, terminal, ovoid-oblong, rather acute, 3-8-flowered, 1''-1½'' long, not subtended by a bract; scales ovate or lanceolate, pale green, the lower obtuse, the upper subacute; bristles about 6, downwardly barbed, longer than the achene; stamens 3; style 3-cleft; achene oblong, 3-angled, pale, pointed at each end, smooth.

Muddy places in salt marshes, Cape Breton Island to Florida and Texas, and about salt springs in New York and Michigan. Also on the Pacific Coast of North America and on the coasts of Europe. July-Sept.

2. Scirpus pauciflorus Lightf. Few-flowered Club-rush. (Fig. 610.)

Scirpus pauciflorus Lightf. Fl. Scot. 1778. 1777.

Perennial by filiform rootstocks, culms very slender, little tufted, 3-angled, grooved, leafless, 3'-10' tall, the upper sheath truncate. Spikelet terminal, solitary, not subtended by an involucral bract, oblong, compressed, 4-10-flowered, 2''-3'' long, nearly 1'' wide; scales brown with lighter margins and midvein, lanceolate, acuminate; bristles 2-6, hispid, as long as the achene or longer; stamens 3; style 3-cleft; achene obovoid-oblong, gray, rather abruptly beaked, its surface finely reticulated.

In wet soil, Anticosti and Ontario to western New York, Minnesota and British Columbia, south in the Rocky Mountains to Colorado, and in the Sierra Nevada. Also in northern Europe. July-Oct.

3. Scirpus caespitosus L. Tufted Club-rush. (Fig. 611.)


Perennial, culms smooth, terete, densely tufted, light green, erect or ascending, almost filiform, wiry, 4'-15' long. Basal sheaths numerous, membranous, imbricated, acuminate, the upper one bearing a short very narrow blade; spikelet solitary, terminal, few-flowered, ovoid-oblong, about 2'' long, subtended by a subulate involucral leaf of about its own length; scales yellowish-brown, ovate, obtuse or subacute, deciduous; bristles 6, smooth, longer than the achene; stamens 3; style 3-cleft; achene oblong, smooth, 3-angled, brown, acute.

In bogs and on moist rocks, Greenland to Alaska, south to the mountains of New England, the Adiron- dacks, western New York, Illinois, Minnesota and British Columbia, in the Rocky Mountains to Colorado, and on the higher summits of the southern Alleghenies. Also in Europe and Asia. June-Aug.
4. Scirpus Clintoni A. Gray. Clinton’s Club-rush. (Fig. 612.)


Perennial, culms tufted, triangular, very slender, erect, 4'-15' tall, roughish on the angles. Lower sheaths inrolled, one or more of them bearing short subulate blades, the upper one bearing a flat, narrowly linear blade shorter than the culm; spikelet solitary, terminal, ovoid, few-flowered, 1'/2'-2' long, subtended by a subulate involucral bract of less than its own length or somewhat longer; scales ovate, pale brown, acute; bristles 3-6, filiform, upwardly barbed, as long as the achene or longer; style 3-cleft; achene oblong, brown, sharply 3-angled, smooth, obtuse.


5. Scirpus planifolius Muhl. Wood Club-rush. (Fig. 613.)

Scirpus planifolius Muhl. Gram. 32. 1817.

Perennial, culms triangular, slender, tufted, rather weak, roughish on the angles, 6'-15' tall. Lower sheaths bearing short subulate blades, the upper with a flat narrowly linear rough-margined leaf about as long as the culm; spikelet solitary, terminal, ovoid-oblong, acute, several-flowered, subtended by a short involucral bract; scales ovate-lanceolate, yellowish-brown with a green midvein, which is extended beyond the acute apex into a sharp cusp; bristles 4-6, upwardly barbed, about equaling the achene; stamens 3; style 3-cleft, pubescent; achene oblong, 3-angled; smooth, light brown, rather obtuse.

In woods and thickets, Rhode Island to Delaware, western New York and Missouri. May-July.

6. Scirpus subterminalis Torr. Water Club-rush. (Fig. 614.)


Perennial (?), aquatic, culms slender, terete, nodulose, 1'-3' long. Leaves slender, channeled, 6'-2' long, 1'/2'-1'/4' wide; spikelet solitary, terminal, oblong-cylindric, narrowed at each end, several-flowered, 3'-5' long, subtended by a subulate erect involucral leaf 3'/2'-1' long, thus appearing lateral; scales ovate-lanceolate, acute, membranous, light brown with a green midvein; bristles about 6, downwardly barbed, as long as the achene or shorter; stamens 3; style 3-cleft to about the middle; achene obvoid, 3-angled, dark brown, smooth, rather more than 1' long, obtuse, abruptly beaked by the slender base of the style.

In ponds and streams or sometimes on their borders, New Brunswick to the Northwest Territory and Washington, south to New Jersey, Pennsylvania and Michigan. The so-called variety terrestris is an emersed form with erect culms and shorter spikelets. July-Aug.
7. Scirpus Hallii A. Gray. Hall's Club-rush. (Fig. 615.)


Annual, culms very slender, smooth, tufted, obtusely triangular, erect, striate, 5'-12' tall. Lower sheaths oblique, and acuminate or mucronate on one side, the upper one commonly bearing a filiform blade ½'-2½' long; spikelets capitate in clusters of 1-7, oblong-cylindric, obtuse, many-flowered, 3'-6' long, about 1½" thick, appearing lateral by the extension of the solitary involucral leaf which is ½'-4½' long; scales ovate-lanceolate, light greenish-brown, acuminate, keeled, cuspidate by the excurrent tip of the midvein; bristles wanting; stamens mostly 2; achene obovate-obrificial or slightly broader than high, black, plano-convex, mucronulate strongly wrinkled transversely, about ½" in diameter.

In wet soil, Massachusetts to Florida, west to Illinois, Colorado, Texas and Mexico. The lowest sheaths occasionally subtend a flower with very long styles. July-Sept.

8. Scirpus débilis Pursh. Weak-stalked Club-rush. (Fig. 616.)

*Scirpus débilis* Pursh, Fl. Am. Sept. 55. 1814.

Annual, smooth, culms slender, terete or nearly so, tufted, erect or ascending, 6'-2° high. Sheaths obliquely truncate, the upper one rarely bearing a short subulate blade; spikelets capitate in clusters of 1-12, ovoid-oblong, subacute, many-flowered, appearing lateral, the solitary involucral leaf narrowly linear, 1½'-4' long, erect or divergent; scales light yellowish-brown with a green midvein, broadly ovate, obtuse or acute; bristles 4-6, downwardly barbed, somewhat unequal and about as long as the achene; stamens 2-3; style 2-cleft or rarely 3-cleft; achene plano-convex, broadly ob-ovate or orbicular, smooth or slightly roughened, dark brown, shining, obtuse, mucronulate.

In wet soil, Maine to Minnesota, south to Georgia, Alabama and Nebraska. July-Sept.

9. Scirpus Smithii A. Gray. Smith's Club-rush. (Fig. 617.)

*Scirpus Smithii* A. Gray, Man. Ed. 5, 563. 1867.

Annual, similar to the preceding species, but the culms usually lower and more slender or nearly filiform, 3'-12' tall, the sheaths oblique and acuminate or the upper one bearing a subulate blade. Spikelets 1-4, in an apparently lateral cluster, ovoid, acute, 2'-3" long, the involucral leaf very narrow, elongated, erect; scales oblong, obtuse, mucronulate, pale brown with a narrow, green midvein; bristles usually wanting, sometimes 1-3, and very much shorter than the achene; style 2-cleft; achene plano-convex, obovate or orbicular, brown, rather dull, smooth or minutely roughened, obtuse, mucronulate.

In wet muddy places, Vermont to Minnesota, south to Delaware, Pennsylvania and Michigan. Perhaps only a form of the preceding. July-Sept.
10. Scirpus Americánuś Pers. Three-square. Chair-maker’s Rush. (Fig. 618.)

Scirpus Americánus Pers, Syn. 1: 68. 1805.
Scirpus pungens Vahl, Enum. 2: 255. 1806.

Perennial by long rootstocks, culms sharply triangular with concave sides or one of the sides nearly flat, erect, stiff, 1°-4° tall. Leaves 1-3, narrowly linear, keeled, shorter than the culm; spikelets oblong-ovoid, acute, 4°-6° long, capitate in clusters of 1-7, appearing as if lateral; involucral leaf solitary, slender, 1½°-4° long; scales broadly ovate, brown, often emarginate or sharply 2-cleft at the apex, the midvein extended into a subulate awn; sometimes 1° long, the margins scarious, ciliolate or glabrous; bristles 2-6, downwardly barbed, shorter than or equaling the achene; stamens 3; style usually 2-cleft; achene obovate, plano-convex, smooth, dark brown, mucronate.

In fresh water and brackish swamps throughout North America. Also in Chile. June-Sept.


Spikelets linear-cylindric, 5°-12° long; bristles as long as the broadly obovate achene. South shore of Lake Ontario; Colorado and New Mexico.

11. Scirpus Olneyi A. Gray. Olney’s Bulrush. (Fig. 619.)


Similar to the preceding species, perennial by long stout rootstocks, culms stout, sharply 3-angled with concave sides, 2°-7° tall. Leaves 1-3, 1°-5° long, or sheaths sometimes leafless; spikelets capitate in dense clusters of 5-12, oblong or ovoid-oblong, obtuse, 2½°-4° long, the solitary involucral leaf short, stout, erect, ½'-1½° long; scales oval or orbicular, dark brown with a green midvein, emarginate or mucronulate, glabrous; bristles usually 6, slightly shorter than or equalling the achene, downwardly barbed; stamens 2-3; style 2-cleft; achene obovate, plano-convex, brown, mucronate.

In salt marshes, Rhode Island to Florida, Texas, Mexico and California, extending north along the Pacific Coast to Oregon. Also in Arkansas. June-Sept.

12. Scirpus Tórreyi Olney. Torrey’s Bulrush. (Fig. 620.)


Perennial by short or slender rootstocks, culms sharply 3-angled, rather slender, nodulose, 2°-4° tall. Leaves narrowly linear, elongated, nodulose, light green, sometimes overtopping the culm; spikelets 1-4, in an apparently lateral capitulate cluster, oblong, narrowed at each end, 5°-8° long; involucral leaf 2°-6° long, erect; scales ovate or lanceolate, shining, chestnut-brown, glabrous, obtuse or the upper acute, mucronulate; bristles about 6, downwardly barbed, longer than the achene; stamens 3; style 3-cleft; achene obovoid, smooth, shining, light brown, 3-angled, one of its sides broader and flatter than the others.

13. *Scirpus mucronatus* L. Bog Bulrush. (Fig. 621.)

*Scirpus mucronatus* L., Sp. Pl. 50. 1753.

Perennial, culms stout, somewhat tufted, sharply 3-angled, smooth, 1°-3° tall. Spikelets 5-12 in a capitate cluster, oblong, obtuse, many-flowered, 4'-6' long, rather more than 1' in diameter, sub-tended by the solitary linear abruptly spreading involucral leaf; scales broadly ovate, obtuse, light brown with a narrow green midvein, mucronate; bristles 6, stout, rigid, downwardly barbed, as long as the achene; stamens 3; style 3-cleft; achene obvoid, smooth, shining, dark brown, 3-angled, two of the sides narrower and more convex than the third.

In a swamp in Delaware county, Pennsylvania. Probably adventive or fugitive from Europe. Widely distributed in the Old World. July-Sept.

14. *Scirpus cylindricus* (Torr.) Britton. Canby’s Bulrush. (Fig. 622.)


*Scirpus lepoloelepis* Chapm. Fl. S. States, 530. 1860.


Perennial by stout rootstocks, culm stout, sharply 3-angled above, 3°-6° high, the linear nodulose keeled and channeled dark green leaves nearly or quite as long. Involucral leaf solitary, 4'-10' long, erect; spikelets in an apparently lateral simple or compound umbel, drooping, oblong-cylindric, acutish, 6'-10' long; primary rays of the umbel 1'-4' long, bracted by 1 or more subulate-linear leaves; scales ovate or ovate-lanceolate, pale brown with scarious margins, acute, mucronulate; bristles 6, stout, rigid, about as long as the achene, serrate; stamens 3; style 3-cleft; achene obvoid, 3-angled, light brown, smooth, abruptly subulate-pointed.

In ponds and swamps, Maryland to Florida and Louisiana, mostly near the coast. July-Sept.

15. *Scirpus lacustris* L. Great Bulrush. Mat-rush. (Fig. 623.)

*Scirpus lacustris* L., Sp. Pl. 48. 1753.

*Scirpus validus* Vahl, Enum. 2: 268. 1806.

Perennial by stout rootstocks, culm stout, terete, smooth, erect, 3°-9° tall, sometimes nearly 1' in diameter, sheathed below, the upper sheath occasionally extended into a short leaf. Involucral leaf solitary, erect, shorter than the umbel, appearing as if continuing the culm; umbel compound, appearing lateral, its primary rays slender, spreading, 1'-4' long, bracts linear-lanceolate, scarious; spikelets oblong-conic, becoming oblong-cylindric, sessile or some of them peduncled, in capitate clusters of 1-5, obtuse or acute, 2'''-8'' long, 1'''-2'' in diameter; scales ovate or oblong, with a rather strong midvein which is sometimes excurrent into a short tip; bristles 4-6, downwardly barbed, equaling or longer than the achene; stamens 3; style 2-cleft; achene plano-convex, obovate, gray, abruptly mucronate, dull.

In ponds and swamps, throughout North America. Also in the Old World. June-Sept.
(Fig. 624.)

*Scirpus TaJora* Kunth. Enum. 2: 106. 1847.  

Perennial, similar to the preceding species, the leaves reduced to basal sheaths. Involucral leaf very short, stoutly subulate, umbel compound; spikelets 3"-5" long, acute, peduncled or some of them sessile; scales brown, ovate, awn-pointed by the excurrent midvein; bristles shorter than or equaling the achene, short-plumose below; stamens 2-3; style 2-cleft; achene obovate, plano-convex, nearly white, narrowed above into a short point, contracted at the base, its surface finely cellular-rieticulated.

In swamps, Florida to Louisiana, New Mexico and California, and widely distributed in tropical America. Not certainly known within our area. June-Aug.

(Fig. 625.)

*Scirpus rufus* Schrad. Fl. Germ. 1: 133. 1806.

Perennial by slender rootstocks, culms tufted, smooth, slender, erect, somewhat compressed, 3'-15' tall. Leaves half-terete, smooth, shorter than the culm, channeled, ½'-3' long, less than 1' wide, the lowest reduced to bladeless sheaths; spikelets red-brown, few-flowered, narrowly ovoid-oblong, subacute, about 3' long, erect in a terminal 2-ranked spike ½'-1' long; involucral leaf solitary, erect, nearly linear, equalling or longer than the spike; scales lanceolate, acute, 1-nerved; bristles 3-5, upwardly barbed, shorter than the achene, deciduous; stamens 3; style 2-cleft; achene oblong, pointed at both ends, light brown, plano-convex or slightly angled in front, 1½'-2' long.

In marshes, New Brunswick and Quebec to the Northwest Territory. Also in northern Europe. Summer.

(Fig. 626.)

Perennial by slender rootstocks, culm slender, smooth, sharply triangular, 1°-2° tall. Leaves usually pale green, smooth, shorter than or overtopping the culm, 1'/-2' wide, those of the involucre 2 or 3, the longer much exceeding the inflorescence; spikelets 3-10 in a dense terminal simple head, oblong-cylindric, mostly acute, 8'-12' long, 2½'-4' in diameter; scales ovate, membranous, puberulent or glabrous, pale brown, 2-toothed at the apex, the midvein excurrent into an ascending or spreading awn about 1' long; bristles 1-3, much shorter than the achene or none; style 2-cleft (sometimes 3-cleft?); achene lenticular, obovate or oblong-ovate, mucronulate, yellow-brown, its surface strongly cellular-rieticulated.

On wet prairies and plains, Manitoba and Minnesota to Nebraska, Kansas and Mexico, west to Nevada. May-Aug.
19. *Scirpus robustus* Pursh. Salt Marsh Bulrush. (Fig. 627.)

*S. robustus* Pursh, Fl. Am. Sept. 56. 1814.


Perennial by large rootstocks, culm stout, stiff, sharply 3-angled with flat sides, smooth, 2°-5° tall. Leaves equalling or overtopping the culm, dark green, smooth, 2½"-5" wide, the midvein prominent; involucral leaves 2-4, elongated, erect, similar to those of the culm, often 1' long; spikelets ovoid-oblong, obtuse or subacute, stout, 8"-12" long, 4½"-5" in diameter, 6-20 together in a dense often compound terminal cluster; scales ovate, brown, puberulent, thin, lacerate or 2-toothed at the apex, the midvein excurrent into an, at length, reflexed awn 1½"-2½" long; bristles 1-6, fragile, shorter than the achene or none; stamens 3; style 3-cleft; achene compressed, very flat on the face, convex or with low ridge on the back, obovate- orbicular, dark brown, shining, 3½" long.


20. *Scirpus fluviatilis* (Torr.) A. Gray. River Bulrush. (Fig. 628.)


*S. fluviatilis* A. Gray, Man. 527. 1848.

Perennial by large rootstocks, culm stout, smooth, sharply triangular with nearly flat sides, 3°-6° tall. Leaves 4½"-8½" wide, smooth, equalling or overtopping the culm, attenuate to a very long tip, the midvein prominent; those of the involuce 3-5, erect or spreading, some of them 5'-10' long; spikelets in a terminal umbel, solitary, or 2-3 together at the ends of its long spreading or drooping rays, or the central spikelets sessile, oblong-cylindric, acute, 8½'-12½' long, about 3½" in diameter; scales ovate, scarious, puberulent, the midvein excurrent into a curved awn 1½"-2½" long; bristles 6, rigid, downwardly barbed, about as long as the achene; style 3-cleft; achene sharply 3-angled, obovoid, rather dull, short-pointed, 2½" long.

In shallow water along lakes and streams, Quebec to Minnesota, New Jersey, Illinois and Kansas. June-Sept.

21. *Scirpus sylvaticus* L. Wood Bulrush. (Fig. 629.)

*S. sylvaticus* L. Sp. Pl. 51. 1753.

Perennial by long rootstocks, culm triangular, stout, smooth, 4°-6° tall, often overtopped by the upper leaves. Leaves flat, 5½"-8½" wide, rough on the margins, more or less rugulose, the midvein prominent, those of the involucre 5-8, the larger similar to those of the culm and often 1½ long or more; umbel terminal, very large, sometimes 8' broad, about 3 times compound, the spikelets ovoid or ovoid-oblong, mostly acute, 1½"-2½" long, borne in capitulate clusters of 2-8 at the ends of the raylets; bractlets of the involucels small, scarious, linear or lanceolate; scales ovate-oblong, obtuse, brown with a green centre; bristles 6, downwardly barbed, slightly exceeding the achene; stamens 3; style 3-cleft; achene oblong, 3-angled, obtuse, nearly white, mucronulate, not shining.

In swamps, Massachusetts to North Carolina. Also in Europe. June-Aug.
22. Scirpus atróvires Muhl. Dark green Bulrush. (Fig. 630.)

Scirpus atróvires Muhl. Gram. 43. 1817.
Perennial by slender rootstocks, culms triangular, rather slender, leafy, 2°-4° high. Leaves elongated, nodulose, rough on the margins, dark green, 3'-6' wide, one or two of them usually exceeding the inflorescence; umbel 1-2-compounded or simple; spikelets ovoid-oblong, acute, densely capitatus 6's-20's at the ends of the rays or raylets; involucels short; scales greenish-brown, oblong, acute, the midvein excurrent; bristles usually 6, downwardly barbed above, naked below, about as long as the achene; stamens 3; style 3-cleft; achene oblong-obovoid, 3-angled, pale brown, dull.

In swamps, Nova Scotia to Manitoba, south to Georgia and Louisiana. June-Aug.

Whole plant pale green; scales awned; spikelets oblong-cylindric, very numerous in the capitate clusters. Minnesota to the Northwest Territory and Colorado.

23. Scirpus microcárpus Presl. Small-fruited Bulrush. (Fig. 631.)

Perennial, the culms 3'-5' tall, often stout, overtopped by the rough-margined leaves. Longer leaves of the involucre usually exceeding the inflorescence; spikelets ovod-oblong, acute, 1'-2' long, 3-25 together in capitae clusters at the ends of the usually spreading raylets; scales brown with a green midvein, blunt or subacute; bristles 4, barbed downwardly nearly or quite to the base, somewhat longer than the achene; stamens 2; style 2-cleft; achene oblong-obovate, nearly white, plano-convex or with a low ridge on the back, pointed.


24. Scirpus polyphyllus Vahl. Leafy Bulrush. (Fig. 632.)

Scirpus polyphyllus Vahl, Enum. 2: 274. 1806.
Perennial by slender rootstocks, culms slender, sharply triangular, 1½'-4' tall, very leafy, the leaves 2'-3' wide, exactly 3-ranked, inconspicuously nodulose, rough-margined, the upper rarely overtopping the culm; leaves of the involucre 3-6, the longer commonly somewhat exceeding the inflorescence; umbel more or less compound; spikelets ovaloid, about 1½' long, capitatus 3's-10's at the ends of the raylets; scales ovate, bright brown, mostly obtuse, mucronulate; bristles 6, flexuous or twice bent, downwardly barbed above the middle, twice as long as the achene; stamens 3; style 3-cleft; achene obvoid, 3-angled with a broad face and narrower sides, short-pointed, dull.

In swamps, wet woods and meadows, Massachusetts to Minnesota, south to Alabama and Arkansas. Some of the scales of the spikelets occasionally develop into linear leaves. July-Sept.
25. *Scirpus Peckii* Britton. Peck’s Bulrush. (Fig. 633.)

*Scirpus Peckii* Britton, Trans. N. Y. Acad. Sci. 11: 82. 1892.

Perennial by rootstocks, culms slender, triangular, 1½°-3½° tall, leafy. Leaves elongated, 2°-5° wide, rough-marginned, the upper overtopping the culm, those of the involucr 3-5, the longer of them exceeding the inflorescence; umbel 1-2-compound, larger; spikelets cylindric, obtusish, 3°-5° long, in capitate clusters of 2-10 at the ends of the raylets or some of them distically peduncled; scales dark brown, keeled, mucronate, falling early; bristles 4-6, downwardly barbed from below the middle to the summit, longer than the achene; style 3-cleft; achene 3-angled, ¼” long, oblong, narrowed at each end, slender-beaked.


26. *Scirpus divaricatus* Ell. Spreading Bulrush. (Fig. 634.)


Perennial (?). Roots fibrous, culms obtusely triangular, smooth, rather slender, 2½°-4° tall. Leaves 2°-4” wide, rough-marginned, the upper and those of the involucr not exceeding the inflorescence; umbel decompound, the primary rays very slender, sometimes 6’ long, widely spreading or drooping; raylets filiform; involucels setaceous; spikelets mostly solitary at the ends of the raylets, sessile or peduncled, linear-oblong, obtuse, 3°-6° long, ½” thick; scales ovate, greenish-brown, subacute or obtuse, with a prominent midvein and scarious margins; bristles 6, flexuous, longer than the achene, somewhat pubescent, not barbed, shorter than the scales; stamens 3; style 3-cleft; achene sharply 3-angled, oblong, narrowed at both ends, apiculate, nearly white, not shining.

In swamps, Kentucky to Missouri, south to Florida and Louisiana. The spikelets sometimes partially develop into tufts of leaves. June-Aug.

27. *Scirpus lineatus* Michx. Reddish Bulrush. (Fig. 635.)


Perennial by stout rootstocks, culms rather slender, triangular, erect, 1°-3° high, leafy, the upper leaves and those of the involucr not exceeding the inflorescence. Leaves 2°-4” wide, light green, flat, rough-marginned; umbels terminal and commonly also axillary, decompound, the rays very slender, becoming pendulous; spikelets mostly solitary at the ends of the slender raylets, oblong, obtuse, 3°-5° long, about ½” in diameter; scales ovate or oblong, reddish-brown with a green midvein, their tips slightly spreading; bristles 6, weak, smooth, entangled, much longer than the achene, equaling the scales or slightly protruded beyond them at maturity; stamens 3; style 3-cleft; achene oblong or oblong-obovoid, pale brown, narrowed at both ends, 3-angled, short-beaked.

In swamps and wet meadows, Ontario to Georgia, west to Oregon and Texas. June-Sept.
28. Scirpus cypérinus (L.) Kunth. Wool-grass. (Fig. 636.)

Scirpus cypérinus Kunth, Enum. 2: 170. 1837.
Scirpus Eriophorum var. cypérinus A. Gray, Man. Ed. 2, 301. 1890.

Perennial by stout rootstocks, culms stout or slender, smooth, obtusely triangular or nearly terete, stiff, leafy, 2-6 feet tall. Leaves elongated, 2"-3" wide, rough-margined, the upper often overtopping the culm, those of the involucre 3-6, the longer much exceeding the inflorescence; umbel terminal, compound, the rays at length somewhat drooping; spikelets ovoid-oblong, obtuse, 1 1/2"-2 1/2" long, in capitate clusters of 3-15 at the ends of the raylets; scales ovate or lanceolate, acute or subacute; bristles 6, entangled, smooth, much longer than the achene, much exserted beyond the scales and grayish-brown at maturity; stamens 3; style 3-cleft; achene 3-angled, oblong, slender-beaked, nearly white.

In swamps, Newfoundland to Ontario, Virginia and Kentucky. Aug.-Sept.

Scirpus cypérinus Eriophorum (Michx.) Britton, Trans. N. Y. Acad. Sci. 11: 82. 1892.
Eriophorum cypérinus var. laxum Wats. & Coult. in A. Gray, Man. Ed. 6, 88. 1890.

Spikelets mostly peduncled. Range of the type, but extending to Florida and Louisiana.

10. ERIÓPHORUM L. Sp. Pl. 52. 1753.

Bog sedges, perennial by rootstocks, the culms erect, triangular or nearly terete, the leaves linear, or 1 or 2 of the upper ones reduced to bladeless sheaths. Spikelets terminal, solitary, capitulate or umbellate, subtended by a 1-4-leaved involucre, or naked. Scales spirally imbricated, usually all fertile. Flowers perfect. Perianth of 6 or numerous filiform smooth soft bristles, which are white or brown, straight or crisped, and exserted much beyond the scales at maturity. Stamens 1-3. Style 3-cleft. Achene 3-angled, oblong, ellipsoid or obovoid. [Greek, signifying wool-bearing, referring to the soft bristles.]

About 10 species, in the northern hemisphere. Besides the following, one occurs in Alaska.

Spikelet solitary; involucral leaf short or none.

Bristles only 6, white, crisped, very long.

Bristles numerous, straight or slightly crisped.

Bristles bright white.

Culm with 2 inflated bladeless sheaths; achene obovoid, obtuse.

Only the upper sheath bladeless, or all blade-bearing; achene linear-oblong, acute.

Bristles reddish-brown.

Spikelets several, umbellate or capitulate; involucre 1-4-leaved.

Achene obovoid, obtuse; spikelets umbellate.

Achene linear-oblong, acute; spikelets capitulate or some of them peduncled.

Leaves channelled; bristles 4-6 times as long as the scale, bright white.

Leaves flat; bristles 3 times as long as the scale, brown (rarely white). 7. E. Virginiicum.

1. Eriophorum alpinum L. Alpine Cotton-grass. (Fig. 637.)


Perennial by short rootstocks, sending up numerous filiform triangular roughish culms, 6'-10' high. Leaves subulate, 3'-10' long, triangular, channelled, borne very near the base of the culm, the lower sheaths often scarios and bladeless; spikelet solitary, terminal, small, erect; involucral bract subulate, mostly shorter than the spikelet, sometimes wanting; young spikelet ovoid-oblong, subacute; scales oblong lanceolate, yellowish-brown, firm, obtuse or subacute, the midvein slender; bristles 6, white, crisped, 4-7 times as long as the scale; achene narrowly obovoid-oblong, brown, apiculate, dull.

In bogs and on high mountains, Newfoundland to Hudson Bay and the Northwest Territory, south to Vermont, northern New York and Minnesota. Also in Europe and Asia. Summer.
2. Eriophorum vaginatum L. Sheathed Cotton-grass. (Fig. 638.)

_Cyperaceae._

_Eriophorum vaginatum_ L. Sp. Pl. 52. 1753.

Culms tufted, stiff, obtusely triangular, smooth, slender, 8'-16' tall, leafless; except at the base, bearing two distant inflated sheaths, the upper one usually above the middle. Leaves stiff, filiform, triangular, channeled, slightly rough, shorter than or sometimes overtopping the culm; involucral leaf wanting; spikelet solitary, ovoid, erect; scales ovate-lanceolate or the lowest lanceolate, acuminate, purple-brown, thin; bristles numerous, white, straight, glossy, 4-5 times as long as the scale; anthers linear; achene oblong, obtuse, brown, dull, minutely apiculate.

In bogs, Newfoundland to Alaska, south to Massachusetts, Pennsylvania and Minnesota. Also in northern Europe and Asia. June-Aug.

3. Eriophorum Scheuchzeri Hoppe. Scheuchzer’s Cotton-grass. (Fig. 639.)

_Eriophorum Scheuchzeri_ Hoppe, Taschenb. 1800: 104.

_Eriophorum capitatum_ Host, Gram. Aust. i: 30. pl. 38. 1801.

Similar to the preceding species but the sheaths all blade-bearing or only the upper one bladeless, culms slender, smooth, nearly terete, 10'-20' tall. Leaves filiform, channeled, usually much shorter than the culm; spikelet solitary, terminal, erect; involucr e none; scales ovate-lanceolate, long-acuminate, purple-brown, membranous; bristles numerous, white or slightly yellowish, weak, nearly straight, 4-5, times as long as the scale; "anthers cordate-ovate;" achene narrowly oblong, acute, brown, dull, subulate-beaked.

In bogs, Newfoundland and Labrador to Manitoba, Alaska, and Oregon. Also in Europe. Summer.

4. Eriophorum russéolum Fries. Russet Cotton-grass. (Fig. 640.)


Culms solitary or little tufted, triangular, erect, smooth, 8'-18' tall, much longer than the leaves. Upper sheath inflated, bladeless, mucronate, rarely with a short subulate blade, usually borne below the middle of the culm; leaves filiform, triangular-channeled, mucronate, 1'-3' long; spikelet solitary, erect; involucr e none; scales ovate-lanceolate, acuminate, thin, purplish-brown with nearly white margins; bristles numerous, bright reddish-brown, 3-5 times as long as the scale; achene oblong, narrowed at each end, apiculate.

Scarcely differs from the preceding species except in the color of the bristles and the shorter-pointed achene. In bogs, Newfoundland to Quebec. June-Aug.
5. Eriophorum polystachyon L. Tall Cotton-grass. (Fig. 641.)

Eriophorum polystachyon L. Sp. Pl. 52. 1753.
Eriophorum latifolium Hoppe, Taschenb. 1800: 103. 1800.

Culm stiff, smooth, obtusely triangular above, nearly terete below, 1½°-3° tall, all the sheaths blade-bearing. Leaves flat, roughish-margined, 1½"-4" wide, tapering to a triangular channeled rigid point, the upper shorter than or rarely overtopping the culm, those of the involucre 2-4, the longer commonly equaling or exceeding the inflorescence; spikelets 3-12, ovoid, or oblong, drooping, in a terminal simple or more or less compound umbel; rays filiform, smooth or rough; scales ovate-lanceolate, acute or acuminate, purple-green or brown; bristles numerous, bright white, about 1' long, 4-5 times as long as the scale; achene obovoid, obtuse, light brown.

In bogs, Newfoundland to Alaska, south to New Jersey, Georgia and Nebraska. Also in Europe and Asia. June-Aug.

6. Eriophorum gracile Koch. Slender Cotton-grass. (Fig. 642.)

Eriophorum triquetrum Hoppe, Taschenb. 1800: 106. 1800.

Culm slender, obtusely triangular, rough on the angles, 1°-2° tall, the sheaths all blade-bearing. Leaves narrowly linear, 1" wide or less, triangular-channeled, rough-margined, the upper not overtopping the culm; involucral leaf commonly only 1, stiff, erect; spikelets 3-8, capitate or subumbellate, the longer-peduncled ones drooping; scales ovate or oblong, obtuse or subacute, greenish brown, the mid-vein rather strong, often with a weaker nerve on each side; bristles numerous, bright white, 8"-12" long, 4-6 times as long as the scale; achene linear-oblong, acute, pointed.

In bogs, Newfoundland to Hudson Bay and Alaska, south to New Jersey, Pennsylvania and Missouri. Also in Europe and Asia. June-Sept.

7. Eriophorum Virginicum L. Virginia Cotton-grass. (Fig. 643.)


Culm stiff, rather slender, obtusely triangular above, terete below, smooth, 1½°-4° tall, rather leafy. Leaves narrowly linear, flat, 1½"-2½" wide, rough-margined, somewhat channeled toward the apex, the upper often overtopping the culm, those of the involucre 2-4, spreading or deflexed, 2'-6' long, 1 or 2 of them much longer than the spikelets; spikelets several or numerous in a dense terminal capitulate cluster usually broader than high, erect or the outer ones spreading; scales ovate, acute, brown with a green centre, about 5-nerved; bristles numerous, dingy brown, about 3 times as long as the scale; achene linear-oblong, acute, apiculate, light brown.

In bogs, Newfoundland to Manitoba, south to Florida and Nebraska. June–Sept.

Eriophorum Virginicum album A. Gray, Man. Ed. 5, 566. 1867.

11. **Fuirena** Rottb. Descr. & Ic. 70. pl. 19. f. 3. 1773.

Perennial sedges, with leafy triangular culms (in a southern species the leaves reduced to inflated sheaths), and many-flowered terete spikelets in terminal and axillary clusters, or rarely solitary. Scales spirally imbricated all around, awned, the 1 or 2 lower commonly empty. Flowers perfect. Perianth of 3 ovate oblong or cordate-ovate, stalked, often awned sepals, usually alternating with as many downwardly barbed bristles. Stamens 3. Style 3-cleft, not swollen at the base, deciduous. Achene stalked or nearly sessile, sharply 3-angled, acute or mucronate, smooth. (In honor of Georg Fuiren, 1581-1628, Danish physician.)

About 20 species, natives of warm-temperate and tropical regions. Besides the following, 1 or 2 others occur in the southern United States.

Sepals awned from the apex or awnless.

Sepals awned on the back below the apex.

1. **Fuirena squarrosa** Michx.

**Squarrose Fuiren.** (Fig. 644.)


Rootstock short, stout, sometimes tuber-bearing; culms tufted, glabrous or nearly so, 2'-2° tall. Leaves flat, nearly or quite glabrous or the lower sheaths pubescent; spikelets sessile and 1-10 together in terminal and usually also lateral capitate clusters, ovoid or ovoid-oblong, acute or obtuse, 3'-6' long, about 2½ in diameter; scales ovate or oblong, brown, pubescent, mostly obtuse, 3-nerved, tipped with a stout spreading or recurved awn of nearly their own length; sepals oblong, long-stalked, usually narrowed at both ends, tapering into a slender terminal downwardly barbed or sometimes smooth awn; bristles mostly longer than the achene, sometimes as long as the sepals.

In wet meadows and marshes, Massachusetts to Florida and Louisiana, near the coast. Also in Michigan and Nebraska. July-Sept.

**Fuirena squarrosa hispida** (Ell.) Chapm. Fl. S. States, 514. 1860.


Sheaths and leaves hisrute; sepals ovate, cordate at the base or abruptly narrowed into the stalk, awnless or very short-awned at the apex; bristles usually shorter than or equaling the achene; plant usually taller. New York to Florida, west to Alabama and Texas. Perhaps a distinct species.

2. **Fuirena simplex** Vahl. Western Fuiren. (Fig. 645.)


Similar to the preceding species, rootstock short, thick; culms slender, 5'-2° tall, glabrous. Leaves flat, glabrous or ciliate; scales tipped with a spreading or reflexed awn; sepals ovate-oblong, obtuse and usually notched at the apex, obtuse, truncate or subcordate at the base, longer or shorter than their stalks, awned on the back from below the apex, the awn varying in length, smooth or downwardly barbed; bristles retrorsely hispid, equalling or exceeding the sessile or short-stalked achene.

In moist soil, Kansas to Texas and Mexico. June-Sept.

Low tufted mostly annual sedges, with erect or spreading, almost filiform culms and leaves, and terete small terminal capitate or solitary spikelets subtended by a 1-3-leaved involucre. Scales spirally imbricated all around, deciduous, all subtending perfect flowers. Perianth of a single hyaline sepal (bract?) between the flower and the rachis of the spikelet; bristles none. Stamina 1-3. Style 2-cleft, deciduous, not swollen at the base. Achene oblong, turgid or leucentic. (Greek, in allusion to the single sepal.)

About 3 species, natives of temperate and tropical regions. Besides the following, another occurs in the southwestern United States. The genus differs from Scirpus, with which it is united by some authors, mainly in the presence of the perianth-scale.

1. Hemicarpha micrantha (Vahl)

Britton. Hemicarpha. (Fig. 646.)


Hemicarpha subsparsosa Nees, in Mart. Fl. Bras. 2: Part 1, 61. 1842.


Annual, glabrous, culm densely tufted, compressed, grooved, diffuse or ascending, 1'-5' long, mostly longer than the setaceous smooth leaves. Spikelets ovoid, many-flowered, obtuse, about 1.5' long, capitate in 2's-4's or solitary; involucral leaves or one of them usually much exceeding the spikelets; scales brown, ovate, with a short blunt spreading or recurved point; sepal inconspicuous; stamen 1; achene obovate-oblong, obtuse, mucronulate, little compressed, light brown, its surface minutely cellular-reticulated.

In moist, sandy soil, Rhode Island to Pennsylvania, Florida, Texas and Mexico. July-Sept.


Scales pale, cuneate-obovate, tapering into squarrose awns about their own length. Kansas to Texas.


Low annual sedges, with slender tufted culm leafy at the base, and terete many-flowered spikelets in a terminal head, subtended by a 1-several-leaved involucre. Scales firm, spirally imbricated all around, all fertile or several of the lower ones empty, at length deciduous. Flowers perfect. Perianth of two small sepals (bracts?) one on each side of the flower; bristles none. Stamina 1-2. Style 2-3-cleft, deciduous, its base not swollen. Achene plano-convex or 3-angled. (Greek, alluding to the thick sepals in some species.)

About 7 species, widely distributed in warm and tropical regions.

1. Lipocarpa maculata (Michx.) Torr.

American Lipocarpia. (Fig. 647.)


Annual, glabrous, roots fibrous, culm tufted, grooved, compressed, smooth, longer than the narrowly linear somewhat channelled leaves, 3'-10' tall. Leaves of the involucre 2-4, the larger 1'-5' long; spikelets ovoid-oblong, obtuse, 2 1/2'-3' long, 1/8' in diameter, 2-6 together in a terminal capitate cluster; scales rhombic or lanceolate, acute at the apex, curved, the sides nearly white, or flecked with reddish-brown spots, the midvein green; exterior sepal convolute around the achene, nerved, hyaline; stamen 1; achene oblong, yellowish, contracted at the base.

In wet or moist soil, eastern Virginia to Florida. Also near Philadelphia, where it is probably adventive. July-Sept.

Leafy sedges, mostly perennial by rootstocks, with erect 3-angled or terete culms, narrow flat or involute leaves, and ovoid oblong or fusiform, variously clustered spikelets. Scales thin, 1-nerved, imbricated all around, usually mucronate by the excurrent midvein, the lower empty. Upper flowers imperfect, the lower perfect. Perianth of 1-20 (mostly 6) upwardly or downwardly barbed or scabrous bristles, wanting in some species (no. 2). Stamens commonly 3. Style 2-cleft, 2-toothed or rarely entire. Achene lenticular or swollen, not 3-angled, smooth or transversely wrinkled, capped by the persistent base of the style (tubercle), or in some species by the whole style. [Greek, referring to the beak-like tubercle.]

About 200 species, of wide geographic distribution, most abundant in warm regions. Besides the following, some 27 others occur in the southern United States.

Style entire or 2-toothed, persistent as a long-exserted subulate beak.

Style deeply 2-cleft, only its base persistent as a tubercle.

1. **R. corniculata**

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<th>Style</th>
<th>3-angled or terete culms, narrow flat or involute leaves, and ovoid oblong or fusiform, variously clustered spikelets. Scales thin, 1-nerved, imbricated all around, usually mucronate by the excurrent midvein, the lower empty. Upper flowers imperfect, the lower perfect. Perianth of 1-20 (mostly 6) upwardly or downwardly barbed or scabrous bristles, wanting in some species (no. 2). Stamens commonly 3. Style 2-cleft, 2-toothed or rarely entire. Achene lenticular or swollen, not 3-angled, smooth or transversely wrinkled, capped by the persistent base of the style (tubercle), or in some species by the whole style. [Greek, referring to the beak-like tubercle.]</th>
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**Rynchospora corniculata** (Lam.) A. Gray. Horned Rush. (Fig. 648.)

*Schœenus corniculatus* Lam. Tabl. Encycl. 1: 137. 1791.


Culm obtusely triangular, stout or rather slender, smooth, 3'-7' tall. Leaves flat, broadly linear, 6'-18' long, 3'-8' wide, rough-marginied; umbels terminal and axillary, sometimes 10 broad, usually compound; spikelets spindle-shaped, 4'-6' long in flower, capitate at the ends of the rays and raylets; primary rays slender, sometimes 6' long; scales lanceolate, thin, acute, light brown; bristles about 6, subulate or filiform, rigid, upwardly scabrous, shorter than, equalling or exceeding the achene; style subulate, entire or minutely 2-toothed at the apex, 2-4 times longer than the achene, upwardly scabrous, ½'-1' long, persistent and much exserted beyond the scales when mature; achene obovate, flat on both sides, 2' long, dark brown, smooth, its surface minutely cellular-reticulated.

In swamps, Delaware to Florida, west to Ohio, Missouri and Texas. July-Sept.


Bristles about twice as long as the achene. Range of the type, but extending north to Massachusetts and Rhode Island.
2. Rynchospora pallida M. A. Curtis. Pale Beaked-rush. (Fig. 649.)


Rootstocks slender, culms sharply triangular, 1½°–2½° tall. Leaves ½°–1° wide, flatterish, nearly smooth, the lowest reduced to many-nerved lanceolate acuminate scales; spikelets numerous, spindle-shaped, narrow, 2½°–3½° long, aggregated in a compound convex terminal head, or occasionally also in a filiform-stalked cluster from the upper axil; uppermost leaves subulate, little exceeding the spikelets; scales pale greenish brown, lanceolate, acuminate; bristles minute and early deciduous, or wanting; style 2-cleft; achene lenticular, obovate-oblong, smooth, brown, somewhat shining, ½° long, tipped by a short tubercle.


3. Rynchospora oligantha A. Gray. Few-flowered Beaked-rush. (Fig. 650.)


Rootstocks short, culms tufted, almost thread-like, leafy only toward the base, 6°–16° tall. Leaves filiform, resembling and shorter than the culm or sometimes equalling it; spikelets 1–4, terminal, narrowly oblong, acute, 3½°–4½° long, sessile or peduncled, subtended by 1 or 2 filiform bracts; scales ovate, pale brown, acute, cuspidate; bristles usually 6, densely plumose below the middle, upwardly scabrous above, equalling or shorter than the achene; style 2-cleft; achene obovoid-oblong, obtuse, turgid-lenticular, pale brown, dull, transversely wrinkled; tubercle with a flat depressed border and a flattened conic acute central projection about one-fifth as long as the achene.

In wet sandy soil, Delaware to Florida and Texas, near the coast. June–Aug.

4. Rynchospora alba (L.) Vahl. White Beaked-rush. (Fig. 651.)

*Schoenus albus* L. Sp. Pl. 44. 1733.


Pale green, rootstocks short, culms slender or almost filiform, glabrous, 6°–20° tall. Leaves bristle-like, ½°–1½° wide, shorter than the culm, the lower very short; spikelets several or numerous, in 1–4 dense corymbose terminal and axillary clusters, narrowly oblong, acute at both ends, 2½°–3½° long; scales ovate or ovate-lanceolate, white, acute; bristles 9–15, downwardly barbed, slender, about as long as the achene and tubercle; style 2-cleft; achene obovate-oblong, smooth, pale brown, lenticular; tubercle triangular-subulate, flat, one-half as long as the achene.

In bogs, Newfoundland to Alaska, south to Florida, Kentucky, Minnesota and Oregon. Also in northern Europe and Asia. June–Aug.
5. Rynchospora capillacea Torr. Capillary Beaked-rush. (Fig. 652.)

*Cyperaceae.*

Rynchospora capillacea Torr. Comp. 41. 1826.

Culms filiform, tufted, glabrous, 6'-20' tall. Leaves filiform, less than \(\frac{3}{4}\)" wide, much shorter than the culm, the lower very short; spikelets few, in 1-3 terminal and axillary loose clusters, oblong, acute at both ends, 2"-3" long; scales ovate-oblanceolate, chestnut-brown, keeled, mucronate; bristles 6, slender, downwardly barbed, about equalling or becoming longer than the achene and tubercle; achene narrowly oblong, short-stalked, light brown, minutely wrinkled, lenticular; style 2-cleft; tubercle compressed, triangular-subulate, dark brown, about one-half as long as the achene.


Rynchospora capillacea laeviseta R. J. Hill, Am. Nat. 10: 376. 1876.

Bristles smooth. Northern Indiana and Michigan.

6. Rynchospora Knieskernii Carey. Knieskern's Beaked-rush. (Fig. 653.)


Culms slender, tufted, smooth, 8'-18' tall. Leaves narrowly linear, flat, about \(\frac{3}{4}\)" wide, much shorter than the culm; spikelets numerous, in several distant compact clusters, oblong, acute, about 1" long; scales chestnut-brown, ovate; bristles 6, downwardly barbed, equalling the achene; achene obovate, lenticular, brown, minutely wrinkled; style 2-cleft; tubercle triangular-subulate, pale, one-half as long as the achene or less and slightly decurrent on its edges.


7. Rynchospora glomerata (L.) Vahl. Clustered Beaked-rush. (Fig. 654.)

*Cyperaceae.*


Rootstocks slender, culms smooth, triangular, slender or rather stout, 1'-3' high. Leaves flat, 1"-2" wide, rough-margined, shorter than the culm; spikelets several or numerous, in 3-7 corymbose-capitate axillary rather loose clusters, oblong, narrowed at both ends, 1\(\frac{1}{2}\)"-2" long; scales lanceolate, rich dark brown; bristles 6, downwardly barbed, longer than or equalling the achene and tubercle; achene obovate, lenticular, smooth, dark brown; tubercle subulate, about as long as the achene.

In moist soil, Maine to Ontario and Michigan, south to Florida and Texas. July-Sept.


Culms very slender, 5'-10' tall; leaves \(\frac{3}{4}\)" wide or less; clusters 2 or 3, small, with 3-10 spikelets. Massachusetts and New Hampshire.


Bristles smooth, or barbed at the apex only. New Jersey to North Carolina.
8. Rynchospora axillaris (Lam.) Britton. Capitate Beaked-rush. (Fig. 655.)


Culms stout, 3-angled, 2°–4° tall. Leaves flat, keeled, 1 1/2°–1 1/4° wide; spikelets spindle-shaped, 2 1/2°–3° long, exceedingly numerous, in several short-peduncled axillary and terminal very dense globose heads sometimes 10° in diameter; scales dark brown, ovate-oblong, acute; bristles usually 6, longer than or equaling the achene and tubercle, downwardly or upwardly barbed; achene broadly obovate, brown, smooth, lenticular; tubercle subulate, about as long as the achene, somewhat decurrent on its edges.

In swamps, Long Island to Florida and Louisiana, near the coast. July–Sept.


Heads only 4°–5° in diameter; spikelets 1 1/2° long; achene one-half as large as that of the type. New Jersey to Florida and Louisiana.

9. Rynchospora fúsca (L.) R. & S. Brown Beaked-rush. (Fig. 656.)


Rootstocks short, culms slender, 3-angled, smooth, tufted, 6°–18° tall. Leaves setaceous, channeled, scarcely 1/2° wide, much shorter than the culm; spikelets spindle-shaped, acute, about 2 1/2° long, several, or rather numerous, in 1–4 loose clusters; scales oblong-lanceolate, brown, shining, concave; bristles 6, upwardly barbed, often unequal, the longer ones usually exceeding the achene and tubercle; achene narrowly obovate, turgid-lenticular, smooth, shining; tubercle triangular-subulate, nearly as long as the achene, its margin serrulate or nearly smooth.

In bogs, New Brunswick to Delaware, west along the St. Lawrence and Great Lakes to Michigan. Also in Europe. July–Aug.

10. **Rynchospora gracilenta** A. Gray.

Slender Beaked-rush. (Fig. 657.)


Culms very slender or filiform, smooth, obtusely triangular, 1°–2° tall. Leaves flat or becoming involute in drying, rather less than 1° wide, elongated but shorter than the culm; spikelets narrowly ovoid, acute, 2° long, few, in 1–4 loose clusters, the lower clusters borne on filiform stalks; scales ovate, brown, mucronate; bristles 6, upwardly barbed, equaling the achene and tubercle; achene broadly oval or nearly orbicular, dark brown, lenticular, dull, smooth; tubercle narrowly subulate, flat, widened at the base, pale, about as long as the achene.

In pine barren swamps, New Jersey to Florida and Texas, near the coast. June–Aug.
11. Rynchospora cymosa Ell. Grass-like Beaked-rush. (Fig. 658.)


Light green, culms tufted, sharply 3-angled, smooth, 1°-2° tall. Leaves flat, narrowly linear, grass-like, 1 1/2"-2" wide or the basal ones broader, the uppermost sometimes overtopping the culm; spikelets ovoid-oblong, acute, 1 1/2" long, sessile or nearly so, capitulate in 2's-7's on the ultimate branches of the axillary and terminal clusters; bracts setaceous; scales dark brown, broadly ovate or suborbicular; bristles 6, upwardly barbed, shorter than the achene; achene broadly obovate or oblong, lenticular, transversely wrinkled; style 2-cleft; tubercle conic, one-fourth to one-third as long as the achene.

In moist soil, New Jersey to Kentucky and Missouri, south to Florida and Texas. Also in Cuba. June-Aug.

12. Rynchospora Torreyana A. Gray. Torrey's Beaked-rush. (Fig. 659.)


Culms terete or obscurely 3-angled, smooth, slender, 1 1/2"-3" tall. Leaves involute, the lower 1 1/2"-2" wide at the base and elongated, the upper bristle-like, distant; spikelets ovoid, 1 1/2" long, peduncled, numerous, in 1-4 loose distant clusters; scales brown, ovate, mucronate; bristles 6, upwardly barbed, shorter than the oblong-obovate transversely wrinkled lenticular achene; style 2-cleft; tubercle flat, conic, one-fourth to one-third as long as the achene.

In wet pine barrens, New Jersey to South Carolina. July-Aug.

13. Rynchospora inexpansa (Michx.) Vahl. Nodding Beaked-rush. (Fig. 660.)


Rootstocks slender, culms tufted, smooth, slender, 3-angled, 2°-3° tall. Leaves smooth, 1" wide or less, flat, the lower elongated, the upper bristle-like, remote; spikelets spindle-shaped, acute at both ends, about 3" long, numerous, in 1-4 narrow finally drooping panicles; scales brown, lanceolate, acuminate; bristles 6, upwardly hispid, very slender, about twice as long as the achene; achene narrowly oblong, transversely wrinkled; style 2-cleft; tubercle flat, triangular-subulate, one-half as long as the achene.


Perennial leafy sedges, similar to the *Rynchosporus*, the spikelets oblong or fusiform, few-flowered, variously clustered. Scales imbricated all around, the lower empty, the middle ones mostly subtending imperfect flowers, the upper usually fertile. Perianth none. Stamens 2 or sometimes 3. Style 2-3-cleft, deciduous from the summit of the achene, its branches sometimes 2-3-parted. Achene ovoid or globose, smooth or longitudinally striate. Tubercle none. [Greek, referring to the branched inflorescence of some species.]

About 30 species, natives of tropical and temperate regions. Besides the following, another occurs in the southern United States and one in California.

1. **Cladium mariscoides** (Muil.) Torr. Twig-rush. (Fig. 661.)

_Schoenus mariscoides_ Muil. Gram. 4. 1817.

Culm slender, erect, rather stiff, obscurely 3-angled, smooth, 1 1/2°-3° tall. Leaves about 1° wide, concave, with a long compressed tip, nearly smooth; umbels 2 or 3, compound, the 1 or 2 axillary, slender stalked; spikelets oblong, narrowed at both ends, acute, 2 1/2° long, capitate in 3's-10's on the raylets; scales chestnut-brown, ovate or ovate-lanceolate, acute, the mid-vein slightly excurrent; upper scale subtending a perfect flower with 2 stamens and a filiform 3-cleft style, the next lower one with 2 stamens and an abortive ovary; achene ovoid, acute, finely longitudinally striate, about 1° long.

In marshes, Nova Scotia to Ontario and Minnesota, south to Florida and Iowa. July-Sept.


Leafy sedges, mostly perennial by rootstocks, the spikelets small, clustered in terminal, or terminal and axillary fascicles, or sometimes interruptedly spicate. Flowers monoecious, the staminate and pistillate spikelets separated or borne in the same clusters. Fertile spikelets 1-flowered. Staminate spikelets many-flowered. Scales imbricated all around, the 1-3 lower and sometimes also the upper ones of the fertile spikelets empty. Perianth none. Style 3-cleft, slender or sometimes swollen at the base, deciduous. Ovary supported on a disk (hypogynium), or this wanting. Stamens 1-3. Achene globose or ovoid, obtuse, crassateous or bony, white in our species. [Greek, in allusion to the hard fruit.]

About 100 species, natives of tropical and temperate regions. Besides the following, some 4 others occur in the southern United States.

Spikelets in terminal, or terminal and lateral clusters; achene supported on a hypogynium.

Achene smooth.


1. **Scleria oligántha** Michx. Few-flowered Nut-rush. (Fig. 662.)


Rootstocks thick, hard, clustered. Culms slender, erect, sharply 3-angled, nearly smooth, 1 1/2°-2 1/2° tall, the angles somewhat winged. Leaves smooth or slightly rough at the apex. 2°-3° wide, the lower short, acute, the upper elongated; clusters terminal, usually also 1 or 2 axillary, and filiform-stalked; bracts slightly ciliate or glabrous; achene ovoid, obtuse but sometimes pointed, bright white, smooth, shining; hypogynium a narrow obtusely triangular border supporting 8 or 9 small tubercles under the achene.

In moist soil, Virginia to Florida and Texas, near the coast. June-Aug.
2. *Scleria triglomerata* Michx. Tall Nut-rush. (Fig. 663.)


Rootstocks hard, short, clustered, culms 3-angled, slender or rather stout, erect or ascending, rough or nearly smooth on the angles, $\frac{1}{2}^\circ-3^\circ$ tall. Leaves flat, smooth or slightly rough-margined, glabrous or nearly so, $1\frac{1}{2}''-2\frac{1}{2}''$ wide, the lower short, acute, the upper tapering to a long tip, rarely exceeding the culm; flower-clusters terminal, and usually also 1 or 2 smaller ones from the axis; bracts glabrous or slightly ciliate; achene ovoid or ovoid globose, obtuse but somewhat pointed, bony, obscurely 3-angled, smooth, bright white, shining, about $1''$ high, supported on a low obtusely triangular, papillose-crustaceous hypogynium.

In meadows and thickets, Vermont to Wisconsin, south to Florida and Texas. July–Sept.

*Scleria triglomerata minor* Britton.


Sculps very slender, $1^\circ-2^\circ$ long; flower clusters smaller; achene ovoid subacute, one-half as large as that of the type. Southern New Jersey.

3. *Scleria reticulâris* Michx. Reticulated Nut-rush. (Fig. 664.)


Rootstocks small, culms very slender, erect, 3-angled, $1^\circ-2\frac{3}{2}^\circ$ tall. Leaves narrowly linear, smooth, glabrous or nearly so, $1''-1\frac{1}{2}''$ wide, not overtopping the culm; spikelets in a terminal cluster and 1–3 remote short-stalked axillary rather loose ones; bracts glabrous; achene globose, crustaceous, dull white when mature, reticulated by longitudinal and transverse ridges, $\frac{3}{4}''$ in diameter, glabrous; hypogynium 3-lobed, its lobes appressed to the base of the achene.

In moist meadows, eastern Massachusetts to Florida, west to Missouri. Also in Cuba. July–Sept.


Reticulations on the achene pubescent; lateral clusters usually longer stalked. New Jersey to Florida and Cuba.


Reticulations very obscure, the top of the achene almost smooth. Rhode Island to North Carolina.

4. *Scleria Torreyâna* Walp. Torrey’s Nut-rush. (Fig. 665.)


Culms weak but rather thick, spreading or diffuse, 3-angled, nearly or quite smooth, $1^\circ-2\frac{3}{4}^\circ$ long. Leaves linear, nearly flat, smooth, glabrous, $1\frac{1}{2}''-4''$ wide, not exceeding the culm; spikelets in a loose terminal cluster, and 1–3 filiform-stalked smaller axillary ones; bracts glabrous; achene globose, somewhat pointed, nearly $1''$ in diameter, irregularly rugose with low ridges somewhat spirally arranged, the ridges usually pubescent, and connected by shorter longitudinal ones, the surface thus indistinctly reticulated; hypogynium 3-lobed, the lobes appressed to the base of the achene.

In moist soil, southern New Jersey to Florida, Texas and Mexico. Also in Cuba. Forms of this species with obscurely reticulate achenes and narrow leaves are with difficulty separated from the preceding. June–Aug.
5. *Scleria pauciflora* Muhl. Papillose Nut-rush. (Fig. 666.)


Rootstocks thick, hard, clustered, culms slender, rather stiff, erect, usually tufted, glabrous or sparingly pubescent, 3-angled, 9°-2° tall. Leaves very narrowly linear, erect, less than 1'/2 wide, the lower short, the upper elongated and often overtopping the culm, their sheaths often densely puberulent; spikelets in a small terminal cluster and sometimes also in 1 or 2 axillary short-stalked ones; bracts ciliate or glabrous; achene oblong or globular, ½'/2 in diameter or rather more, crustaceous, papillose, the lower papilae elongated and reflexed; hypogynium a narrow obtusely triangular border supporting 6 very small tubercles somewhat approximate in pairs.

In dry soil, New Hampshire to Ohio and Missouri, south to Florida and Texas. Also in Cuba. June-Sept.

6. *Scleria verticillata* Muhl. Low Nut-rush. (Fig. 667.)


*Hypoporum verticillatum* Nees, Linnacea, 9: 303. 1835.

Annual (?) roots fibrous, culms very slender or filiform, 3-angled, smooth or nearly so, erect, 4°-2° tall. Leaves very narrowly linear, ¼'/2-½'/2 wide, erect, shorter than the culm, the lower very short; sheaths sometimes pubescent; spikelets in several separated clusters, the inflorescence simple or sparingly branched; bracts bristle-like; scales glabrous; achene globose, ½'/2 in diameter, crustaceous, usually tipped with the base of the style, marked by sharp distinct transverse ridges, or somewhat reticulated by additional longitudinal ridges; hypogynium none.

In moist meadows, eastern Massachusetts to Ontario and Michigan, south to Florida, Texas and Mexico, and in the West Indies. Plant, especially the roots, fragrant in drying. July-Sept.


Low tufted arctic and mountain sedges, with erect slender mostly leafless culms, the narrowly linear leaves clustered at the base, and small 2-flowered spikelets in a narrow terminal cylindric spike. Scales of the spikelet 3 or 4, distinct, usually only one of them flower-bearing; the staminate flower of 3 stamens, the pistillate of a single pistil. Bristles or perianth wanting. Style slender, 3-cleft, not jointed to the oblong ovary. Achene obtusely 3-angled, sessile. [Greek, signifying covering, perhaps in allusion to the overlapping scales.]

Four or five species, the following occurring in the arctic and alpine regions of the northern hemisphere, the others in the mountains of Europe and Asia.
1. *Elyna Bellardi* (All.) C. Koch. Arctic Elyna. (Fig. 668.)

*Carex Bellardi* All. Fl. Ped. 2: 264. pl. 92. f. 2. 1785.
*Elyna Bellardi* C. Koch, Linnaea, 21: 616. 1848.

Densely tufted, culms very slender, 4′-18′ tall, longer than the very narrow leaves. Old sheaths fibrolose, brown; margins of the leaves more or less revolute; spike subtended by a short bract, or bractless, densely flowered or sometimes interrupted below, 8′-15′ long, 1 1/2′-2′ in diameter; achene rather less than 1′ long, 1/2′ thick, appressed.

In arctic America from Greenland to Bering Sea, south in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.


Slender arctic and mountain sedges, with erect culms leafy below, and few–several-flowered spikelets clustered in a terminal spike. Scales of the spikelets 1-flowered, the lower usually pistillate, and the upper staminate. Stamens 3. Perianth–bristles or perigynium wanting. Ovary oblong, narrowed into a short style; stigmas 3, linear. Achene obtusely 3-angled, sessile. [Name in honor of Von Kobres, a naturalist of Augsburg.]

Three or four species, the following widely distributed in arctic and mountainous regions, the others Himalayan.

1. **Kobresia bipartita** (All.) Britton.

Arctic Kobresia. (Fig. 669.)

*Carex bipartitis* All. Fl. Ped. 2: 265. pl. 89. f. 5. 1785.

Culms solitary or tufted, smooth or very nearly so, 4′-12′ tall. Leaves about 1/2′ wide, infolded at least in drying, usually shorter than the culm, the old sheaths becoming fibrolose; spike 1′ long or less, composed of several or numerous linear appressed or ascending spikelets; scales somewhat serrulate on the keel, rather more than 1/2′ long; mature achene slightly longer than the scales.

Greenland to the Canadian Rocky Mountains. Also in Europe and Asia. Summer.


Culms erect, leafy, or the leaves all basal. Spike simple, erect, terminal, the scales imbricated, 1-flowered, the lower pistillate, the upper staminate. Scales ovate or oblong, concave, not keeled, obtuse or the lower acute. Stamens 3, rarely 1 or 2. Pistil enclosed in a utricle (perigynium), borne at the base of a slender axis, which is usually exerted beyond the orifice of the perigynium, at least in fruit, and sometimes hooked. Stigmas mostly 3. Achene 3-angled. [Latin, referring to the hooked projecting axis of the southern species.]

About 30 species, all but the following natives of the southern hemisphere. Our species differs from *Carex* only in the elongation of the subulate axis within the perigynium; those of the southern hemisphere are very different in habit.
1. Uncinia microglochin (Wahl.) Spreng.

*C. oligantha* Boott, Ill. 174. pl. 589. 1807.
*C. microglochin* Spreng. Syst. 3: 380. 1826.

Perennial by short stolons, culms very slender, weak, 4'-12' long. Leaves ½'-'1' wide, much shorter than the culm; spike 4'-8' long, usually pistillate for more than one-half its length; scales oblong-lanceolate, 1-nerved, deciduous; perigynia very narrowly lanceolate, 3''-'4' long, less than ½' thick, strongly reflexed in fruit; achene oblong, obtusely 3-angled, much shorter than the perigynium; axis of the pistillate flower bristle-like, long-exserted beyond the orifice of the perigynium.

Greenland to James Bay and British Columbia. Also in the arctic and mountainous parts of Europe and Asia and at the Strait of Magellan. Plant with the aspect of *C. paniculiflora*. Summer.


Grass-like sedges, perennial by rootstocks. Culms mostly 3-angled. Leaves 3-ranked, the upper elongated or very short (bracts) and subtending the spikes of flowers, or wanting. Flowers monoecious or dioecious, solitary in the axils of bracts (scales). Spikes either wholly pistillate, wholly staminate, or bearing both staminate and pistillate flowers (androgy nous). Perianth entire. Stamine flowers of 3 stamens, the filaments filiform. Pistillate flowers of a single pistil with a style and 2 or 3 stigmas, borne on a very short axis in the axil of a sac-like bractlet or second bract called the perigynium (utricle), which completely encloses the achene. Achenes 3-angled, lenticular or plano-convex.

A vast genus, of more than 1000 species, widely distributed, most abundant in the temperate zones. Besides the following about an equal number occur in the western and southern parts of North America. Specimens can only be satisfactorily determined when nearly or quite mature. The genus is divided into the two subgenera, *Eucarex* (nos. 1-142) and *Vignea* (nos. 143-205).

I. Stamine flowers numerous, in one or more terminal spikes, which are sometimes pistillate at the base or summit; or the spike solitary and the stamine flowers uppermost or basal, rarely dioecious; stigmas mostly 3 and the achene 3-angled or swollen (stigmas 2 and the achene lenticular or compressed in nos. 12-16; 49-50; 67-72); pistillate spikes stalked or sessile, the lower commonly stalked. Nos. 1-142. EUCAREX.

A. Perigynia mostly long-beaked, 1½'-'10' long, often inflated, the bead usually as long as the body or longer (short-beaked in nos. 11-16, 34 and 35); pistillate spikes mostly large (small in nos. 1, 13 and 14), globose, ovoid, oblong or cylindric. Nos. 1-35.

(a) Perigynia membranous or papery. Nos. 1-31.

1. Spike solitary, few-flowered, staminate above; perigynia strongly reflexed, subulate. *Pauci-Florae.*

2. Spikes normally several, the stamine uppermost; if solitary, stamine at the base. (See no. 30.) Nos. 2-31.

*Perigynia ovoid, conic with a narrowed base, or subulate, tapering into the beak.* Nos. 2-28.

† Teeth of the perigynium-beak slender, short or none; not stiff nor awned. Nos. 2-24.

‡ Teeth of the perigynium-beak lancelolate or subulate. Nos. 2-10. LUPULINAE.

Pistillate spikes ovoid or globose, few-many-flowered.

Perigynia subulate, reflexed when mature.

Perigynia conic or ovoid, not reflexed.

Perigynia yellow or yellowish; perigynia little inflated.

Leaves ½'-2' wide; stamine spikes sessile.

Leaves 2'-5' wide; stamine spikes mostly stalked.

Plants green; perigynia much inflated; stamine spikes stalked.

Leaves 2½'-5' wide; heads loosely flowered.

Leaves 3½'-5½' wide; heads globose, dense.

Pistillate spikes ovoid or cylindric, densely many-flowered.

Perigynia strongly several-nerved, shining: leaves 1½'-2' wide.

Perigynia many-nerved, dull; leaves 2½'-3' wide.

Pistillate spikes cylindric; achene not longer than thick.

Perigynia yellowish, tapering into a beak twice as long as the body.

Perigynia greenish-brown, abruptly narrowed into a beak 2-3 times as long as the body.

Northern Uncinia. (Fig. 670.)
**Cyperaceae.**

†† Teeth of the perigynium-beak short or almost wanting (long in no. 17) nos. 11-24. **Vesicariae.**

Spikes small. 1 long or less, oblong or subglobose; stigmas often 2.

Spikes green or greenish yellow.

Leaves involute; perigynia ovate; pistillate spikes few, several flowers. 11. *C. oligosperma.*

Leaves flat; perigynia oblong-elliptic; pistillate spikes many-flowered. 12. *C. Kacena.*

Spikes dark brown or purple; arctic species.

Leaves flat.

Perigynia little inflated, papery.

Beak of perigynium nearly or quite entire.

Beak of perigynium sharp and minutely 2-toothed. 13. *C. miliaris.*

Perigynia much inflated, very fragile.

Leaves involute when dry.

Perigynia ascending or spreading, not reflexed.

Spikes narrowly cylindrical, 1'-6' long, 3'-4' thick.

Leaves 2'-6' wide; calum stout.

Leaves 1'-2 1/2' wide; calum slender. 17. *C. utricularia.*

Perigynia cylindrical or oblong-cylindric, 1'-2' long, 6' thick.

Scales smooth-awned.

Perigynia, at least the lower ones, reflexed when mature.

Perigynia of almost all species. nos. 25-28. **Pseudocyperae.**

Spikes all erect or spreading.

Spike, at least the lower ones, slender stalked and drooping.

Pistillate spikes oblong-cylindric, 1'-2' long; perigynia ascending.

Pistillate spikes narrowly cylindrical, 1'-2 1/2' long; perigynia reflexed.

Teeth of the beak erect or little spreading. 27. *C. Pseudocyperus.*

Teeth of the beak recurved-spreading. 28. *C. comosa.*

**Perigynia obvoid, very abruptly contracted into the beak; spikes exceedingly dense.** Nos. 29-31. **Squarrosee.**

Scales linear-subulate, longer than the perigynia.

Scales lanceolate, about one-half as long as the perigynia.

Scales ovate-lanceolate, rough-awned; leaves often pubescent.

Leaves bright green, not glaucous; teeth of the perigynium-beak slender, conspicuous.

Scales lanceolate, acute or acuminate; leaves glabrous.

Scales ovate-lanceolate, rough-awned; leaves often pubescent:

Leaves pale green, glaucous; teeth of the perigynium-beak short.

Pistillate spikes about 1' thick; teeth of the perigynium-beak manifest.

Pistillate spikes about 2' thick; teeth of the perigynium-beak manifest. 34. *C. riparia.*

35. *C. acutiformis.*

B. **Perigynia short-beaked or beakless, little or not at all inflated, 1/2'-2 1/2' long, the beak commonly not more than one-half as long as the body (long-beaked in nos. 43, 48, 93, 96); spikes small, and oblong or globose; or elongated, linear or narrowly cylindric.** Nos. 36-142.

(a) Spikes 2 or more, the staminate one always uppermost, sometimes partly pistillate. (No. 140 may be looked for here.) Nos. 36-132.

1. Pistillate spike or spikes many-flowered, mostly 1 long or more (or shorter in nos. 44, 48, 53-55, 61, 63-65, 73, 75, 76, 85, 89-92), linear, narrowly cylindric or oblong. Nos. 36-92.

* Perigynia with a straight short beak (long-beaked in no. 43; nearly beakless in no. 36), firm or leathery in texture; pistillate spikes erect (or nodding in no. 37); stigmas 3. Nos. 36-43.

Uppermost spike staminate from the base to about the middle. **Shortii.** 36. *C. Shortiana.*

Upper one or more spikes entirely staminate, or occasionally pistillate at the base.

Perigynia papillosa; beak very short, nearly or quite entire. **Anomalae.** 37. *C. scabra.*

Perigynia pubescent (sometimes glabrous in no. 39), the beak sharply 2-toothed. **Hirtae.**

Staminate spike or spikes sessile or nearly so.

Staminate spike or spikes distinctly stalked.

Leaves glabrous; native species.

Leaves flat or their margins slightly revolute.

Scales only half as long as the perigynia; southern coast species.

39. *C. Waleriana.*

Scales equalling or but slightly shorter than the perigynia; northern species.

Leaves 2'-3 1/2' wide; perigynia 1' thick, the nerves prominent. 40. *C. Hookertfohii.*

Leaves 1'-2' wide; perigynia 1' thick, the nerves obscured by the dense pubescence.

Leaves strongly involute, 1' wide or less.

Leaves or their sheaths pubescent: introduced species; beak long. 43. *C. hilata.*
**Perigynia beakless or very short-beaked (see no. 36), and with orifices nearly or quite entire, thin in texture, not inflected, closely investing the achene; pistillate spikes erect or drooping, often brown or purple; stigmas often 2. Nos. 41-72.**

† Pistillate spikes erect or somewhat spreading (drooping when mature in no. 45). Nos. 44-58.

Terminal spike staminate below, pistillate above (rarely all staminate in no. 47); stigmas 3.

A R T R A E A .

Scales shorter than or equalling the perigynia; arctic and alpine species.

Orifice of the perigynium minutely 2-toothed; scales obuse or acutish.

**Perigynia with orifices nearly or quite entire, thin in texture, not inflected, closely investing the achene; pistillate spikes erect or drooping, often brown or purple; stigmas often 2. Nos. 41-72.**

† Pistillate spikes erect or somewhat spreading (drooping when mature in no. 45). Nos. 44-58.

Terminal spike staminate below, pistillate above (rarely all staminate in no. 47); stigmas 3.

A R T R A E A .

Scales shorter than or equalling the perigynia; arctic and alpine species.

Orifice of the perigynium minutely 2-toothed; scales obuse or acutish.

**Perigynia with orifices nearly or quite entire, thin in texture, not inflected, closely investing the achene; pistillate spikes erect or drooping, often brown or purple; stigmas often 2. Nos. 41-72.**

† Pistillate spikes erect or somewhat spreading (drooping when mature in no. 45). Nos. 44-58.
Perigynia at'-'2" long, slightly swollen; spikes linear or linear-cylindric. Plant glabrous; perigynia obtuse.

Perigynia at'-'2" long; spikes erect or somewhat spreading.

Perigynia 2" long; spikes drooping, at least when old.

Perigynia 2"-2½" long, manifestly swollen; spikes oblong or oblong-cylindric. Perigynia faintly few-nerved; scales ovate, acute or short-awned.

Perigynia strongly many-nerved; scales lanceolate, long-awned.

†† Terminal spike entirely stamine, or sometimes pistillate at the base. Nos. 82-92. (See no. 110.) Perigynia manifestly beaked, nerved or nerveless; pistillate spikes drooping, at least when old.

Beak of the perigynium cylindric or subulate, 1-2 times as long as the body. Perigynia broadly oval, smooth, spreading. Perigynia narrowly conic, tuberculato-hispid, appressed. Beak of the perigynium not more than one-half as long as the body.

Leaves pubescent. FLEXILES.

Leaves glabrous. Leaves sile. Pistillate spikes narrowly oblong, 2"-6" long; perigynium at" long; arctic and alpine species. CAPILLARES.

Pistillate spikes linear, 1'-3' long; perigynium 2"-3" long. DEBILES.

Perigynia membranous, few-nerved; pistillate spikes slender. Leaves 2½"-3" wide; scales two-thirds as long as the perigynia. 85. C. capillaris. Leaves 1'-2½" wide; scales one-half as long as the perigynia. 86. C. arcata. Leaves 1'-2½" wide; scales one-half as long as the perigynia. 87. C. tenuis. Perigynia coriaceae, strongly many-nerved; pistillate spikes thicker.

Perigynia beakless or minutely beaked, finely many-atriate; spikes erect or nearly so. GRINEAE. Leaves slightly or not at all glaucous. Perigynia little longer or shorter than the scales. Pistillate spikes dense, usually many-flowered; leaves 2½"-3" wide, spreading, soft. 89. C. grisea. Pistillate spikes loosely several-flowered; leaves 1½"-2½" wide, mostly erect and rigid. 90. C. amphibia. 91. C. flavosperma. 92. C. glaucidea. Perigynia 2-3 times longer than the scales. Plant very glaucous all over.

2. Pistillate spikes small, few-many-flowered, mostly 3"-12" long (sometimes longer in nos. 103, 104, 116). Nos. 93-132. (See also nos. 44, 48, 53-55, 61, 63-65, 68, 73, 75, 80, 84, 85 and 89-92.) * Perigynia glabrous. Nos. 93-120. (See no. 123.)

† Pistillate spikes many-flowered, 4"-'t" long, usually dense. Nos. 93-99.

Pistillate spikes scattered, distant, long-stalked or the 2 upper ones close together and nearly sessile. GRANULARES.

Bracts elongated, mostly overtopping the spikes; perigynia strongly many-nerved.

Bracts short, rarely overtopping the spikes; perigynia obscurely few-nerved. 94. C. Craveri. Pistillate spikes close together and nearly sessile at the summit of the culm, or the lowest distant and stalked.

Beak of the perigynium stout, 2-toothed; plants glabrous. EXTENSÆ.

Leaves strongly involute; perigynia brown, the beak shorter than the body. 95. C. extensa. Leaves flat, 1½"-2½" wide; perigynia yellow when mature, 2½"-3" long; the beak about as long as the body. 96. C. flavâ. Leaves flat, 1" wide or less; perigynia dark green, 1½" long, the beak one-half as long as the body. 97. C. viridula. Beak of the perigynium short, entire or none; leaves, or their sheaths, more or less pubescent.

PALASENTES.


†† Pistillate spikes few—several-flowered, often loose. Nos. 100-120; 135-138.

† Scales of the spike normal, not elongated and leaf-like. Nos. 100-120.

‡ Leaves 1½"-1½" wide; bracts usual, usually large. Nos. 100-119.

O Perigynia green (yellow or purple in no. 116). Nos. 100-117.

Perigynia finely many-atriate. OLIGOCARPAE.

Sheaths glabrous.

Perigynia narrowed at both ends, beakless. 100. C. conoida. Perigynia with a short entire beak. 101. C. oligocarpa. Perigynia with few or many, mostly strong nerves. LAXIFLORAE.

Plants not at all glaucous, or very slightly so. Beak of the perigynium straight, slender.

Culms slender, spreading; pistillate spikes 2 or 3, stalked, spreading. 103. C. altocaicus. Culms stout, erect; pistillate spikes 1 or 2, erect.

Beak of the perigynium bent, short or none.

SEDGE FAMILY.

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Scales acute, cuspidate, acuminate, or awned.
Perigynia oblong, 1/5′-1 1/2′ long.
Perigynia oblong, about 2′ long.
Perigynia sharply 3-angled.
Spikes drooping or spreading; leaves 1′-2′ wide, or wider in the variety.
Spike erect; leaves 3′-6′ wide.
Leaves broad, 6′-18′ wide.
Bracts leafy, the upper usually overtopping the spikes.
Spikes mostly reduced to purple leafless sheaths.
Plants distinctly glaucous.
Perigynia drooping on hair-like stalks.
Basal leaves much longer than the culm.
Basal leaves shorter than the culm or equalling it.
Leaves 6′-13′ wide.
Leaves 1′-2′ wide.
Scales acute; perigynia yellow, purple or mottled.
Scales obtuse, or the lower acute; perigynia pale green.

○○ Perigynia white, yellow or becoming brown. Bicolores.

Perigynia beakless.
Perigynia with a short cylindrical beak; arctic species.

ⅡⅡ Leaves and culms almost capillary; bracts reduced to bladeless sheaths.

DIGITATAE.

Perigynia more or less pubescent; becoming glabrous in no. 123.

Culm-leaves present, often short; bracts mainly reduced to bladeless purplish sheaths.

PEDUNCULATAE.

Staminate spike short-stalked or sessile.
Perigynia about twice as long as the scales.
Perigynia not longer than the scales.
Staminate spike long-stalked, commonly with some pistillate flowers at its base.

Leaves all basal; bracts short or long, not sheathing.

Neither the culm nor the leaves pubescent; perigynia rounded.

MONTANAE.

Plant not stoloniferous.

Perigynia more or less pubescent (becoming glabrous in no. 123).

Plants stoloniferous, the stolons sometimes short.

Culms, or some of them, longer than the leaves.

Scales smooth or very nearly so.
Staminate spike conspicuous, 3′-6′ long.
Staminate spike stout, 1/5′-1 1/5′ thick.
Plant dark green; staminate spike very prominent; perigynia broadly oval.
Plant light green; staminate spike shorter; perigynia oblong.

Staminate spike very slender, not over 1/5′ thick.
Staminate spike inconspicuous, rarely over 2′ long (longer in the variety.)

Scales, at least the lower, rough-awned.

Culms, or most of them, much shorter than the leaves.

Scales light green with lighter scariosus margins; perigynia oval.

Plant pubescent all over; perigynia sharply 3-angled.

PHYLLOSTACCHAE.

(b) Spike solitary (except in no. 140), sometimes dioecious.

Leaves 1′-2′ wide, thick, spreading.

PhysoccephalaE.

Leaves 1′-3′ wide.

Staminate and pistillate spikes on different culms.

Scirpinae.

Leaves longer than the culm; perigynia obovoid; southern species.
Leaves shorter than the culm; perigynia oval; northern species.

Staminate and pistillate flowers in the same spike.

Scales of the spike leaf-like, elongated.

PHYLLOSTACCHAE.

Lower scales 1′ wide or less, not enclosing the perigynia.

Body of the perigynium oblong, its beak flattened.

Body of the perigynium globose, its beak subulate.

Lower scales 1′-2′ wide, enclosing the perigynia.

Scales of the spike short, normal.

Leaves 1′-2′ wide; arctic and western species.

Rupes tres.

Stipitately gladiolatus, androgynous; perigynium-beak stout, long.

Spikes 2-4, the staminate uppermost; perigynium-beak short.

Leaves 3′-6′ wide or less.

Perigynia obtuse, beakless; swamp species.

Leptocephala.

Perigynia obovoid-oval, beaked; prairie species.

Filifoliae.

111. C. canadensis.
112. C. Horrida.
113. C. bicolor.
114. C. phlyctocarpa.
115. C. platyphylla.
116. C. panicca.
117. C. livida.
118. C. aureca.
119. C. bicolor.
120. C. setifolia.
121. C. concinna.
122. C. Richardsoni.
123. C. pedunculata.
124. C. pedicellata.
125. C. panicca.
126. C. varia.
127. C. Novae-Angliae.
128. C. pedicellata.
129. C. praecox.
130. C. nigronmarginata.
131. C. umbellata.
132. C. pubescens.
133. C. Fraseri.
134. C. pica.
135. C. scirpoidea.
136. C. Wildenovii.
137. C. Jamesii.
138. C. duri folia.
139. C. Purpurea.
140. C. tubulosa.
141. C. leptaera.
142. C. filifolia.
II. Stamine flowers few, at the summits or bases of the always sessile spikes, or sometimes forming whole spikes, or variously intermixed with the pistillate; stigmas always 2; achene lenticular, compressed, ellipsoid or plano-convex. Nos. 143-205. VIGNEA.

   (a) Spike solitary, terminal, mostly brown, plants often dioecious. Nos. 143-145. Dioeciae.
   Perigynia nerveless, or faintly few-nerved.
   Perigynia with a short nearly entire beak. 143. C. capitata.
   Perigynia beakless, the orifice 2-toothed. 144. C. nardina.
   Perigynia strongly several-nerved on the outer face.
   Beak of the perigynium very short.
   Beak slender, rough, about half as long as the body of the perigynium. 145. C. Redowskiana.
   Beak 1/2-1/3 length of the body.
   Perigynia strongly several-nerved.
   Scales lanceolate, ovate-lanceolate, or ovate-lanceolate (more or less aggregated in nos. 170-173). Nos. 152-173.

   (b) Spikes several or many, clustered, separated or sometimes pinnate. Nos. 147-151.
   * Spikes densely aggregated into a globose or ovoid head, often appearing like a solitary terminal spike.
   Scales ovate or ovate-lanceolate, acute or acuminate, not awned. Poetidiae.
   Perigynia strongly many-nerved.
   Culms and leaves usually curved; scales shorter than the perigynia. 147. C. chordorrhiza.
   Perigynia faintly several-nerved.
   Culms mostly straight, erect; scales equalling the perigynia. 148. C. incurva.
   Scales lanceolate, awned, or long-acuminate. Areneriae.
   Scales 2-4 times longer than the perigynia; western species. 149. C. stenophylla.
   Scales about equalling the perigynia; introduced sea-coast species. 150. C. Douglassii.
   ** Clusters of spikes looser, often compound or the spikes distinctly separated (more or less aggregated in nos. 170-173). Nos. 152-173.

† Spikes yellowish or brown at maturity, often in compound or pinnate clusters. Nos. 152-163.
   Perigynia strongly several-nerved, especially on the outer face. Nos. 152-154. Vulpinae.
   Beak of the perigynium shorter than the body. 152. C. conjuncta.
   Beak of the perigynium equalling or longer than the body.
   Spikes crowded in an oblong cluster; beak 1-2 lengths of the body. 153. C. stipata.
   Spikes in a large branching cluster; beak 3-4 lengths of the body. 154. C. Crus-corti.
   Spikes very numerous in a branched decomposed cluster, small. 155. C. decompedita.
   Spikes several or many in an oblong or oval, simple or somewhat compound cluster.
   Leaves 1/2-1/3 length of the body; western species. 156. C. marecida.
   Beak as long as the body; northern marsh species. 157. C. leucellavica.
   Scales acuminate, cuspidate or awned.
   Perigynia 1 1/2-2 1/2 times as long as the body. 158. C. alopecoidea.
   Perigynia broadly ovate or orbicular, the beak about one-third as long as the body. 159. C. granida.
   Perigynia 1 1/2 times as long or less.
   Leaves as long as the culm or longer. 160. C. vulpinoides.
   Leaves shorter than the culm.
   Perigynia ovate-elliptic, the base narrowed.
   Perigynia lanceolate, the base truncate. 161. C. xanthocarpa.
   Scales blunt, scarious-tipped. 162. C. setacea.
   163. C. Sartiscelliti.

†† Spikes green or greenish when mature, aggregated or separated, in simple clusters. Nos. 164-173. Muhlenberghianae.
   Perigynia ellipsoid, nearly terete; spikes 1-5 flowered, widely separated, or the upper close together.
   Perigynia lanceolate, ovate or roundish, compressed or plano-convex; spikes several—many flowered.
   Spikes separated or the upper close together; perigynia mostly radiating, or reflexed.
   Leaves 1/2-1/2 length of the body.
   Beak of the perigynium one-third to one-half as long as the body; native woodland species.
   Perigynia ovate-lanceolate, 1/2-1 1/2 times as long as the body. 164. C. tenella.
   Perigynia stellately radiating.
   Perigynia reflexed when mature. 165. C. rosea.
   Perigynia narrowly lanceolate, 1 1/2-2 times as long as the body. 166. C. retroflexa.
   Perigynia exilis.
   Beak of the perigynium more than half as long as the body; introduced wild species. 167. C. Texensis.
   Leaves 1/2-1/2 length of the body.
   Scales reflexed, scarious-tipped. 168. C. muricata.
   Spikes all aggregated or the lower separated; perigynia spreading or ascending.
   Leaves thin, lax, 2-4 times as wide, perigynia about 2 times as long. 169. C. sparganioides.
   Beak of the perigynium one-third to one-half as long as the body; native woodland species.
   Perigynia ovate-lanceolate, 1/2-1 1/2 times as long as the body. 170. C. cephaloida.
   Leaves 1/2-1/2 length of the body.
   Scales reflexed, scarious-tipped. 171. C. cephalophora.
   Leaves 2 1/2-3 wide; perigynia ovate. 172. C. Leavenworthii.
   Perigynia 1 1/2-2 times as long as the body; perigynia orbicular-ovate; southern. 173. C. Muhlenbergii.
2. STAMINATE FLOWERS VARIOUSLY MINGLED WITH THE PISTILLATE IN THE SPIKES OR OCCASIONALLY FORMING WHOLE SPIKES. (See nos. 143-146.)

Perigynia radiately spreading or reflexed.
Perigynia erect or appressed.
Perigynia wingless, the inner face flat.
Perigynia winged, the inner face concave.

Perigynia radiately spreading, or reflexed when old.
Perigynia distinctly nerved on both faces, the beak rough.
Perigynia lanceolate; beak more than half as long as the body.
Perigynia ovate; beak about one-third as long as the body, abrupt.
Perigynia faintly nerved on the outer face, nerveless or nearly so on the inner; beak smoothish.

Perigynia ascending, appressed or somewhat spreading when old, not radiating.
Perigynia ovate, oval, oblong or elliptic.
Bracts short, scale-like or none, the lowest occasionally longer than its spike.

(a) Perigynia without a marginal wing. Nos. 174-187. ELONGATAE.

Perigynia radiately spreading, or reflexed when old.
Perigynia distinctly nerved on both faces, the beak rough.
Perigynia lanceolate; beak more than half as long as the body.

Perigynia ovate; beak about one-third as long as the body, abrupt.
Perigynia faintly nerved on the outer face, nerveless or nearly so on the inner; beak smoothish.

Perigynia ascending, appressed or somewhat spreading when old, not radiating.
Perigynia ovate, oval, oblong or elliptic.

Bracts short, scale-like or none, the lowest occasionally longer than its spike.

Spikes distinctly separated or the upper close together.

Heads silvery green or nearly white.
Heads brown or brownish.
Spikes few-flowered, 2'-3' long; perigynia less than 1'' long, the beak manifest.

Spikes densely clustered at the top of the culm, or the lower separated.
Spikes green or greenish brown.

Spikes in an ovoid cluster; perigynia ovate, rough-beaked.

Spikes only 2-4; perigynia elliptic, beakless.
Spikes dark brown; arctic species.

Culms slender, stiff, erect.
Leaves involute; scales about equalling the perigynia.

Leaves flat; scales shorter than the perigynia.

Culms weak, spreading or reclining.
Bracts bristle-form, much elongated, much exceeding the 2-4 oblong nerved perigynia.

Perigynia lanceolate or ovate-lanceolate.
Perigynia nervous; spikes oblong or subglobose.

(b) Perigynia with a narrow or broad marginal wing. Nos. 188-205. OVALES.

Perigynia lanceolate or ovate-lanceolate, 2-5 times as long as wide.

Top of the culm mounding; arctic and northwestern species.

Culms strictly erect, mostly stiff.

Perigynia nervous, broadly winged; northwestern species.

Perigynia several-nerved on both faces.

Perigynia broadly winged; staminate flowers intermixed with the pistillate.

Perigynia narrowly winged; staminate flowers all basal.

| Spikes 1 1/2'-1 long; perigynia about 4 1/2 long. | 191. C. MAssinghwnensis. |
| Spikes 2'-3' long; perigynia 2'-3' long. | |
| Spikes oblong or oval; perigynia ascending or erect. | |
| Spikes green-brown, blunt. | 192. C. tribuloides. |
| Spikes bright brown, pointed; perigynia lanceolate. | 193. C. scopolia. |
| Spikes rather dark brown, blunt; perigynia ovate-lanceolate. | 194. C. leporina. |

Spikes subglobose; perigynia spreading, at least when old. 195. C. cristatella.

Perigynia ovate, not more than twice as long as wide (longer in some forms of no. 198.)

Perigynia narrowly winged above; heads greenish brown.

Perigynia broadly wing-margined.

| Perigynia spreading or ascending. | 169. C. adusta. |
| Spikes silvery green. | 167. C. foenea. |
| Spikes yellowish brown or greenish. | 168. C. stramina. |

Perigynia erect or appressed.

Heads silvery green or nearly white; sea-beach species.

Heads brown-green; meadow or marsh species.

Perigynia orbicular, very broadly ovate or somewhat obovate, sometimes wider than long.

Heads green-brown.

Perigynia spreading or ascending; achene sessile.

Perigynia erect, 2'-2 1/2' broad; achene short-stalked.

Heads silvery green, yellowish or whitish.

Perigynium-wing firm; achene sessile.

Perigynium-wing membranous; achene stalked.

Perigynia narrowly linear-lanceolate, tapering into a subulate beak 2-3 times as long as the body.

CYPERIDEAE.
1. Carex pauciflora Lightf. Few-flowered Sedge. (Fig. 671.)

Carex pauciflora Lightf. Fl. Scot. 543. pl. 6. 1777.

Glabrous, culms erect or assurgent, very slender, 3'-2° high. Leaves very narrow, shorter than the culm, the lowest reduced to toothed sheaths; spike solitary, androgynous, the staminate and pistillate flowers each 2-5, the staminate uppermost; perigynium green, narrow, scarcely inflated, 3'/4'-4'/4" long, about 11/2" in diameter, several-nerved, tapering from below the middle into a slender or almost subulate beak, strongly reflexed and readily detachable when mature, 2-3 times longer than the deciduous lanceolate or ovate scale; stigmas 3.


2. Carex Collinsii Nutt. Collins' Sedge. (Fig. 672.)


Glabrous, culms very slender, erect or reclining, 6'-2° long. Leaves narrow, the broadest about 21/2" wide, the uppermost not exceeding the culm; staminate spike terminal, stalked; pistillate spikes 2-4, distant, 2-8-flowered, short-stalked, or the stalk of the lowest sometimes 11/2" long; bracts similar to the upper leaves, elongated; perigynium light green, scarcely inflated, subulate, 5'/4'-7'/4" long, tapering from below the middle into an almost filiform beak, faintly many-nerved, strongly reflexed when mature, about 3 times as long as the hyaline lanceolate-acuminate persistent scale, its teeth reflexed at maturity; stigmas 3.

In bogs, Rhode Island to eastern Pennsylvania, south to South Carolina and Georgia. Ascends to 2000 ft. in Pennsylvania. Attributed to Canada by Michaux. June-Aug.

3. Carex abacta Bailey. Yellowish Sedge. (Fig. 673.)


Glabrous, whole plant yellowish, culm erect or slightly assurgent at the base, rather stiff, slender, 1°-2° high. Leaves narrow, the broadest about 2" wide, the uppermost often exceeding the culm; staminate spike terminal, closely sessile; pistillate spikes 2 or 3, several-flowered, the upper sessile or very nearly so and closely approximated, the lowest, when present, remote and borne on a stalk 11/2'-2' long; bracts similar to the leaves, usually erect and overtopping the culm; perigynium slender, narrow, scarcely inflated, erect or spreading, tapering into a subulate 2-toothed beak, 5'/4'-7'/4" long, less than 1" thick at the base, rather strongly many-nerved, about twice as long as the lanceolate or ovate, acute or acuminate scale; stigmas 3.

4. Carex folliculata L. Long Sedge. (Fig. 674.)


Glabrous, light green or yellowish, culm stout or slender, erect or reclining, 1½"-3" long. Leaves broad and elongated, sometimes overtopping the culm, often ½' wide; staminate spike stalked or nearly sessile; pistillate spikes 2-4, usually distant, all except the uppermost slender-stalked, several-many-flowered, the lower often nodding on a stalk 2'-3' long; bracts commonly overtopping the spikes; perigynium ovoid, somewhat inflated, ascending or spreading, green, rather prominently many-veined, 6½'-8½' long, 1' or a trifle more in diameter near the base, tapering from below the middle into a slender 2-toothed beak, one-third to one-half longer than the awned broadly scarious-margined persistent scale; teeth of the perigynium nearly erect; stigmas 3.

In swamps and wet woods, Newfoundland to Maryland, west to Michigan and West Virginia. May-Sept.

5. Carex intumescens Rudge. Bladder Sedge. (Fig. 675.)

*Carex intumescens* Rudge, Trans. Linn. Soc. 7: 97. pl. 9. f. 3. 1804.

Glabrous, culms slender, commonly tufted, erect or slightly reclining, 1½"-3" high. Leaves elongated, dark green, shorter than or sometimes equaling the culm, roughish, 1½'-3½' wide; bracts similar, overtopping the culm; staminate spike narrow, mostly long-stalked; pistillate spikes 2 (1-3) sessile or very short-stalked, globose or ovoid; perigynia 1-3, spreading or the upper erect, 6½'-10½' long, much inflated, about 3" in diameter above the base, many-nerved, tapering from below the middle into a subulate 2-toothed beak, the teeth somewhat spreading at maturity; scales narrowly lanceolate, acuminate or aristate, about one-half as long as the perigynia; stigmas 3.

In swamps, bogs and wet woods, Newfoundland to Manitoba, south to Florida and Louisiana. May-Oct.

6. Carex Asa-Grayi Bailey. Gray's Sedge. (Fig. 676.)


*Carex Grayi* Dewey, 1831.


Glabrous, culms stout, erect or slightly assurgent at the base, 2½'-3½' tall. Leaves elongated, dark green, 3½'-4½½' wide, the upper commonly overtopping the culm; bracts similar to the upper leaves, usually much overtopping the culm; staminate spike mostly long-stalked; pistillate spikes 1 or 2, globose, dense, about 1' in diameter; perigynia 10-30, ovoid, glabrous or pubescent, much inflated, many-nerved, about 4" in diameter above the base, tapering to a sharp 2-toothed beak; scales ovate or lanceolate, acuminate or cuspidate, scarious, about one-third as long as the perigynia; stigmas 3.

In swamps and wet meadows, Vermont to Michigan, south to Georgia and Missouri. June-Sept.
8. Carex lupulina Muhl. Hop Sedge. (Fig. 678.)

Glabrous, culms stout, erect or reclining, 1°-4° tall. Leaves elongated, nodulose, 2½°-6° wide, the upper ones and the similar bracts much overtopping the culm; staminate spike solitary or rarely several, nearly sessile or slender-peduncled, rather stout; pistillate spikes 2-5, densely many-flowered, sessile or the lower slender-stalked, oblong, 1½°-2½° long, often 1' in diameter; perigynia ascending or spreading, often short-stalked, much inflated, many-nerved, 6°-9° long, about 1½° in diameter just above the base, tapering from much below the middle into a subulate 2-toothed beak; achene longer than thick; scales lanceolate, acuminate or aristate, one-third as long as the perigynia; stigmas 3.

In swamps and ditches, Hudson Bay to western Ontario, Florida and Texas. June-Aug.

Culms slender; pistillate spikes remote, slender-stalked, sometimes staminate at the summit. the perigynia widely spreading at maturity, the staminate spike sometimes branched and with 1 or 2 perigynia at its base. Eastern New York to southern Ontario.

A hybrid with C. retrorsa is described by Professor Dudley (Cayuga Fl. 110 1886).

9. Carex lupuliformis Sartwell. Hop-like Sedge. (Fig. 679.)

Glabrous, culm stout, erect, 1½°-3° tall. Leaves and bracts similar to those of the preceding species, much elongated; staminate spike solitary, stalked or nearly sessile, sometimes 4° long; pistillate spikes 3-6, stalked or the upper sessile, densely many-flowered, 2°-3° long, 6°-10° in diameter, often staminate at the top; perigynia yellowish, at first appressed, later ascending, sessile, much inflated, several-nerved, 5°-8° long, about 2° in diameter above the base, tapering from below the middle to a subulate 2-toothed beak; achene as long as thick, its angles mamillate; scales lanceolate, awned, shorter than or equaling the perigynia.

Swamps, Rhode Island to Del. and Minnesota. June-Aug.
10. *Carex grándis* Bailey. Large Sedge. (Fig. 680.)


Not Rudge, 1804.


Glabrous, culm slender, erect or reclining, 2°-3° high. Leaves rather dark green, elongated, 4'-6' wide, the uppermost sometimes surpassing the culm; bracts similar to the leaves, much overtopping the culm; staminate spike sessile or peduncled, sometimes bearing perigynia at its base; pistillate spikes 3-5, all stalked or the upper sessile, cylindrical, 1'-3' long, sometimes staminate at the summit; perigynia much swollen at the base, and about 2" in diameter, 5'-6' long, many-nerved, spreading at maturity, 3-4 times as long as the scarious lanceolate acuminat' or aristate scale, abruptly contracted into a subulate 2-toothed beak 2-3 times as long as the inflated portion; stigmas 3.

In swamps, Delaware to Kentucky and Missouri, south to Florida, Louisiana and Texas. June-Aug.

11. *Carex oligóspérma* Michx. Few-seeded Sedge. (Fig. 681.)


Glabrous, culms very slender, erect, rather stiff, 1½°-3° tall. Leaves about 1½" wide, not exceeding the culm, involute when old; bracts similar, overtopping the culm; staminate spike stalked, narrowly linear; pistillate spikes 1 or 2, globose or obovoid, 5'-10' long, sessile or the lower short-stalked, few-several-flowered, the upper sometimes reduced to 1 or 2 perigynia and with a staminate summit; perigynia ovoid, erect, inflated, strongly few-nerved, yellowish green, 2'-2½" long, about 1½" in diameter, tapering from the middle into a minutely 2-toothed beak; scales acute or mucronate, shorter than the perigynia; stigmas 3.

In bogs, Labrador to the Northwest Territory, south to Massachusetts, Pennsylvania and Michigan. June-Sept. Ascends to 4000 ft. in the Adirondacks.

12. *Carex Raeána* Boott. Rae's Sedge. (Fig. 682.)


*Carex Raeana* Boott; Richards. Arct. Exp. 2: 344. 1851.

Culm stouter than that of *C. miliaris*, very rough above, 1½°-3° tall. Leaves 1'-1½" wide, flat, shorter than the culm, nodulous, somewhat scabrous on the margins, the lower bracts narrower, about equaling the culm; staminate spikes 1-4, slender-stalked; pistillate spikes 1-3, erect, cylindrical or obovoid, 6'-12' long, sessile or the lower short-stalked; perigynia obovoid-elliptic, yellowish-green, few-nerved, acute, narrowed into a rather conspicuous 2-toothed beak; scales lanceolate, acute or acuminate, yellowish or brown-margined, slightly shorter than the perigynia; stigmas 2 or 3.

On lake and river shores, northern Maine to Labrador. Summer.
13. Carex miliaris Michx. Northeastern Sedge. (Fig. 683.)


Glabrous, culms very slender, erect, roughish above, 1°-2° tall. Leaves flat, about 1" wide, elongated, nodulose, the upper about equalling the culm; bracts similar to the leaves, often overtopping the culm; staminate spikes 1 or 2, stalked, narrowly linear; pistillate spikes 1-3, oblong or linear-oblong, many-flowered, 4'-1' long, the upper sessile, the lowest, when three, stalked; perigynia inflated, ovoid, faintly few-nerved, 1°-1½' long, dark brown or brown-tipped, tapering into a short, nearly entire beak, slightly longer than the ovate or ovate-lanceolate, wholly or partly brown, obtuse or acute scale; stigmas 2.

Borders of lakes and streams, Labrador and northern Quebec. Reported from northern Minnesota. Summer.

14. Carex saxatilis L. Russet Sedge. (Fig. 684.)


Glabrous, culms erect, slender, 3'-12' tall. Leaves flat, 1½'-1½' broad, the upper not overtopping the culm; bracts short; staminate spike solitary, short-stalked; pistillate spikes 1-4, all stalked or the upper nearly or quite sessile, oblong, densely many-flowered; perigynia dark purple-brown, ascending, ovoid, slightly inflated, nerveless or very faintly few-nerved, tipped with a short minutely 2-toothed beak; scales oblong, subacute, greenish purple, about as long as the perigynia; stigmas usually 2.

Greenland to James Bay and Alaska. Also in arctic Europe and Asia. Summer.

15. Carex membranopácta Bailey. Fragile Sedge. (Fig. 685.)


Similar to _C. saxatilis_ but stouter and taller, 6'-18' high. Leaves flat, not exceeding the culm, 1½'' wide; bracts short, the lower commonly longer than its spike, the upper subulate; staminate spikes 1-3, short-stalked; pistillate spikes 1-3 (commonly 2), sessile or the lower short-peduncled, narrowly oblong, obtuse, densely many-flowered, about 1'' long and 4'' in diameter; perigynia spreading, brown-purple, ovoid, fragile, much inflated, about 1½'' long, tipped with a short nearly entire beak, little nerved, about as long as the ovate-oblong greenish-purple or white-margined scales.

Greenland, through arctic America to Kamptchatka. Summer.
16. Carex ambústa Boott. Blackened Sedge. (Fig. 686.)

*Carex ambústa* Boott, Ill. 64, pl. 172. 1838.

Similar to *C. saxatilis*, culms slender, erect, 8'-18' tall, nearly or quite smooth. Leaves nearly or quite smooth, elongated, mostly less than 1'' wide, involute in drying, nearly erect, shorter than the culm; bracts similar to the upper leaves, sometimes equaling or overtopping the culm; staminate spike solitary, stalked; pistillate spikes 1 or 2, oblong, erect, obtuse, densely many-flowered, slender-stalked or the upper nearly sessile, 6'-6' long, about 3½'' in diameter; perigynia oblong-lanceolate, 1½'' long, rather more than ½'' wide, spreading or ascending, bicouvéx, smooth, firm, not at all inflated, dull, faintly few-nerved at the base, green below, dark brown at the summit, tapering into a short minutely 2-toothed beak; scales lanceolate, dark brown, as long as the perigynia; stigmas 2.

Labrador, British Columbia to Alaska. Summer.

17. Carex utriculátæ Boott. Bottle Sedge. (Fig. 687.)

*Carex utriculátæ* Boott; Hook. Fl. Bor. Am. 2: 221. 1840.

*C. utriculátæ* var. minor Boott, loc. cit. 1840.

Glabrous, culms stout, erect, 2°-4° tall. Leaves elongated, nodulose, the upper mostly exceeding the culm, 2°-6'' wide, the midvein prominent; bracts overtopping the culm; staminate spikes 2-4, linear, stalked, the lower occasionally pistillate at the top and usually subtended by a very slender bract; pistillate spikes 3 or 4, nearly erect, cylindric, densely many-flowered or sometimes looser near the base, 2°-6' long, the lower short-stalked, the upper sessile, sometimes staminate at the summit; perigynia spreading when old, ovoid, light green, somewhat inflated, few-nerved, 2°-2½'' long, narrowed into a sharp 2-toothed beak; scales lanceolate, the lower awned and slightly longer than the perigynia, the upper acute; stigmas 3.


18. Carex monile Tuckerm. Necklace Sedge. (Fig. 688.)

*Carex monile* Tuckerm. Enum. Meth. 20. 1843.

*Carex Olneyi* Boott, Ill. 15, pl. 57. 1858.

Glabrous, culm slender, erect or reclining, 1½°-3° tall. Leaves elongated, rather light green, 1½''-2½'' wide, sometimes exceeding the culm, little or not at all nodulose; bracts similar, often overtopping the culm; staminate spikes 1-4, usually 2 or 3, slender-stalked, commonly subtended by short bracts; pistillate spikes 1-3, erect-spreading, cylindric, 1°-3° long, about 4'' in diameter, many-flowered, rather loose at maturity, the upper sessile, the lower one, when 3, slender-stalked and usually remote; perigynia yellowish green, ascending or spreading, ovoid, inflated, about 2½'' long, rather strongly 8-to-nerved, tapering into a sharp 2-toothed beak; scales lanceolate, acuminate or awned, shorter than the perigynia; stigmas 3.

In marshes and wet meadows, Nova Scotia to British Columbia, south to New Jersey, Missouri, in the Rocky Mountains to Colorado, and to California. June-Aug.
Carex monile monstrosa Bailey, Mém. Torr. Club, 1: 30. 1889. A form with the terminal spike more or less pistillate, the pistillate spikes very small and loosely flowered, usually on very long stalks, found several years ago along the Concord River, Mass., has not since been collected.

19. Carex Tuckermæni Dewey. Tuckerman’s Sedge. (Fig. 689.)

Glabrous, culm very slender, usually roughish above, erect or reclining, 2°–3½° long. Leaves and bracts much elongated, commonly much overtopping the culm, 1½'–2½' wide, sometimes sparingly nodulose; staminate spikes 2 or 3; pistillate spikes stout, cylindrical, 1'–2' long, about ½' in diameter; the upper sessile or nearly so, the lower stalked and usually spreading; perigynia very much inflated, yellowish-green, ovoid, prominently few-nerved, ascending, abruptly contracted into a subulate 2-toothed beak; scales lanceolate, smooth-awned, about half as long as the perigynia; stigmas 3.


20. Carex bullata Schk. Button Sedge. (Fig. 690.)

Glabrous, culms very slender, erect, 1°–2½° high, roughish above. Leaves and bracts very narrow and elongated, rather stiff, commonly overtopping the culm, rarely more than 2'' wide, rough-margined, sparingly nodulose; staminate spikes mostly 2, long stalked; pistillate spikes 1–3, usually 2, light green, varying from almost sessile to long-stalked and spreading, many-flowered, oblong or oblong-cylindric, 1'–1½' long, 4½'–6½' in diameter; perigynia much inflated, ovoid, 2½'–3½' long, spreading when mature, tapering into a subulate rough 2-toothed beak, shining, strongly curved, 2–3 times longer than the lanceolate acuminate or acute scale, or the uppermost scales obtuse; stigmas 3.

In swamps, Massachusetts to North Carolina. June–Aug.

21. Carex retrórsa Schwein. Retrorse Sedge. (Fig. 691.)

Glabrous, culm stout, erect, smooth or slightly rough above, 1°–3½° tall. Leaves elongated, thin, rough-margined, sparingly nodulose, 2½'–3½' wide, the upper commonly exceeding the culm, the bracts similar, usually much overtopping the culm; staminate spikes 1–3, short-stalked; pistillate spikes 3–6, ascending or spreading, all close together at the summit and sessile or very nearly so or the lowest distant and stalked, cylindrical, densely many-flowered, 1'–2' long, about ½' in diameter; perigynia ovoid, membranous, strongly few-nerved, yellowish green, about 3'' long, reflexed at maturity, tapering into a subulate 2-toothed beak; scales lanceolate, acute, smooth, one-third to one-half as long as the perigynia; stigmas 3.

22. Carex Hartii Dewey. Hart Wright’s Sedge. (Fig. 692.)


Glabrous, culm slender, nearly smooth 1½"-2½" long. Leaves elongated, rough on the margins and lower side of the midvein, 2"-3" wide, the upper and the similar bracts much overtopping the culm; staminate spikes 1 or 2, the lower sometimes pistillate at the base, borne on a stalk ½'-1' long; pistillate spikes 2-4, scattered, rather loosely many-flowered, the upper sessile, the lower slender-stalked, 1'-2' long, about ½' thick, all erect or ascending; perigynia inflated, ovoid-conic, spreading or the lower slightly reflexed, prominently few-nerved, about 3" long, gradually tapering into the long 2-toothed beak, 2-3 times as long as the lanceolate acute or acuminate scale; stigmas 3.


23. Carex lurida Wahl. Sallow Sedge. (Fig. 693.)


Glabrous, culm slender, erect, smooth or slightly scabrous above, 1½"-3" tall. Leaves elongated, rough, rarely more than 2" wide, the upper and the similar bracts usually much overtopping the culm; staminate spike usually solitary, short-stalked, elongated; pistillate spikes, 1-4, cylindric, densely many-flowered, 1'-2' long, about ½' in diameter, the upper sessile, the lower peduncled and spreading or drooping; perigynia inflated, ovoid, tapering into a long subulate beak, ascending or the lower spreading, 4'-6' long, thin, yellowish green, rather conspicuously nerved, longer than the rough-awned scale; stigmas 3.


*C. tentaculata* var. *parsula* Paine, Cat. Pl. Oneida, 105. 1865.

Culm 6'-18' high; pistillate spikes only 1 or 2, scarcely more than ½' long, globose or oblong, sessile or very nearly so; perigynia 3'-4' long. New Hampshire to Pennsylvania and Iowa.

Carex lurida exundana Bailey

Culms long and spreading; pistillate spikes 1½'-2½' long, on very long stalks; scales subulate, the lower often much longer than the perigynia. Occasional with the typical form.

24. Carex Baileyi Britton. Bailey’s Sedge. (Fig. 694.)

*C. tentaculata* var. *gracilis* Boott, Ill. 94. 1860. Not *C. gracilis*, R. Br. 1810.


Glabrous, culms erect or reclining, very slender, minutely scabrous above, 1°-2° long. Leaves roughish, elongated, 1½"-2½" wide, the upper and the similar bracts exceeding the culm; staminate spike solitary, short-peduncled; pistillate spikes 1-3, narrowly cylindric, very densely many-flowered, all erect or ascending, 9'-2' long, about 4' in diameter, the upper sessile, the lower more or less stalked; perigynia inflated, ovoid, 2½'-3½' long, ascending, abruptly contracted into the subulate 2-toothed beak, prominently several-nerved, the lower about equalling, the upper longer than the linear-subulate ciliate-scabrous scale; stigmas 3.

25. Carex Schweinitzii Dewey. Schweinitz’s Sedge. (Fig. 695.)


Glabrous, light green, culm erect, roughish above, 1°-2½° tall. Leaves elongated, 2½°-4” wide, the basal ones and the similar bracts commonly overtopping the culm, those of the culm mostly shorter; staminate spike solitary or sometimes 2, often pistillate at the base or in the middle; pistillate spikes 3-5, ascending, linear-cylindric, not very densely flowered, 1½°-3’ long, about 4’ thick, the upper usually sessile, the lower stalked; perigynia thin, somewhat inflated, ovoid-conic or oblong, tapering into the subulate, 2-toothed beak, about 2½’ long and 1’ in diameter, ascending, rather prominently few-nerved, equaling or the upper longer than the lanceolate or linear, usually ciliate-scabrous scale; stigmas 3.

In swamps and bogs, Massachusetts to Ontario, Michigan, New Jersey and Missouri. June-Aug.

26. Carex hystricina Muhl. Porcupine Sedge. (Fig. 696.)


Glabrous, light green, culms slender, erect or reclining, somewhat rough above, 1°-2½° tall. Leaves elongated, minutely scabrous, 1½°-2½” wide, the upper and the similar bracts overtopping the culm; staminate spike slender-stalked, sometimes pistillate at the summit; pistillate spikes 1-4, oblong-cylindric, densely many-flowered, ½°-1½’ long, about 4½” in diameter, the upper sessile or nearly so, the lower slender-stalked and drooping; perigynia ascending, somewhat inflated, ovoid-conic, 2½°-3” long, strongly many-nerved, tapering into the subulate 2-toothed beak, equaling or the upper longer than the narrow rough scales; stigmas 3.

In swamps and low meadows, Nova Scotia to the Northwest Territory, south to Georgia and Nebraska. June-Aug.


Culms often reclining, 2°-3° long; leaves 2½°-4” wide; staminate spike long-stalked; pistillate spikes 1½°-2½” long, ½° in diameter, filiform-stalked. Maine to Connecticut, western New York, Pennsylvania and Michigan.

27. Carex Pseudo-Cyperus L. Cyperus-like Sedge. (Fig. 697.)


Glabrous, culm somewhat stout, rough on the sharp angles, at least above, 2°-3° high. Leaves elongated, rough on the margins, nodulose, 2½°-5’ wide, the upper and the similar bracts overtopping the culm; staminate spike short-stalked; pistillate spikes 2-5, linear-cylindric, densely many-flowered, all slender-stalked and spreading or drooping, 1’-2½’ long, 3’-4’ in diameter, the stalk of the lowest sometimes 2’ long; perigynia light green, slightly inflated, conic, prominently many-ribbed, somewhat flattened, at length reflexed, tapering into a short 2-toothed beak, the short teeth slightly spreading; scales linear with a broad base, ciliate-scabrous, about equaling the perigynia; stigmas 3.

(Fig. 698.)  
*Carex comosa* Boott, Trans. Linn. Soc. 20: 117. 1846.  

Similar to the preceding species, culms commonly stouter, the leaves sometimes 1'/2 wide. Stamineate spike short-stalked, sometimes pistillate at the summit; pistillate spikes 2–6, usually 3–5, stalked or the uppermost nearly sessile, all spreading or drooping, stouter and bristly, about 1'/2 in diameter; perigynia more slender, little inflated, strongly reflexed when mature, tapering into a slender, prominently 2-toothed beak, the teeth subulate and recurved-spreading; scales mostly shorter than the perigynia, very rough; stigmas 3.

In swamps and along the borders of ponds, Nova Scotia to southern Ontario and Washington, south to Georgia, Louisiana and California. May–Oct.

(Fig. 699.)  
*Carex Fränkii* Kunth, Enum. 2: 498. 1837.  
Not Less. 1831.

Glabrous, much tufted, culms stout, smooth, erect, very leafy, 1°–21/2° tall. Leaves elongated, roughish, 21/2"–4" wide, the upper ones and the similar bracts commonly overtopping the culm; stamineate spike stalked, sometimes pistillate at the summit; pistillate spikes 3–6, exceedingly dense, cylindric, erect, 1/2–11/2" long, about 4" in diameter, the upper nearly or quite sessile, the lower slender-stalked; perigynia green, slightly inflated, about 1" in diameter, few-nerved, obovoid with a depressed summit from which arises the subulate 2-toothed beak; scales linear-subulate, longer than the perigynia; stigmas 3.

In swamps and wet meadows, eastern Pennsylvania to eastern Virginia and Georgia, west to Illinois, Missouri, Louisiana and Texas. June–Sept.

(Fig. 700.)  
*Carex squarrōsa* L. Sp. Pl. 973. 1753.

Glabrous, culms slender, erect or reclining, rough above on the angles, 2°–3° tall. Leaves elongated, rarely more than 2" wide, rough-marginated, the bracts similar and somewhat overtopping the culm; spikes 1–3, erect, stalked, oblong or globose, exceedingly dense, rarely over 1" long, 6"–10" in diameter, the upper one club-shaped, stamineate at the base or sometimes for one-half its length or more; perigynia yellowish green, becoming tawny, spreading or the lowest reflexed, somewhat inflated but firm, obovoid, 1'/2–11/2" in diameter, few-nerved, abruptly narrowed into the subulate minutely 2-toothed beak, twice as long as the scarious lanceolate acuminate or awn-tipped scale; achene linear-oblong, tapering into the stout style; stigmas 3.

In swamps and bogs, Connecticut to Indiana, Michigan and Nebraska, south to Georgia, Louisiana and Arkansas. June–Sept.
31. Carex typhinoïdes Schwein. Cat-tail Sedge. (Fig. 701.)


Similar to the preceding species, but darker green, the leaves much broader, often 4"-5" wide, the similar bracts much overtopping the culm; spikes 2-6, cylindric, very dense, 1'-1½' long, 4'-7' in diameter, often staminate at both ends, the terminal one commonly tapering to a conic summit; basal staminate flowers much less numerous than in C. squarrosa; perigynia dull straw-color, ovoid, ascending or the lowest spreading or reflexed, inflated, abrutptly contracted into the slender 2-toothed beak, which is often upwardly bent; scales oblong-lanceolate, obtusish; achene ovoid-elliptic, sharply 3-angled with concave sides, tipped with the subulate straight style.

In swamps, Quebec to Virginia, Louisiana and Missouri. July-Aug.

32. Carex trichocàrpa Muhl. Hairy-fruited Sedge. (Fig. 702.)


Culm usually stout and tall, smooth below, very rough above. Leaves elongated, glabrous, rough-margined, 2'-3' wide, the upper ones and the similar bracts commonly overtopping the culm; stamineate spikes 2-6, long-stalked; pistillate spikes cylindric, densely flowered except at the base, 1'-4' long, 5'-8' in diameter, the upper sessile or nearly so and erect, the lower slender-stalked and sometimes spreading or drooping; perigynia ovoid-conic, pubescent or glabrous, prominently many-ribbed, 4'-5' long, 1'-1½' in diameter, tapering gradually into the stout conspicuously 2-toothed beak, the teeth somewhat spreading; scale hyaline, acute or acuminate, one-half as long as the perigynia or longer; stigmas 3.

In marshes and wet meadows, Quebec to Michigan, south to Georgia, Missouri and Kansas. June-Aug.

33. Carex aristàta R. Br. Avued Sedge. (Fig. 703.)


Culms stout erect, smooth or roughish above, sharp-angled, 2'-5' tall. Leaves elongated, 2½'-5' wide, more or less scabrous, often pubescent beneath and on the sheaths; bracts similar, the lower often overtopping the culm; stamineate spikes as in the preceding species; pistillate spikes 3-5, remote, cylindric, sessile or the lower short-stalked, loosely flowered at the base, dense above, 1'-4' long, sometimes 8' in diameter; perigynia ascending, conic, glabrous, conspicuously many-ribbed, 4'-6' long, gradually tapering into the conspicuously 2-toothed beak, the teeth divergent; scales oblong-lanceolate, rough-awned, thin-margined, one-half to two-thirds as long as the perigynia.

34. Carex riparia Curtis. River-bank Sedge. (Fig. 704.)

C. riparia Curtis, Fl. Loud. 4: pl. 60. 1821.

Glabrous, pale green, culms stout or rather slender, smooth, or somewhat rough above, erect, 2°-3½° tall. Leaves elongated, sometimes nodulose, slightly scabrous, somewhat glaucous, 3½'-6' wide, about equaling the culm; lower bract similar to the leaves, the upper mostly narrower and shorter; staminate spikes 1-5; pistillate spikes 2-5, cylindric, 1½'-4' long, about 4' in diameter, the upper erect, sessile or nearly so, the lower more or less stalked and sometimes spreading or drooping; perigynia narrowly ovoid, firm, scarcely inflated, ascending, tapering gradually into a short 2-toothed beak, the teeth divergent; scales lanceolate or oblanceolate, long-aristate or acute, the lower longer, the upper equalling or shorter than the perigynia; stigmas 3.

In swamps, Newfoundland to James' Bay and Manitoba, south to Florida, Louisiana, Texas and Idaho. Also in Europe. May-Aug.

35. Carex acutifórmis Ehrh. Swamp Sedge. (Fig. 705.)

C. acutifórmis Ehrh. Beitr. 4: 43. 1789.


Culms stout, erect, sharp-angled, 2°-3° tall, smooth below, often rough above. Leaves 2½'-6' wide, flat, pale green, equalling or sometimes exceeding the culm; lower bracts similar to the leaves, the upper short and narrow; staminate spikes 1-3, stalked; pistillate spikes 3-5, narrowly linear-cylindric, 1½'-3° long, 2½'-5½'' thick, the upper sessile or nearly so and erect, the others slender-stalked, spreading or drooping; perigynia ovoid, 1½'' long, not inflated, strongly many-nerved, tapering into a very short and minutely 2-toothed beak; scales awn-tipped, longer than the perigynia or the upper equalling them; stigmas 3.


36. Carex Shortiana Dewey. Short's Sedge. (Fig. 706.)


Glabrous, culms rather slender, erect, rough above, 1°-3° tall, usually overtopped by the upper leaves. Leaves elongated, roughish, 2½'-2½'' wide; bracts short, narrow, rarely much exceeding the spikes; spikes 3-7, linear-cylindric, densely many-flowered, ½'-1½' long, 1½'-2'' in diameter, erect, the lower stalked, the uppermost staminate below for about one-half its length; perigynia dark brown at maturity, compressed, 2-edged, orbicular or obovate, nerveless, slightly wrinkled, abruptly and minutely beaked, equaling or shorter than the scales, which are hyaline, scarious-margined, ovate or oblong-lanceolate, acute or obtuse and persistent; orifice of the perigynium entire or very nearly so; stigmas 3.

In moist meadows and thickets, Pennsylvania to Virginia and Tennessee, west to Illinois, Missouri and the Indian Territory. May-July.
37. Carex scabrata Schwein. Rough Sedge. (Fig. 707.)

Glabrous, culms slender, erect or reclining, rough above, leafy, 1°-3° long. Leaves rough, much elongated, 2½'-7'/ wide, the bracts similar but narrower and usually exceeding the culm; staminate spike short-stalked; pistillate spikes 3-6, erect, the upper short-stalked, the lower sometimes spreading or drooping, all linear-cylindric, densely many-flowered, 1'-2' long, 2½'-4'' in diameter; perigynia greenish-brown, ovoid, somewhat inflated, strongly nerved, papillose, tipped with a short rough minutely 2-toothed or entire beak; scales lanceolate, acute or short-awned, prominently 1-nerved, shorter than the perigynia; stigmas 3.

In moist woods and thickets, New Hampshire and Ontario to Michigan, South Carolina and Tennessee. Ascends to 4,200 ft. in Virginia. May-Aug.

38. Carex vestita Willd. Velvet Sedge. (Fig. 708.)

Culms strict and slender, erect or reclining, 1½'-2½' tall, rough above. Leaves distant, 1½'-2½' wide, not overtopping the culm; bracts similar, but narrower, short, rough-ciliate on the margins; staminate spike solitary, rarely 2, almost sessile; pistillate spikes 1-5, oblong, 5'-10'' long, 3'-4'' in diameter, erect, commonly stamineate at the summit, sessile or the lower very short-stalked; perigynia ovoid, ascending or the lower spreading, densely pubescent, less than 1'' in diameter, prominently few-ribbed, tapering gradually into a short conic 2-toothed whitish beak, slightly shorter than or equaling the ovate acute membranous scales; stigmas 3.

In sandy woods, Massachusetts to eastern New York and Pennsylvania, south to Georgia. June-July.

39. Carex Walteriana Bailey. Walter's Sedge. (Fig. 709.)

Culms slender, strict, erect, usually rough above, 1°-2½' tall. Leaves narrow and elongated, smooth or roughish, 1'-2'' wide, nodulose, not overtopping the culm; lowest bract similar, very long, the upper smaller and often almost filiform; staminate spikes 2-5, long-stalked; pistillate spikes 1 or 2, when 2 the lower remote from the upper, sessile or very short-stalked, oblong-cylindric, erect, 1'-1½' long, about 4'' in diameter, rather loosely many-flowered; perigynia ovoid, purple-brown, many-nerved, slightly inflated, ascending, glabrous, or partly or wholly pubescent, 1½'-2' in diameter, tapering into a short 2-toothed beak, the teeth short; scales ovate, acute, short-aristate or obtuse, membranous, one-half the length of the perigynia; stigmas 3.

In pine-barren bogs, southern New Jersey to Florida, near the coast. May-July.
40. Carex Houghtonii Torr.  Houghton's Sedge.  (Fig. 710.)


Culms rather stout, rough above, erect, 1°-2½° tall, exceeding the leaves. Leaves and lowest bract 2½-3½" wide, rough, their margins more or less revolute; upper bracts much shorter; staminate spikes 1-3, stalked, sometimes pistillate at the base; pistillate spikes 2 or 3, oblong-cylindric, ½-1½" long, 3½'-4½' in diameter, erect, rather loosely several-many-flowered, the upper sessile, the lower stalked; perigynia broadly ovoid, 1½" in diameter, light green, ascending, densely pubescent, prominently many-ribbed, narrowed into a short conspicuously 2-toothed beak; scales lanceolate, short-awned, hyaline-margined, strongly 1-nerved, somewhat shorter than the perigynia; stigmas 3.

In sandy or rocky soil, Nova Scotia to the Northwest Territory, south to Maine, Ontario, Michigan and Minnesota. June-Sept.

41. Carex lanuginosa Michx.  Woolly Sedge.  (Fig. 711.)


Culms slender, but usually rather stouter than that of *C. filiforis*, sharp-angled and rough above. Leaves and lower bracts elongated, flat, not involute, 1½'-2½' wide, more or less nodulose, sometimes overtopping the culm; staminate spikes 1-3, long-stalked, sometimes pistillate at the base; pistillate spikes 1-3 usually distant, sessile or the lower slender-stalked, cylindric, 9'-18' long, 2½'-3'' in diameter; perigynia like those of *C. filiforis*; but rather broader; scales acuminate or aristate.


*Carex lanuginosa* Kansana Britton.

42. Carex filiforis L.  Slender Sedge.  (Fig. 712.)


Culms very slender, erect or reclining, rather stiff, smooth, obtusely angled, 2°-3° long. Leaves very narrow, involute, about 1" wide, rough on the inrolled margins, not overtopping the culm; lower bract similar, often equalling the culm; upper bracts filiform; staminate spikes 1-3, commonly 2, stalked; pistillate spikes 1-3, cylindric, 9'-15' long, about 3'' in diameter, erect, sessile or the lower distant and short-peduncled; perigynia green, ascending, oval, densely pubescent, faintly nerved, about 1' in diameter, tapering into a short 2-toothed beak; scales ovate, membranous, sometimes purplish, acute or short-awned, shorter than or equalling the perigynia; stigmas 3.

43. **Carex hirta** L.  Hairy Sedge.  (Fig. 713.)

*Carex hirta* L. Sp. Pl. 975.  1753.

Rootstocks extensively creeping, culms rather slender, erect, nearly smooth, 6'-2'' tall. Leaves flat, pubescent, especially on the sheaths, rough, 1 1/2''-2 1/2'' wide, the basal ones much elongated, often exceeding the culm, the upper and the similar bracts shorter; stamine spikes 2 or 3, stalked; pistillate spikes 2 or 3, remote, erect, oblong-cylindric, 9''-18'' long, about 3'' in diameter, rather loosely many-flowered; perigynia ovoid-oblong, green, ascending, densely pubescent, 1'' in diameter, 2'' long, few-ribbed, tapering into a stout prominently 2-toothed beak; teeth often as long as the beak; scales membranous, lanceolate, aristate, 3-nerved, somewhat shorter than the perigynia; stigmas 3.

In fields and waste places, Massachusetts to eastern New York and Pennsylvania. Naturalized or adventive from Europe. June-Sept.

44. **Carex alpina** Sw.  Alpine Sedge.  (Fig. 714.)


*Carex lahlatt Schk. Riedgr. 87.  1801.

Culms slender, erect, rough above, leafy only below the middle, 6''-2'' tall. Leaves roughish, 1/2''-1 1/2'' wide, shorter than or rarely equalling the culm; spikes 2-4 (commonly 3), clustered at the summit, the terminal 1 or 2 stamine below, oblong or globose, 2''-5'' long, sessile or the lower peduncled; perigynia oval, orbicular or obovoid, light green, about 1'' long, tipped with a very short and minutely 2-toothed beak, nerves or with a few very faint nerves, equalling or slightly shorter than the ovate black or purple-brown obtuse or acutish scales; stigmas 3.

In rocky places, Quebec to James’ Bay and Athabasca, western Ontario and Isle Royale, Lake Superior, south in the Rocky Mountains to Colorado. Also in Europe. Summer.

45. **Carex atratiformis** Britton.  Black Sedge.  (Fig. 715.)

*Carex atrova* Rudge, Trans. Linn. Soc. 7: 96.  pl. 9.  1804.

*Not Burm. 1768.*

*Carex atrata var. atrova Boott, Ill. 141.  1862.*


Glabrous, culms slender, erect, sharp-angled, rough above, 8''-2'' tall, usually leafy only below. Leaves smooth or roughish, 1'/-2'' wide, rarely over 6'' long, much shorter than the culm; spikes 2-5, dense, oblong or oblong-cylindric, 4''-12'' long, about 2 1/2'' in diameter, the terminal one usually stamine at the base and sessile, or nearly so, the others slender stalked, drooping when mature; lower bracts 1 1/2'' long, very narrow, the upper ones subulate; perigynia flattened, ovate or nearly orbicular, punctate, ascending; about 1'' long, tipped with a very short, 2-toothed beak; scales black or reddish-brown, oblong, obtuse or subacute, slightly narrower than the perigynia and about equalling them; stigmas 3.

Newfoundland to the mountains of New England, west to the Northwest Territory. Summer.
46. Carex stylōsa C. A. Meyer. Variegated Sedge. (Fig. 716.)


Culms slender, erect, 1°-1½° tall, rough and leafless above. Leaves 1½" wide, shorter than or sometimes equalling the culm; staminate spike solitary, nearly sessile, often pistillate for one-half its length or more; pistillate spikes 2 or 3, oblong-cylindric, erect, 4½'-6½" long, about 1½" in diameter, the lowest slender-stalked and subtended by a linear-subulate bract; perigynia ovate, slightly inflated, brown, minutely granulate all over, less than 1" long, nerveless and beakless, the orifice entire and closed by the usually protruding style; scales black with white veins, obtusish, shorter than the perigynia; stigmas 3.

Labrador and Greenland to Alaska. Summer.

47. Carex Parryana Dewey. Parry’s Sedge. (Fig. 717.)


Glabrous, culms very slender, smooth, erect, stiff, 8½'-20½' tall, leafless above. Leaves about 1" wide, much shorter than the culm, their margins somewhat involute; spikes 1-4, dense, erect, linear-cylindric, 5½'-12½' long, 1½" in diameter, the upper sessile and staminate below or throughout, the lowest stalked and subtended by an almost filiform bract; perigynia plano-convex, obovate, pale, less than 1½" long, minutely papillose, faintly few-nerved, very minutely beaked, the orifice entire; scales ovate, acute or mucronulate, dark brown with lighter marginis, about as long as the perigynia; stigmas 3.

Hudson Bay to the Northwest Territory, south in the Rocky Mountains to Colorado. Summer.

48. Carex fūsca All. Brown Sedge. (Fig. 718.)

*Carex fūsca* All. Fl. Ped. 2: 266. 1785.


Glabrous, culms slender, stiff, erect, sharp-angled, rough above, 1½'-3½' tall. Leaves rough, erect, 1½'-2½" wide, shorter than or sometimes equalling or exceeding the culm; spikes 2-4, oblong or cylindric, erect, all sessile and close together or the lowest sometimes distant and very short-stalked, 4½'-15½" long, about 4½" in diameter when mature, the terminal one staminate at the base or rarely throughout; perigynia elliptic or somewhat obovate, flat, ascending, 1½" long, very light green, faintly few-nerved, beakless, the apex minutely 2-toothed; scales ovate, awn-tipped, black or dark brown with a green midvein, longer than the perigynia; stigmas 3.

In bogs, Newfoundland to Alaska, south to Georgia, Kentucky, Utah and California. Also in Europe. May-July.
49. Carex stricta Lam. Tussock Sedge. (Fig. 719.)

Carex stricta Lam. Encycl. 3: 387. 1789.

Glabrous, rather dark green, culms slender, stiff, erect, usually in dense clumps, sharply 3-angled, rough above, 1½"-4" tall. Leaves long, rarely overtopping the culm, very rough on the margins, 1½"-2½" wide, their sheaths becoming prominently fibrillose; lower bract similar, sometimes equaling the culm; pistillate spikes solitary or sometimes 2, stalked; pistillate spikes 2-5, linear-cylindric, often stamineate at the top, very densely flowered, or loose at the base, ½"-2" long, about 2½" thick, erect or somewhat spreading, all sessile or the lower stalked; perigynia ovate-elliptic, ascending, acute, faintly few-nerved, ½" long or less, minutely beaked, the orifice entire or nearly so; scales brown-purple with green margins and midvein, oblong or lanceolate, appressed; stigmas 2.

In swamps, Newfoundland to Ontario, south to Georgia and Texas. Hybridizes with C. filiformis. July-Sept.

Carex stricta angustata (Boott) Bailey in A. Gray, Man. Ed. 6. 600. 1890.

Pistillate spikes longer, 2'-4' long, erect; scales lanceolate, acute, often longer than the perigynia. Range apparently nearly that of the type.


Pistillate spikes almost filiform, about 1½" in diameter, erect. New York to Illinois.

50. Carex Haydeni Dewey. Hayden's Sedge. (Fig. 720.)


Boott, 1880.


Glabrous, similar to C. stricta but smaller, culm slender, rough above, seldom over 2" high. Leaves 1½"-1½" wide, rough-margined, shorter than or sometimes a little overtopping the culm, their sheaths slightly or not at all fibrillose; lower bract foliaceous, about equaling the culm; pistillate spikes linear-cylindric, 6"-15" long, about 2½" in diameter, erect or somewhat spreading, all sessile or nearly so, sometimes with a few stamineate flowers at the summit; perigynia orbicular, obtuse, about ½" broad, faintly 2-4-nerved, minutely beaked, the orifice entire; scales lanceolate, purplish, spreading, very acute, about twice as long as the perigynia; stigmas 2.

Swamps, New Brunswick to Rhode Island and Nebraska.

51. Carex Nebraskensis Dewey. Nebraska Sedge. (Fig. 721.)


Glabrous, culms rather stout, erect, sharp-angled, smooth, or rough above, 1½'-2½' tall. Leaves pale green, 1½"-2½" wide, rough-margined, not exceeding the culm, their sheaths more or less nodulose; lower bract foliaceous, sometimes equaling the culm, the upper much shorter and narrower; stamineate spikes commonly 2, stalked; pistillate spikes 2-4, dense, oblong-cylindric, erect, ½"-1½" long, about 3½" in diameter, sessile or the lower short-stalked; perigynia ascending, elliptic or somewhat obovate, prominently several-ribbed when mature, short-beaked, the beak 2-toothed; scales ovate or lanceolate, acute or mucronate, brown with a green midvein or green all over, the upper shorter than the perigynia; stigmas 2.

Nebraska to Oregon and New Mexico. May-Aug.
52. Carex aquatilis Wahl. Water Sedge. (Fig. 722.)


Glabrous, glaucous and pale green, culms rather stout, erect, sharp-angled above, smooth or nearly so, 2°-4° tall. Leaves elongated, sometimes equaling the culm, 2°-3 1/2° wide, their sheaths nodulous; bracts similar to the leaves, the lower much overtopping the culm; staminate spikes 1-3, stalked; pistillate spikes narrowly linear-cylindric, often staminate at the summit, erect or slightly spreading, 1°-2 1/2° long, 2°-3° in diameter, sessile and dense, or the lower narrowed and loosely flowered at the base and short-stalked; perigynia narrowly elliptic, green, nerveless, minutely beaked, the orifice entire; scales oblong, shorter than or equaling the perigynia and much narrower; stigmas 2.

In swamps and along streams, Newfoundland to Alaska, south to Massachusetts, Pennsylvania, Ohio, Minnesota and British Columbia. Also in Europe. June-Aug.

A hybrid between this species and C. stricta is described by Professor L. H. Bailey.

53. Carex lenticulare Michx. Lenticular Sedge. (Fig. 723.)


Glabrous, pale green, culms very slender, erect, sharp-angled, slightly rough above, 1°-2° tall. Leaves elongated, rarely over 1° wide, shorter than or rarely overtopping the culm, slightly rough-margined, their sheaths not fibrillose; lower bracts similar to the leaves, usually much overtopping the spikes; staminate spikes solitary or rarely 2, sessile or short-stalked, often pistillate above; pistillate spikes 2-5, clustered at the summit or the lower distant, sessile or the lower short-stalked, erect, linear-cylindric, 4°-1° long, 1 1/2°-2° in diameter; perigynia ovate or elliptic, acute, minutely granulate, faintly few-nerved, appressed, tipped with a minute entire beak; scales green, appressed, shorter than the perigynia; stigmas 2.


54. Carex Goodenovii J. Gay. Goodenough's Sedge. (Fig. 724.)

Carex vulgaris E. Fries, Mant. 3: 153. 1842.

Glabrous, culms stiff, erect, sharp-angled, smooth or sometimes rough above, 1°-2° tall. Leaves elongated, smooth or nearly so, glaucous, 1°-2° wide, not exceeding the culm, their sheaths not fibrillose; lower bracts usually foliaceous, sometimes equaling the culm; staminate spike sessile or stalked; pistillate spikes 2-4, all sessile or nearly so, erect, densely many-flowered, narrowly cylindric, 2°-2 1/2° in diameter, 5°-12° long; perigynia flattened, broadly oval or ovate, faintly few-nerved, green, appressed, less than 1° long, minutely beaked, the orifice nearly entire; scales purple-brown to black with a green midvein, very obtuse, shorter than the perigynia; stigmas 2.

55. Carex Bigelovii Torr. Bigelow’s Sedge. (Fig. 725.)

Glabrous and smooth throughout or very nearly so, culm sharp-angled, erect, 8’-18’ tall. Leaves 1¼’-2’ wide, not exceeding the culm, the lower bracts similar, but shorter; sheaths slightly or not fibrillose; staminate spikes stalked, sometimes pistillate at the base, pistillate spikes 2-4, linear-cylindric, loosely flowered at the base, dense above, 6’-12’ long, 1½’-2’ thick, the upper sessile, the lower often slender-stalked; perigynia oval, ascending, about 1’ long, very faintly nerved, scarcely beaked, the orifice entire; scales purple-brown with a narrow green midvein and often with green margins, obtuse or the lower acute, equalling or a little exceeding the perigynia; stigmas 2, rarely 3.

Greenland and Labrador to the higher mountains of northern New England and New York. Also in Europe. Summer.

56. Carex subspathacea Wormsk. Hoppner’s Sedge. (Fig. 726.)

Glabrous, culm stiff, smooth, 1’-7’ tall. Leaves rigid, smooth, about 1” wide, often overtopping the culm; lower bracts foliaceous; staminate spikes solitary, stalked; pistillate spikes 1-3, erect, sessile or very short-stalked, 3’-6’ long, about 1½” in diameter; perigynia oval or ovoid, very short beaked, pale green, faintly few-nerved, about 1” long; scales ovate or ovate-oblong, obtuse or acute, shorter than or equalling the perigynia; stigmas 2.

Greenland to Hudson Bay. Summer.

57. Carex salina Wahl. Salt-marsh Sedge. (Fig. 727.)

Glabrous, culm slender, smooth, erect, 6’-18’ tall. Leaves very narrowly linear, ½’-1’ wide, sometimes overtopping the culm, the lower bract similar; staminate spikes 1 or 2, stalked; pistillate spikes 1-3, slender-stalked or the upper sessile, erect, loosely few–several-flowered, ½’-1’ long, 1½’-2’ thick; perigynia ovate-elliptic, pale, faintly few-nerved, ascending, 1½’ long, tapering into a very short entire beak; scales ovate, brown with a green midvein, acute or cuspidate, somewhat longer than the perigynia; stigmas 2.

In salt marshes, Greenland to Hudson Bay. Also in arctic Europe. Summer.
58. Carex cuspidata Wahl. Cuspidate Sedge. (Fig. 728.)

Carex salina var. cuspidata Wahl. Fl. Lapp. 246. 1812.

Glabrous, culms rather stout, smooth or rough above, erect, 1°-2½° tall. Basal leaves often equaling the culm, 1½"-3" wide, smooth, their sheaths more or less nodulose; leaves of the culm shorter, similar to the lower bracts, which usually overtop the spikes; staminate spikes 1-3, stalked; pistillate spikes 2-4, narrowly cylindric, often staminate at the summit, erect, the upper often sessile, the lower stalked; perigynia elliptic, green, 2-4-nerved, with a very short entire beak; scales lanceolate, pale, acuminate or abruptly contracted into a serrate awn, much longer than the perigynia; stigmas 2.

In marshes, Labrador to the coast of Massachusetts. Also in Europe. Summer.

59. Carex torta Boott. Twisted Sedge. (Fig. 729.)

Carex torta Boott; Tuckerm. Enum. Meth. 11. 1843.
Glabrous, rather light green, culm very slender, erect or reclining, smooth or slightly scabrous above, 1½°-3° long. Leaves about 2½" wide, the basal shorter than or equaling the culm, those of the culm very short; sheaths not fibrillose; lower bract commonly foliaceous; staminate spikes 1-3, stalked; pistillate spikes 3-5, all but the upper spreading or drooping, linear, 1°-3" long, about 2½" in diameter, sometimes compound, often loosely flowered toward the base; perigynia oblong or narrowly ovate, green, nerveless, narrowed and more or less twisted above, 1½°-1½" long; scales ovate, obtuse or subacute, purple-brown with a green midvein, shorter and mostly narrower than the perigynia; stigmas 2.

In marshes and wet thickets, Maine and Vermont to North Carolina and Missouri. Ascends to 2500 ft. in Virginia. June-July.

60. Carex praesina Wahl. Drooping Sedge. (Fig. 730.)


Glabrous, rather light green, culm slender, smooth or nearly so, reclining, sharply 3-angled, 1°-2½° long. Leaves shorter than or equaling the culm, flaccid, roughish, 1½"-2½" wide; lower bract similar, commonly overtopping the spikes; staminate spike solitary, short-stalked, often pistillate at the summit; pistillate spikes 2 or 3, narrowly linear-cylindric, drooping, the lower filiform-stalked, the upper sometimes nearly sessile, 1°-2½° long, 2½" in diameter, rather loosely many-flowered; perigynia light green, lanceolate, very obscurely nerved, tapering into a slender minutely 2-toothed beak; scales ovate, acute, acuminate, or short-awned, pale green, shorter than the perigynia; stigmas 3.

In meadows and moist thickets, Vermont and Ontario to New Jersey and Pennsylvania, south in the Alleghanies to Georgia. Ascends to 4200 ft. in Virginia. May-July.
61. Carex misandra R. Br. Short-leaved Sedge.  (Fig. 731.)

*C. misandra* R. Br. Suppl. Parry’s Voy. cclxxxiii. 1824.

Glabrous and smooth, culms very slender, erect, 1'–1'½' tall. Leaves 1½'–1½" wide, clustered at the base, usually much shorter than the culm, seldom over 2½' long; bracts narrowly linear, sheathing, not overtopping the spikes; terminal spike often partially pistillate at base or summit, slender-stalked; pistillate spikes 1 or 2, filiform-stalked, 3½'–7½' long, about 2½' thick, rather few-flowered, drooping; perigynia narrowly lanceolate, acuminate at the apex, narrowed at the base, 1½' long, ascending, dark brown, denticulate above; scales oval, obtuse, purple-black with narrow white margins, somewhat shorter than the perigynia; stigmas 2 or 3.

Throughout arctic America, extending south in the Rocky Mountains to the higher summits of Colorado. Also in arctic Europe and Asia. Summer.

62. Carex littoralis Schwein. Barratt’s Sedge.  (Fig. 732.)


Glabrous, pale green and somewhat glaucous, culms erect, slender, smooth, 1°–2° tall, leafless above. Leaves 1½'–2½' wide, smooth, usually much shorter than the culm, the lower sheaths fibrous; bracts not sheathing, the lower usually short and narrow, sometimes elongated and overtopping the culm; staminate spikes 1–3, usually rather long-stalked; pistillate spikes 2–4, drooping or the upper ascending, slender-stalked, linear-cylindric, ½'–2' long, 3" in diameter, mostly staminate at the summit; perigynia oblong, green, faintly few-nerved, 1½'–1½" long, tipped with a minute entire beak; scales brown-purple with lighter margins, obtuse, equalling or shorter than the perigynia; stigmas 3.


63. Carex rariflora J. E. Smith. Loose-flowered Alpine Sedge.  (Fig. 733.)


Glabrous, culms very slender, rather stiff, erect, 4'–12' tall, smooth, or roughish above. Leaves 1½ wide or less, shorter than the culm, the lower very short; bracts subulate, purple at the base; staminate spike solitary, long-stalked, sometimes with a few pistillate flowers at the base; pistillate spikes 1 or 2, narrowly oblong, few-flowered 3½'–6½' long, 2½" in diameter, nodding on filiform stalks; perigynia pale, oblong, acute at each end, 1½' long, ½" wide, minutely beaked, few-nerved, the orifice entire; scales oval, purple-brown with a greenish midvein, obtuse or mucronate, equalling or a little longer than the perigynia; stigmas 3.

In wet places, Greenland and Labrador to Hudson Bay, south to Mt. Katahdin, Maine, and to northern Minnesota. Also in Europe and Asia. Summer.
64. Carex limosa L. Mud Sedge.  
(Fig. 734.)

_Carex limosa_ L. Sp. Pl. 977. 1753.

Glabrous, rather light green, culms slender, rough above, erect, 10'-2o' tall. Leaves 1'-2o' wide or less, shorter than the culm, the midvein prominent, the margins somewhat involute in drying; bracts linear-filiform, the lower ½'-1½' long; staminate spike solitary, long-stalked; pistillate spikes 1 or 2, filiform-stalked and drooping, oblong, 5'-10' long, about 3' thick; perigynia pale, oval, narrowed at both ends, 1½' long, ascending, tipped with a minute entire beak, several-nerved, about as long as the oval green or purplish-brown cuspidate or acute scale; stigmas 3.

In bogs, Labrador to the Northwest Territory, south to Maine, New Jersey, Ohio, Minnesota and Idaho. Ascends to 4000 ft. in the White Mountains. Also in Europe. Summer.

(Fig. 735.)

_Carex irrigua_ Smith; Hoppe, Caric. 72. 1826.

Glabrous, culms slender, smooth or nearly so, erect or reclining, 6'-2o' tall. Leaves flat, 1'-2o' wide, somewhat rough on the margins, commonly shorter than the culm, the lower bract similar and usually overtopping the spikes; staminate spike solitary, or rarely 2, often partially pistillate; pistillate spikes 1-3, oblong, filiform-stalked and drooping, 4'-8' long, about 3' in diameter; perigynia biconvex, oval, pale, minutely granulate-papillose, oval or suborbicular, few-nerved, 1½'-2½' long, tipped with a very minute beak, the orifice entire; scales lanceolate, long-acuminated or awned, dark green or purplish-brown, 1½'-2 times as long as the perigynia; stigmas 3.

In bogs, Newfoundland and Labrador to Manitoba, south to Maine, Pennsylvania and Michigan. Also in the Uinta Mountains, Utah, in Europe, and in southern South America. Ascends to 6000 ft. in the Adiron-dacks. Summer.

(Fig. 736.)


Glabrous, culms very slender, erect or reclining, rough above, 10'-2o' long. Leaves a little rough on the margins, 1½'-2'' wide, shorter than the culm, the lowest reduced to short sheaths; lower bract similar to the upper leaves, the upper much shorter and narrower; staminate spikes 1 or 2, stalked; pistillate spikes 2-4, cylindric, dense, many-flowered, ½'-1½' long, 3' in diameter, stalked or sessile, the lower often nodding; perigynia elliptic-lanceolate, flat, about 2½' long, acute at both ends, appressed, faintly nerved, the orifice entire; scales purple-black, ovate, acuminate, longer than the perigynia, the midvein produced into a subulate awn 2'-6' long; stigmas 2 or 3.

Arctic America. Closely related to _C. atrozírca_ Schk. Summer.
67. Carex cryptocarpa C. A. Meyer. Hidden-fruited Sedge. (Fig. 737.)


Cyperaceae.

Glabrous, culm stout, erect, sharply 3-angled, rough above, 1½°-3° tall. Leaves smooth, 2'/2°-3° wide, the basal shorter than or equaling the culm, the upper ones and the lower bract shorter; stamine spikes 2-4, stalked; pistillate spikes 2-5, all filiform-stalked and drooping, densely flowered, 1' - 3' long, 3'/2°-4' in diameter; perigynia oblong or oval, green, faintly several-nerved, 1½° long, tipped with a very short entire beak; scales purple-brown, ascending, lanceolate, acuminate, 2 or 3 times longer than the perigynia; stigmas 2.

Arctic America from Greenland to Alaska. Summer.


Carex filipendula var. variegata Drejer, Rev. Crit. Car. 46. 1851.

Lower than the type, seldom over 1° tall; pistillate spikes about 2, ovoid or short oblong, 6°-9° long; scales ovate-lanceolate, acute, little longer than the perigynia. Range of the species.

68. Carex maritima Muller. Seaside Sedge. (Fig. 738.)

C. maritima Muller, Fl. Dan. 4: 12. 6. pl. 703. 1777.

Glabrous, light green, culms slender, or rather stout, erect, sharply 3-angled, smooth, or roughish above, 1°-2½° tall. Leaves 2'/2°-3° wide, roughish on the margins and midvein, rarely overtopping the culm, the lower bracts similar; stamine spikes 1-3, slender-stalked, often pistillate at the base; pistillate spikes 2-4, cylindric, often stamine at the summit, densely many-flowered, 1'-3' long, 4°-6° thick, drooping on filiform stalks; perigynia oval or nearly orbicular, ascending, pale, biconvex, rather less than 1° long, nerveless or with a few faint nerves, tipped with a very short and nearly or quite entire beak; scales ascending, green, linear-subulate, ciliate-scabrous, 3-8 times as long as the perigynia; stigmas 2.

In salt meadows, Newfoundland and Labrador to Massachusetts. Also in Europe. June-Aug.

69. Carex crinita Lam. Fringed Sedge. (Fig. 739.)

Carex crinita Lam. Encycl. 3: 393. 1789.

Glabrous, culms stout, 3-angled, rough or very nearly smooth, erect or somewhat recurving, 2°-5° tall. Leaves flat, rough-margined, 3°-5° wide, the upper sometimes overtopping the culm, the lowest very short and sheathing; stamine spikes 1 or 2, stalked, often pistillate at the base or in the middle; pistillate spikes 3-5, narrowly cylindric, densely many-flowered, 1'-4½° long, 3°-4° in diameter, all stalked, drooping and commonly secund; perigynia obovoid, obtuse, about 1° long and nearly as thick, nerveless, abruptly tipped by the very short entire beak; scales green, subulate, ciliate-scabrous, spreading, 2-6 times as long as the perigynia; stigmas 2.

In swamps and wet woods, Nova Scotia and Ontario to Florida and Texas. June-Aug.

A hybrid with C. torta, occurring in New Hampshire, is described by Prof. L. H. Bailey.
Carex crinita minor Britton. Ill. 18. 1858.
Culms slender, 10'-20' tall; leaves 1½"-2½" wide; pistillate spikes 1'-1½' long, 2' thick, spreading or slightly drooping; perigynia little more than ½" in diameter. Maine to southern New York.

70. Carex gynandra Schwein. Nodding Sedge. (Fig. 740.)


Similar to the preceding species, culms stout, 2°-4° tall. Leaves 3½"-6" wide, glabrous or their sheaths often finely pubescent; pistillate spikes 1'-4' long, narrowly cylindric, stalked, drooping; perigynia oblong or elliptic, faintly few-nerved or nerveless, compressed, not at all or slightly inflated, 1½"-2" long, and about one-half as broad, tapering gradually to an acute entire orifice; scales subulate, rough, ascending, 2-4 times as long as the perigynia; stigmas 2, rarely 3.

In swamps, Nova Scotia (according to Macoun) to northern New York, Florida and Louisiana. Ascends to 5000 ft. in New Hampshire. June-Aug.

Carex gynandra Porter (Olney) Britton.


Smaller, bearing the same relation to the species that minor does to C. crinita. Maine.

71. Carex macrokolea Steud. Southern Glaucous Sedge. (Fig. 741.)


Glabrous, light green and glaucous, culms stout, erect, slightly rough on the angles above, 2°-4° tall. Leaves flat or in drying somewhat involute, rough, 1½"-3" wide, often equalling the culm, tapering to a very long narrow tip, the lower bracts similar, shorter; staminate spikes 1 or 2, short-stalked, often pistillate at the summit; pistillate spikes 2-8, cylindric, dense, 1'-2' long, erect, sessile or the lower stalked; perigynia dark brown, broadly ovoid, 3-angled, 1½" long, usually several-nerved, abruptly contracted into a sharp beak about one-fourth as long as the body; scales oblong, scarious-margined, rough-awned, as long as the perigynia or longer; stigmas 2 or 3.

In swamps, Missouri to Florida and Texas. June-Aug.

72. Carex glauca Scop. Glaucous Sedge. (Fig. 742.)


Glabrous, pale green and glaucous, culms slender, erect, smooth or roughish above, 1°-2° tall, the rootstocks long and stout. Leaves shorter than or equalling the culm, smooth or nearly so, about 2" wide; lower bract similar to the leaves, but narrower; staminate spikes mostly 2, stalked; pistillate spikes 2 or 3, ascending or at length drooping, slender-stalked, linear-cylindric, 1'-2' long, 3" thick, densely many-flowered, commonly staminate at the summit; perigynia brown, ellipsoid, faintly few-nerved, or nerveless, minutely granulate or papillose, nearly 1" long, minutely beaked, the orifice entire; scales ovate or lanceolate, brown with a green midvein, acute or obtusish, about as long as the perigynia; stigmas 2.

73. Carex virescens Muhl. Downy Green Sedge. (Fig. 743.)


Culms very slender, erect or somewhat reclining, rough above, 6'-18' tall. Leaves light green, pubescent, especially on the sheaths; spikes 2-5, very short-stalked, erect or nearly so, oblong-cylindric, densely many-flowered, 4'-10' long, about 1½" in diameter, the terminal one stamineate below; perigynia 3-sided, broadly oval or ovoid, rather less than 1½' long, ascending, densely pubescent, few-nerved, green, beakless, the orifice entire; scales oblong-ovate, cuspidate by the excurrent midvein, scarious-margined, slightly shorter than the perigynia; stigmas 3.


74. Carex costellata Britton. Ribbed Sedge. (Fig. 744.)

Not Presl. 1819.

Similar to the preceding species, but taller and more spreading; culms slender, 1½'-2½' long. Leaves 1½'-2½' wide, pubescent, especially on the sheaths, shorter than the culm, the upper one and the similar lower bract sometimes overtopping the spikes; spikes 2-5, narrowly cylindric, many-flowered, rather loose, ½'-1½' long, 1½" in diameter, erect or slightly spreading, the terminal one stamineate below, the lower one commonly filiform-stalked; perigynia oblong, densely pubescent, narrowed at each end, strongly several-ribbed, 1½" long, rather more than ½" thick, beakless, the orifice entire; scales ovate, scarious-margined, acuminate or cuspidate, shorter than the perigynia; stigmas 3.

In woods, Maine and Ontario to North Carolina, where it ascends to 4000 ft. June-Aug.

75. Carex triceps Michx. Hirsute Sedge. (Fig. 745.)


Light green, culms slender, rough above, erect or reclining, 6'-3½' long. Leaves 1½'-2½' wide, pubescent, at least on the sheaths, shorter than the culm, the lower bract similar; spikes 2-5, oblong or oblong-cylindric, dense, erect, sessile or very nearly so, 3½'-8' long, 2½'-3½" in diameter, usually clustered at the summit, the terminal one stamineate at the base; perigynia oval or ovoid, flattened, not inflated, green or greenish-brown, few-nerved, imbricated, usually pubescent when young, when mature ½'-1½' long, beakless, the orifice minutely notched or entire; scales ovate, scarious-margined, cuspidate or short-awned, rather shorter than the perigynia; achene elliptic-obovoid, its summit not beut; stigmas 3.

In woods, fields and swamps, Massachusetts to southern Ontario and Michigan, south to Florida and Texas. Ascends to 2500 ft. in Virginia. April-Aug.
76. Carex Caroliniana Schwein. Carolina Sedge. (Fig. 746.)

Carex Smithii Porter; Ohcyy, Car. Bor. Am. 2, name only. 1871. Not Tausch. 1821.

Culms very slender, erect, rough above, 1°–2½° tall. Leaves 1¼–1½" wide, rather dark green, glabrous except on the sheaths, the upper and the similar but narrower bracts usually much overtopping the spikes; spikes 2–4, oblong, dense, sessile or nearly so, 4½–6½" long, 2½" in diameter; erect, clustered at the summit, the upper one staminate at the base; perigynia subglobose or obovoid, swollen, not imbricated, about ½" in diameter, nerveless or faintly nervet, brown, beakless, glabrous at least when mature, the orifice entire; scales brown, ovate, mucronate; achene pyriform, bent at the summit or tipped with the bent style.


77. Carex gracillima Schwein. Graceful Sedge. (Fig. 747.)


Glabrous, culms slender, erect or spreading, roughish above, 1½–3½° long. Leaves dark green, 1½–3½" wide, shorter than the culm, the basal ones wider than the upper; lower bract foliaceous, sometimes overtopping the spikes; spikes 3–5, narrowly cylindric, usually densely flowered except at the base, 1½–2½" long, about 2½" thick or sometimes much smaller, filiform-stalked and drooping, the upper one partly or wholly staminate; perigynia ovoid-oblong, obtuse, slightly swollen, few-nerved, glabrous, 1½" long; scales thin, ovate-oblong, very obtuse or the lower cuspidate, pale, scarious-margined, one-half as long as the perigynia; stigmas 3.


Professor Bailey has described a hybrid with C. hircuta, occurring at Phillipstown, N. Y.

Carex Sullivantii Boott, is a hybrid of this species with C. pubescens.

78. Carex aestivalis M. A. Curtis. Summer Sedge. (Fig. 748.)


Culms very slender or filiform, erect or nearly so, smooth, or roughish near the summit, 1½–2½° tall. Leaves flat, 1½–1¾" wide, elongated but usually shorter than the culm, their sheaths usually pubescent, the blades sometimes slightly so; lower bracts similar to the leaves but narrower; spikes 3–5, narrowly linear, erect or somewhat spreading, 1½–2° long, about 1½" thick, loosely many-flowered or the upper ones dense, the terminal one staminate at the base or also at the summit; perigynia oblong, pointed at both ends, 3-sided, glabrous, few-nerved, 1½" long, ½½" thick, beakless, the orifice entire; scales ovate-oblong, obtuse, or the lower cuspidate or short-awned, green, thin, one-half as long as the perigynia or more; stigmas 3.

In mountain woods, Massachusetts and northern New York to Georgia. June–Aug.
79. Carex oxylepis Torr. & Hook. Sharp-scaled Sedge. (Fig. 749.)


Culms slender, smooth, erect, 1°-2° tall. Leaves flat, 1½'-2' wide, pubescent, especially on the sheaths, shorter than or equalling the culm, the lower bract similar but narrower; spikes 4 or 5, linear-cylindric, 1'-2' long, about 2" in diameter, rather densely many-flowered, filiform-stalked and at maturity spreading or drooping, the terminal one stamine at the base or sometimes wholly stamine; perigynia oblong, sharply 3-angled, pointed at both ends, slightly swollen, 2' long, less than 1" thick, several-nerved, the orifice entire; scales ovate-lanceolate with broad white scarious margins, short-awned, about one-third shorter than the perigynia, the awn scabrous; stigmas 3.

Southern Missouri to Tennessee and South Carolina, south to Texas and Florida. April-May.

80. Carex formosa Dewey. Handsome Sedge. (Fig. 750.)


Culms slender, smooth, erect, 1°-2½° tall. Leaves flat, pubescent, especially on the sheaths, the basal 2½'-3' wide, often as long as the culm; lower bract similar to the shorter culm-leaves; spikes 3-5, oblong-cylindric, dense, ½'-1½' long, nearly 3' in diameter, filiform-stalked, spreading or drooping, the lower distant, the upper one stamine at the base; perigynia ovoid, glabrous, ascending, swollen, faintly few-nerved, 2½' long, 1" thick, tipped with a very short and slightly notched beak; scales lanceolate or ovate, green, with scarious margins, acute, cuspidate or the lower short-awned, shorter than the perigynia or the lower equalling them; stigmas 3.

In dry woods and thickets, Massachusetts and Vermont to southern Ontario, New York and Michigan. June-July.

81. Carex Davisii Schwein. & Torr. Davis' Sedge. (Fig. 751.)


Similar to the preceding species, culms stouter, 1½°-3° tall. Leaves 1½'-3' wide, flat, pubescent, especially on the sheaths, the basal ones often as long as the culm; lower bract foliaceous, commonly overtopping the spikes; spikes 3-5, clustered near the summit or the lower one distant, dense, ½'-1½' long, 3' in diameter, all filiform-stalked and at length spreading or drooping, the terminal one stamine at the base; perigynia ovoid, much swollen, glabrous, strongly several-nerved, 2½'-2½" long, rather more than 1" thick, tipped with a very short but conspicuously 2-toothed beak; scales lanceolate or oval, long-awned, spreading, equalling or longer than the perigynia; stigmas 3.

In moist thickets and meadows, Massachusetts to New York and Minnesota, south to Georgia, Kentucky and the Indian Territory. May-July.
82. Carex longirostris Torr. Long-beaked Sedge. (Fig. 752.)


Glabrous, light green, culms very slender, roughish above, erect or reclining, 10'-5' long. Leaves flat, slightly scabrous, 1"-1½" wide, usually not exceeding the culm, the bracts similar, shorter, sometimes overtopping the spikes; staminate spikes 1-3, slender-stalked, rarely pistillate at the base; pistillate spikes 2-4, oblong-cylindric, loosely flowered, ½'-2' long, 3'-4' in diameter, all filiform-stalked and nodding or the upper one nearly sessile; perigynia broadly oval, spreading, smooth, slightly inflated, pale, strongly 1-nerved on each side, the body about 1'' long, contracted into a very slender beak of nearly twice its length; scales lanceolate, spreading, long-acuminate, scarious-margined, 3'-4'' long; stigmas 3.


Carex longirostris minor Boott, seems to be but a dwarf form of the species.

83. Carex Assiniboinensis W. Boott. Assiniboia Sedge. (Fig. 753.)


Glabrous and nearly smooth, culms filiform, reclining, 2'-7½' long, longer than the leaves. Leaves and bracts ½'' or less wide, the lower reduced to short purplish sheaths; staminate spike long-stalked; pistillate spikes 2 or 3, distant, loosely few-flowered, 7½''-15'' long, drooping on filiform stalks; the flowers alternate; perigynia very narrowly conic, appressed, obtusely 3-angled, subulate-beaked, above 3'' long and 1'' thick above the base, densely tuberculate-hispid, narrowed into a short stalk; scales lanceolate, scarious-margined, awned, about the length of the perigynia; stigmas 3.

In wet soil, northern Minnesota and Manitoba. Summer.

84. Carex castanea Wahl. Chestnut Sedge. (Fig. 754.)


Carex flexilis Rudge, Trans. Linn. Soc. 7: 98. pl. 10. 1804.

Culms slender or filiform, nearly erect, rough above, 1'-3' tall. Leaves 1½''-2½'' wide, pubescent, shorter than the culm; bracts linear-filiform, ½'-1½' long; staminate spike stalked; pistillate spikes 1-4, oblong or oblong-cylindric, rather loosely flowered, ½'-1' long, about 3'' thick, drooping on filiform stalks, sometimes close together at the summit; perigynia glabrous, pale brown, ascending, oblong or oblong-lanceolate, 3-angled, few-nerved, tapering gradually into a 2-toothed beak one-half as long as the body, scales thin, ovate or ovate-lanceolate, acute or cuspidate, lacerate or entire, rather shorter than the perigynia; stigmas 3.

85. Carex capillaris L.  Hair-like Sedge. (Fig. 755.)

Glabrous, culms slender or filiform, smooth or roughish above, erect, 2'-14' tall. Leaves ½'-1'' wide, much shorter than the culm, flat or somewhat involute in drying, roughish; lower bract similar, the upper much narrower, all sheathing; spikes all filiform-stalked, the terminal one staminate; pistillate spikes 1-3, narrowly oblong, 2''-6'' long, 1'' thick, nodding, 2-12-flowered; perigynia oblong, 3-angled, light green, almost nerveless, about 1'' long, rather less than ½'' thick, the slender beak about one-third as long as the body; scales oval, scarious-margined, shorter than the perigynia; stigmas 3.

Greenland to Alaska, Maine, the White Mountains, northern New York, Michigan, and in the Rocky Mountains to Colorado and Utah. Also in Europe and Asia.

86. Carex arctata Boott. Drooping Wood Sedge. (Fig. 756.)


Glabrous, culms slender, erect or reclining, 1°-2½° long, roughish above. Leaves flat, roughish-margined, much shorter than the culm, the basal ones 3''-5'' wide; stamine spike solitary, short-stalked; pistillate spikes 2-5, linear, 1'-3' long, 1½'' thick, loosely many-flowered, erect, ascending, or at length drooping and filiform-stalked, the lower one usually remote; perigynia oblong, or thickest below the middle, rather strongly few-nerved, narrowed at each end, about 2'' long, less than 1'' thick, 3-angled, tapering into a short 2-toothed beak; scales ovate, cuspidate or short-awned, about one-third shorter than the perigynia; stigmas 3.

In dry woods and thickets, New Brunswick to Minnesota, south to Pennsylvania and Michigan. May-June.

*Carex Knieskerni* Dewey, is probably a hybrid with *C. castanea* or *C. formosa*.

87. Carex tenuis Rudge. Slender-stalked Sedge. (Fig. 757.)


Culms slender, rough above, erect or commonly reclining, 4°-3° long. Leaves shorter than the culm or equalling it, light green, 1½''-2½'' wide; lower bracts similar to the culm-leaves, sometimes overtopping the spikes; stamine spike short-stalked; pistillate spikes 2-5, linear, 1'-3' long, 1½'' thick, filiform-stalked and spreading or drooping; perigynia spindle-shaped, glabrous or puberulent, faintly few-nerved, obtusely 3-angled, 3'' long, less than 1'' thick, tapering into a short 2-toothed beak; scales ovate or oblong, acute, cuspidate or obtuse, scarious-margined, one-half as long as the perigynia; stigmas 3.

In woods, Newfoundland to Michigan, Virginia, the mountains of North Carolina and Kentucky. May-Aug.

A hybrid with *C. virescens* occurs at Revere, Mass.

*C. tenuis* var. *interjecta* (Bailey) Britton.

Pistillate spikes very slender, often compound at the base, erect or nearly so, filiform-stalked, very loosely flowered, the perigynia alternate, only about 2'' long. New York and Pennsylvania.
88. *Carex obilta* Steud. Dark-green Sedge. (Fig. 758.)

Glabrous, culms slender, erect or reclining, sharply 3-angled, smooth or very nearly so, 1°-3° long. Leaves 2"-2½" wide, shorter than the culm, slightly rough; lower bract similar to the culm-leaves but narrower, sometimes overtopping the spikes; staminate spike solitary, filiform-stalked, sometimes partially pistillate; pistillate spikes 3-5, narrowly cylindric, 1½-2½" long, about 2½" thick, loosely flowered, slender-stalked, the upper mostly close together and spreading or ascending, the lower distant, drooping; perigynia dark green, 3-angled, glabrous, 3" long, less than 1" thick, ascending, rather strongly many-nerved, tapering into a short 2-toothed beak; scales obtuse, about one-third the length of the perigynia; stigmas 3.


90. *Carex grisea* Wahl. Gray Sedge. (Fig. 759.)

Glabrous, culms rather stout, erect or somewhat spreading, smooth or nearly so throughout, 1°-2½° long. Leaves light green and sometimes slightly glaucous, flat, 2½-3½" wide, the basal shorter than or equalling the culm; bracts similar to the leaves, spreading, much overtopping the spikes; staminate spikes solitary, sessile; pistillate spikes 3-5, dense, oblong, several—many-flowered, 4°-12° long, about 2" thick, the upper usually sessile and close together, the lower slender-stalked and distant; perigynia oblong, 2½" long, 1½" thick, nearly terete or irregularly angled by overlapping, subaeute but beakless, finely many-striate, longer or the lower equalling or shorter than the ovate scarious-margined euspidate or awned scales; stigmas 3.

In woods and thickets, Maine to Ontario and Minnesota, south to North Carolina and Kansas. May-July.
91. **Carex flaccospérm**a Dewey. Thin-fruited Sedge. (Fig. 761.)


Similar to *Carex grisea* and *C. glaucodea*; slightly glaucous, rather deep green, culms erect, 1"-2" tall. Leaves thin and flat, the basal ones 3"-6" wide, shorter than or equalling the culm; the bracts leafy, much overlapping the spikes; staminate spike sessile or nearly so; pistillate spikes 2-4, oblong, erect, the lower slender-stalked; perigynia oblong, 3-angled, striate-nerved, sub-acute, 2½" long; scales broadly ovate, green, not at all or very slightly scarious-margined, acute, cuspidate or the upper obtuse, 2-3 times shorter than the perigynia; stigmas 3.

Southern Missouri to Texas, east to North Carolina and Florida. June-July.

92. **Carex glaucodea** Tuckerm. Glaucous-cent Sedge. (Fig. 762.)


Similar in habit to *Carex grisea*, but pale and very glaucous all over, culms smooth, erect or spreading, 6'-18' long. Leaves 2'-4" wide, the basal shorter than or equalling the culm; bracts foliaceous, overlapping the spikes; staminate spike sessile; pistillate spikes 3-5, erect, densely several-many flowered, the lower slender-stalked; perigynia oblong, many-striate, 1½"-2" long, sub-acute, beakless, mostly nearly twice as long as the ovate scarious-margined acute cuspidate or short-awned scales; stigmas 3.

In open fields and meadows, Massachusetts to Pennsylvania, Illinois, Virginia and Arkansas. May-July.

93. **Carex granuláris** Muhl. Meadow Sedge. (Fig. 763.)


*Carex granuláris recta* Dewey; Wood's Class-book, 763. 1866.

Glaucous, light green and slightly glaucous, culms slender, erect or spreading, smooth or nearly so, 6'-2½' long. Leaves flat, roughish or smooth, 1½"-3" wide, the basal shorter than the culm; bracts similar to the culm-leaves and usually much exceeding the spikes; staminate spike solitary, sessile or short-stalked; pistillate spikes 3-5, distant or the upper two contiguous, erect or slightly spreading, narrowly oblong or cylindric, ½'-1½' long, 2½" thick, densely many-flowered, slender-stalked or the upper sessile perigynia ovoid, brown, somewhat swollen, strongly many-nerved, ascending, about 1" long, tipped with a short, usually entire, bent or nearly straight beak; scales ovate, thin, acute or cuspidate, shorter than or sometimes equalling the perigynia; stigmas 3.

In moist meadows, New Brunswick to Ontario and Minnesota, south to Florida and Louisiana. May-July.

*Carex granuláris* Shriveri Britton.


Basal leaves broader, 2½"-8" wide, glaucous; perigynia about one-half the size of the type, the more conspicuous point slightly bent. Pennsylvania to Wisconsin and Virginia.
94. Carex Crawei Dewey. Crawe’s Sedge. (Fig. 764.)


Glabrous, culms low, stiff, erect, 3'-15' tall. Leaves rather stiff, flat, 1'/2'-2' wide, erect or nearly so, shorter than the culm, the bracts similar, rarely overtopping the spikes; staminate spikes 1-3, long-stalked; pistillate spikes 1-4, distant, cylindric, erect, 1'/2'-1' long, 2'/4'-3' thick, densely many-flowered, stalked or the upper sessile, the lowest often borne near the base of the culm; perigynia ovoid, ascending, nerveless, usually minutely resinous dotted, 1'/2'-1'/2' long, tapering into a very short entire beak; scales ovate or oval, thin, acute or cuspidate, shorter than the perigynia; stigmas 3.

In moist meadows and on banks, Quebec to Manitoba, south to Pennsylvania and Tennessee. May-July.

95. Carex extensa Gooden. Long-bracted Sedge. (Fig. 765.)


Glabrous, bright green, culms stiff, erect, 1'-2' tall. Leaves 1'/2'-2' wide, strongly involute, erect, shorter than the culm, the lower bract similar, much exceeding the spikes, the upper shorter, sometimes deflexed; staminate spike sessile, rarely pistillate at the base; pistillate spikes 1-3, erect, sessile and close together or the lowest short-stalked and distant, oblong, densely many-flowered, 5'/2'-8'/2' long, about 3' thick; perigynia ovoid or ovoid-oblong, brown, 1'/2' long, narrowed at the base, slightly swollen, strongly many-ribbed, tapering into a short stout 2-toothed beak; scales ovate, acute, brown with a greenish midvein, shorter than the perigynia; stigmas 3.


96. Carex flava L. Yellow Sedge. (Fig. 766.)

C. flava L. Sp. Pl. 975. 1753.

Glabrous yellow-green, culms very slender but stiff and erect, smooth or nearly so, 1'-2' tall. Leaves 1'/2'-2'/2' wide, flat, the radical shorter than or sometimes exceeding the culm, the lower bract elongated, spreading or ascending; staminate spike solitary, stalked or sessile; pistillate spikes 1-4, oblong or globose-oblong, erect, sessile and close together or the lower one distant and short-stalked, densely flowered, 3'/2'-6' long, about 3' thick; perigynia narrowly ovoid, yellow, and spreading or deflexed when mature, 2'/2'-3' long, strongly several-nerved, the subulate 2-toothed beak about as long as the body; scales lanceolate or oval, acute or subacute, shorter and narrower than the perigynia; stigmas 3.

In swamps and wet meadows, Newfoundland to the Northwest Territory, south to Rhode Island, New Jersey, Pennsylvania, Ohio and Montana. Also in Europe. July-Sept.

C. Badari Ehrh., found by the late I. C. Martindale at Atco, N. J. (according to Prof. Bailey), is a walt from Europe, otherwise not known from America.
97. Carex viridula Michx. Green Sedge. (Fig. 767.)


Glabrous, bright green, culms slender, smooth, erect, 4'-15' tall, often exceeded by the erect narrow basal leaves. Leaves 1" or less wide, the bracts similar usually strictly erect and much overtopping the spikes; staminate spike sessile, sometimes pistillate at the top; pistillate spikes 2-5, all close together and sessile or the lower distant and short-stalked, oblong-cylindric or oblong, 2'-6' long, 2' or less in diameter; perigynia ovoid-oblong, 1' or less long, strongly few-nerved, narrowed at the base, tapering into a 2-toothed beak about one-half as long as the body; scales ovate, shorter than the perigynia and about as wide; stigmas 3.

In bogs and on wet rocks, Newfoundland to Hudson Bay and the Northwest Territory, south to Maine, Pennsylvania, Minnesota, Utah and Washington. Summer.

. Carex distans L., a related species, has been collected on ballast at Philadelphia.

98. Carex pallescens L. Pale Sedge. (Fig. 768.)

Carex pallescens L. Sp. Pl. 977. 1753.

Light green, culms slender, erect, rough above, 4'-20' tall. Leaves flat, 1'-1½' wide, pubescent at least on the sheaths, shorter than the culm; lower bract similar to the culm-leaves, erect or nearly so and exceeding the spikes; staminate spikes solitary, stalked; pistillate spikes 2-4, oblong, erect or somewhat spreading, slender stalked or the upper one sessile, densely many-flowered, 4'-9' long, 2½'-2½' in diameter usually clustered; perigynia short-oblong, pale, 1' long, ½' thick, obtuse, thin, faintly few-nerved, beakless, the orifice entire; scales ovate, membranous, cuspidate or short-awned, equaling or the upper shorter than the perigynia; stigmas 3.


99. Carex abbreviata Prescott. Torrey's Sedge. (Fig. 769.)

Carex abbreviata Prescott; Booth, Trans. Linn. Soc. 20: 141. 1846.

Pale green, culms slender, rather stiff, erect, 10'-20' tall, finely ciliate-pubescent. Leaves about 1' wide, erect, elongated but shorter than the culm, finely and usually densely pubescent; lower bract ½'-2' long, spreading or ascending, pubescent; staminate spike solitary, short-stalked; pistillate spikes 1-3, short oblong, dense, 3½'-5' long, about 3' thick, sessile or the lower one short stalked, erect, clustered; perigynia broadly oblong or ovoid, glabrous, about 1' long and more than ½' thick, strongly many-nerved, obtuse, abruptly tipped by a short cylindric beak, scales cuspidate, shorter than the perigynia; stigmas 3.

In dry soil, New York to the Northwest Territory, south in the Rocky Mountains to Colorado. June-July.
100. **Carex conoidea** Schk. Field Sedge.  
(Fig. 770.)


Glabrous, culms slender, rather stiff, erect, 8'-18' tall. Leaves 1"-1 1/2" wide, the basal sometimes equaling the culm; lower bracts similar to the culm-leaves, sometimes overtopping the spikes; staminate spike long-stalked; pistillate spikes 1-3, distant, erect, oblong or oblong-cylindric, 5"-12" long, 2 1/2" thick, not densely flowered, the upper nearly sessile, the lower slender-stalked; perigynia oblong, obtusely 3-angled, narrowed to each end, acute, finely many-striate, beakless, 1"-1 1/2" long, about 1/2" thick, the orifice entire; scales broadly ovate, scarious-margined, abruptly contracted into a rough awn, the lower longer than the perigynia, the upper shorter than or equaling them; stigmas 3.

In meadows, Nova Scotia to Ontario, south to Rhode Island, New Jersey, Ohio and Illinois. May-June.

101. **Carex oligocarpa** Schk. Few-fruited Sedge.  
(Fig. 771.)


Glabrous, culms very slender or almost filiform, spreading or reclining, roughish, 8'-18' long. Leaves about 1" wide, spreading, soft, the basal shorter than or equaling the culm, the bracts similar, usually exceeding the spikes; staminate spike solitary, long-stalked or nearly sessile; pistillate spikes 2-4, erect or nearly so, distant, loosely few-flowered, 4"-8" long, less than 2" thick, erect, the lower filiform-stalked, the upper sessile; perigynia oblong, firm, pale, finely many-striate, ascending, 1"-1 1/2" long, abruptly narrowed into a short straight or oblique entire beak; scales ovate, tipped with a rough spreading awn, longer than or equaling the perigynia; stigmas 3.

In dry woods and thickets, Vermont and Ontario to Michigan, south to New Jersey, West Virginia, Kentucky and Missouri. May-July.

102. **Carex Hitchcockiana** Dewey. Hitchcock's Sedge.  
(Fig. 772.)


Culms slender, erect, somewhat rough, 1'-2' tall. Leaves 1 1/2"-3" wide, the basal mostly shorter than the culm, the upper and similar bracts much overtopping the spikes, their sheaths pubescent, their blades somewhat so; staminate spike stalked or nearly sessile; pistillate spikes 2-4, loosely few-flowered, erect, rather distant, stalked or the upper sessile; perigynia ovoid, obtusely 3-angled, finely many-striate, ascending, 1 1/4" long, nearly 1" thick, tipped with a short stout oblique entire beak; scales ovate or ovate-lanceolate, scarious-margined, rough-awned, longer than or equaling the perigynia; stigmas 3.

In woods and thickets, Vermont and Ontario to Michigan, south to New Jersey, West Virginia, Kentucky and Missouri. May-July.
103. Carex altocaulis (Dewey) Britton. Sheathed Sedge. (Fig. 773.)


Glabrous, light green but not glaucous, culms very slender, weak, spreading or reclining, 1°-2° long. Leaves 1 3/4'-2' wide, shorter than the culm, the upper ones and the bracts usually very short; staminate spike long-stalked; pistillate spikes 2 or 3, distant, slender-stalked, ascending, spreading or recurved, less than 1' long, loosely several-flowered, their stalks partly enclosed by the long sheaths; perigynia oblong, 3-angled, narrowed at the base, faintly few-nerved 2' long, nearly 1' thick, tipped with a beak about one-fourth the length of the body, the orifice 2-toothed, oblique; scales ovate or ovate-lanceolate, acute or the upper obtuse, shorter than or the lower equaling the perigynia; stigmas 3.

In swamps, Quebec and Vermont to Ontario, New York and Minnesota. Summer.

104. Carex polymorpha Muhl. Variable Sedge. (Fig. 774.)

Carex polymorpha Muhl. Gram. 239. 1817.

Glabrous, rather dark green, culms stiff, strictly erect, smooth or nearly so, 1°-2° tall. Leaves flat, 1 3/4'-2' wide, nearly erect, the basal sometimes as long as the culm, the others much shorter; bracts usually little longer than the pistillate spike; staminate spikes 1 or 2, long-stalked; pistillate spikes commonly solitary, sometimes 2, erect, short-stalked or sessile, densely many-flowered or sometimes looser at the base, 1'-1 1/2' long and 4' thick, occasionally staminate at the summit; perigynia ovoid-oblong, obscurely 3-angled, fully 2' long and 1' in diameter, the beak more than one-half as long as the body, the orifice oblique; scales red-brown, obtuse or the lower acute, somewhat shorter than the perigynia; stigmas 3.

In swamps or wet meadows, Massachusetts to northern New Jersey, south to North Carolina. Local. Ascends to 2000 ft. in Pennsylvania. June-Aug.

105. Carex tetanica Schk. Wood’s Sedge. (Fig. 775.)

Carex tetanica Schk. Riedgr. Nachr. 68. figs. 100, 207. 1866.


Light green and glabrous, culms slender, erect or nearly so, rough above, 1°-2° tall. Leaves flat, 1'-2' wide, the basal about equaling the culm; bracts narrow, elongated, sometimes overtopping the spikes; staminate spike stalked, the stalk sometimes 3' long; pistillate spikes 2 or 3, erect, distant, narrowed at the base, loosely or compactly several-many-flowered, 1' long or less, or the lower filiform-stalked and drooping; perigynia oblong, green, prominently many-nerved, about 1 3/4' long, less than 1' thick, oblique, the summit curved outwards and tapering to an entire orifice, beakless; scales ovate-oblong, obtuse or the lower mucronate, shorter than the perigynia or the lower equaling them; stigmas 3.

In meadows and wet woods, Ontario to Manitoba, North Carolina and Louisiana. June-July.
106. Carex Meadii Dewey. Mead’s Sedge. (Fig. 776.)


Similar to the preceding species, culm stouter, very rough above, 12'-18' tall. Basal leaves usually shorter than the culm; bracts short, not overtopping the spikes; staminate spike long-stalked; pistillate spikes 1-3, sometimes stamineate at the summit, occasionally compound at the base, oblong-cylindric, densely flowered, ½'-1' long, about 3" in diameter, erect, stalked or the upper one sessile; perigynia broadly oblong, prominently many-nerved, green, 1½" long, about 1" in diameter, tipped with a minute slightly bent beak; scales ovate, green with purple-brown margins, acute, mucronate or the upper obtuse, the upper short, the lower sometimes exceeding the perigynia; stigmas 3.

In swamps and wet meadows, Rhode Island to Pennsylvania and Georgia, west to Michigan, Assiniboia, Nebraska and Arkansas. The lowest spike is sometimes borne on a very long stalk arising from the axil of one of the basal leaves. May-July.

107. Carex laxiflora Lam. Loose-flowered Sedge. (Fig. 777.)

Carex laxiflora Lam. Encycl. 3: 392. 1789.

Glabrous, rather pale green, culms erect or reclining, slender, roughish above, 6'-2' long. Leaves 1½"-3" wide, soft, the basal mostly shorter than the culm, the bracts similar to the culm-leaves sometimes overtopping the spikes; stamineate spike usually stalked; pistillate spikes 2-4, distant, linear-cylindric, loosely several-many-flowered, ½'-1' long, 1½"-2" thick, all slender-stalked and spreading or drooping or the upper one erect and sessile; perigynia ascending, obovoid, more or less oblique, ½"-1½" long, rather more than ½" thick, narrowed at the base, strongly many-nerved, tapering into a short stout outwardly bent entire beak; scales ovate with broad white scarious margins, acute, cuspidate or awned, shorter than or exceeding the perigynia; stigmas 3.

In meadows and thickets, Maine and Ontario to Minnesota, south to Florida, Alabama and the Indiana Territory. Ascends to 5000 ft. in Virginia. May-July.

Carex laxiflora biánda (Dewey) Boott, Ill. 37. 1858.

Carex laxiflora var. sriatula Carey in A. Gray, Man. Ed. 2, 524. 1856.

Pistillate spikes cylindric, mostly densely flowered, the upper sessile or nearly so, erect, contiguous to the usually sessile stamineate one, the lower slender-stalked. Range of the type. Perhaps distinct.


Stouter and taller than the preceding; leaves 2½"-3½" wide; pistillate spikes sometimes 1½" long and 2½" thick, dense, often compound at the base, the upper sessile or short-stalked and contiguous to the sessile stamineate one, the lower long-stalked. New Hampshire to southern New York and Missouri. Range undetermined.

Carex anceps var. patulifolia Dewey, Wood’s Bot. 423. 1845.

Glaucous or pale green; basal leaves 2½"-4½" wide; staminate spike usually stalked; pistillate spike 1' long or more, loosely flowered, scattered; perigynia oblong or ellipsoid, the beak nearly straight. Halifax, Nova Scotia (according to Macoun), Massachusets to Michigan, south to Virginia and Tennessee.


Perigynia larger than in the other forms, contracted into a stipe one-half as long as the body. Washington, D. C.
108. Carex styloflexa Buckley. Bent Sedge. (Fig. 778.)


*Carex laxiflora* var. *styloflexa* Boott, Ill. 37. 1858.

Glabrous, culms leaning, slender, smooth, 1°-2° tall. Leaves 1½'-3'' wide, flat, shorter than the culm; bracts short, rarely exceeding the spikes; staminate spike solitary, usually long-stalked but sometimes nearly sessile; pistillate spikes 1-4, distant, loosely few-several-flowered, less than 8'' long, the lower drooping on filiform stalks; perigynia oblong, triangular, many-nerved, about 2'' long, 1'' thick, somewhat oblique, tapering gradually to both ends and thus slender-beaked; scales ovate or ovate-lanceolate, scarious-margined, acute, cuspidate or short-awned, shorter than the perigynia; stigmas 3.

In woods and thickets, southern New York and Pennsylvania to Florida, Louisiana and Texas. May-July.

109. Carex digitalis Willd. Slender Wood Sedge. (Fig. 779.)


Glabrous, bright green, not at all glaucous, culms slender or almost filiform, nearly or quite smooth, usually reclining, 4'-18' long. Leaves flat, 1''-2'' wide, the basal sometimes exceeding the culm, the upper ones and the bracts similar but shorter, the latter commonly overtopping the spikes; staminate spike stalked; pistillate spikes 2-4, linear, loosely alternately flowered, ½'-1' long, the upper one sessile or nearly so, the others filiform-stalked and widely spreading or drooping; perigynia oblong, sharply triangular, many-nerved, brown when ripe, narrowed at both ends, 1'' long, more than ½'' thick, the very short beak slightly oblique; scales lanceolate or ovate-lanceolate, scarious-margined, acute, acuminate or short-awned, shorter than or the lower about equaling the perigynia; stigmas 3.

In woods and thickets, Maine and southern Ontario to Minnesota, south to Florida and Texas. Ascends to 3000 ft. in Virginia. May-July.


Larger in every way, culms sometimes 2' long, reclining; leaves 2½'-4'' wide; pistillate spikes shorter and denser; perigynia larger. Michigan and southern Ontario.

110. Carex Careyana Torr. Carey's Sedge. (Fig. 780.)


Glabrous, bright green, culms slender, erect or somewhat reclining, smooth or nearly so, 1°-2° tall. Basal leaves flat, 3''-6'' wide, much shorter than the culm; bracts linear-lanceolate with very long sheaths, the blades 1'-3' long; staminate spike usually large, long-stalked; pistillate spikes 1-3 (commonly 2), erect, loosely few-several-flowered, less than 1'' long, the upper sessile or short-stalked, the lower on a long filiform stalk; perigynia ovoid-oblung, very sharply 3-angled, many-nerved, fully 2'' long and over 1'' thick, brown, the short beak slightly oblique, entire; scales ovate with white hyaline margins, cuspidate or awned, shorter than the perigynia; stigmas 3.

In woods, New England (according to Bailey); New York to Michigan and Virginia. May-June.
111. Carex Albursina Sheldon. White Bear Sedge. (Fig. 781.)

Carex laxiflora var. latifolia Boott, Ill. 38. 1858. Not C. latifolia Moench.


Glabrous, rather deep green, culms stout, nearly smooth, flattened, usually spreading, 8'-2° long. Basal leaves lanceolate or oblong-lanceolate, acuminate, shorter than the culm, 1'/2'-1'/2' wide; bracts similar to the narrower culm-leaves, the upper overtopping the spikes; staminate spikes sessile or nearly so; pistillate spikes 2-4, distant and narrowly linear, stalked or the upper sessile and close together, 1'/2'-1'/2' long, very loosely flowered; perigynia obovoid, obtusely 3-angled, strongly many-nerved, 2' long, 1'' thick, tipped with a very short bent entire beak; scales ovate-oblong, scarious-margined, obtuse or the lower acute, shorter than the perigynia; stigmas 3.

In woods, Massachusetts to New York, Ohio and Minnesota, south to Virginia and Michigan. Ascends to 2300 ft. in Virginia. June-Aug. The specific name is in allusion to White Bear Lake, Minn.

112. Carex plantaginea Lam. Plantain-leaved Sedge. (Fig. 782.)

Carex plantaginea Lam. Encycl. 3: 392. 1789.

Glabrous, rather dark green, culms slender, erect or reclining, 6'-2° long. Leaves 1'/2'-1' wide, shorter than or equalling the culm, persistent through the winter and until the new culms develop in the following spring; bracts short, usually with purple or purplish clasping sheaths; staminate spike long-stalked, purple; pistillate spikes 3 or 4, erect, all slender-stalked, 1' or less long, loosely flowered, the stalks of the upper ones enclosed in the sheaths; perigynia oblong, outwardly curved, many-nerved, 1'/2' long, about 1'' thick, longer than or equalling the ovate cuspidate scales; stigmas 3.

In woods, New Brunswick and Ontario to Manitoba, south to Virginia and Wisconsin. Ascends to 2100 ft. in Virginia. May-July.

113. Carex laxiculmis Schwein. Spreading Sedge. (Fig. 783.)


Glabrous, blue-green and glaucous, culms filiform, smooth or very nearly so, ascending or diffuse, 6'-2° long. Basal leaves elongated, 3''-5'' wide, often longer than the culms; bracts similar to the narrower culm-leaves, usually short; staminate spike long-stalked; pistillate spikes 2-4, oblong, loosely few-flowered, 3''-6'' long, about 2'' thick, drooping on long hair-like stalks or the upper short-stalked and erect; perigynia ovoid-oblong, sharply 3-angled, many-nerved, about 1'' long and rather more than 3/4'' thick, narrowed at both ends, scarcely beaked, longer than the ovate green cuspidate or short-awned scales; stigmas 3.

In woods and thickets, southern Ontario to Michigan, south to Rhode Island and Virginia. Ascends to 3600 ft. in Virginia. May-June.
114. Carex ptychocarpa Steud. Thicket Sedge. (Fig. 784.)


Glabrous, pale green and glaucous, culms erect, very slender, smooth, only 2'-6' tall. Leaves flat, the basal 2'-4' wide, much longer than the culm; bracts foliaceous, usually overtopping the spikes; staminate spike small, sessile; pistillate spikes 2 or 3, sessile and close together at the summit or the lower one slender-stalked and nearly basal, all erect, loosely few-flowered, 4'-8' long; perigynia oblong, pale, 3-angled, rather strongly many-nerved, 1" long, rather more than 1/2" thick, pointed at both ends, minutely straight-beaked, the orifice entire; scales ovate, thin, obtuse, about one-half as long as the perigynia; stigmas 3.

In moist woods and thickets, Massachusetts and New Jersey to Florida and Louisiana. June-Sept.

115. Carex platyphylla Carey. Broad-leaved Sedge. (Fig. 785.)


Glabrous, pale green and glaucous, culms slender, spreading or reclining, 4'-15' long. Leaves flat and broad, 1/4'-1' wide, shorter than the culm; bract linear-lanceolate with long clasping sheaths, 1'-21/2' wide, not overtopping the spikes, usually less than 2' long; staminate spike stalked; pistillate spikes 2-4, distant, erect, all slender-stalked or the upper one nearly sessile, loosely several-flowered, 5'-10' long, their stalks commonly enclosed in the sheaths, perigynia oblong, 3-angled, many-nerved, slightly bent at the narrowed summit, 1'/-11/2' long, rather more than 1/2" thick, equaling or somewhat longer than the ovate-oblong acute cuspidate or short-awned scales; stigmas 3.

In woods and thickets, Quebec and Ontario to Michigan, south to Virginia and Illinois. Ascends to 2500 ft. in Virginia. May-June.

116. Carex panicea L. Grass-like Sedge. Carnation-grass. (Fig. 786.)

Carex panicea L. Sp. Pl. 977. 1753.

Glabrous, pale bluish green and glaucous, culms slender, smooth, erect, stiff, 1'-2' tall. Leaves flat, 1'/-2' wide, the basal ones shorter than or equalling the culm, those of the culm and the bracts much shorter and narrower; staminate spikes 1 or 2, stalked; pistillate spikes 2 or 3, distant, filiform-stalked or the upper nearly sessile, erect, 1' or less long, about 21/2" thick, rather loosely several-many-flowered, the upper sometimes staminate at the summit; perigynia oval, about 11/2" long and nearly 1" in diameter, slightly swollen and obscurely 3-angled, yellow, purple or mottled, faintly few-nerved, tipped with a very short entire somewhat oblique beak; scales ovate, acute, purple or purple-marginated, shorter than the perigynia; stigmas 3.

117. Carex livida (Wahl.) Willd. Livid Sedge. (Fig. 787.)


Glabrous, pale green and very glaucous, culms slender, strictly erect, smooth, 1'-1 1/2' tall. Leaves 1''-2'' wide, the basal shorter than or sometimes about equaling the culm, involute in drying; bracts narrow, usually short; staminate spike solitary, short-stalked; pistillate spikes 1-3, 5''-12'' long, about 2'' thick, erect and clustered at the summit of the culm, narrowly cylindric, densely several-flowered or looser at the base, the third, when present, distant or sometimes nearly basal, stalked; perigynia oblong, very pale, nearly 2'' long, less than 1'' thick, finely nerved, straight, beakless, narrowed to an entire orifice; scales ovate, obtuse or the lower subacute, rather shorter than the perigynia; stigmas 3.

In bogs, Labrador and Hudson Bay to Alaska, south to Connecticut, the pine barrens of New Jersey, central New York and Michigan. Also in Europe. Summer.

118. Carex aurea Nutt. Golden-fruited Sedge. (Fig. 788.)


Glabrous, light green, culms very slender, erect or reclining, 2'-15' long. Leaves flat, 1''-1 1/2'' wide, the basal equaling or exceeding the culm; bracts similar to the culm-leaves, commonly much overtopping the spikes; terminal spike short-stalked, stamine or androgynous; pistillate spikes 2-4, oblong or linear-oblong, erect and clustered near the summit of the lower one distant, filiform-stalked, loosely or compactly few-flowered, 2''-10'' long, about 1 1/2'' thick; perigynia obovoid or subglobose, white or nearly white when young, becoming fleshy, yellow or brown and about 1'' in diameter when mature, many-nerved, beakless, the orifice entire; scales ovate, membranous acute, blunt, cuspidate or short-awned, shorter than or the lower exceeding the perigynia; stigmas mostly 2.

In wet meadows, springs and on wet rocks, Newfoundland to the Northwest Territory and British Columbia, south to Massachusetts, Pennsylvania, Michigan, Utah and Washington. Summer.

119. Carex bicolor All. Parti-colored Sedge. (Fig. 789.)


Similar to the preceding species, but somewhat glaucous; culms slender, erect, 2'-18' tall. Basal leaves 1''-2'' wide, shorter than or equaling the culm; spikes 2-4, mostly clustered at the summit of the culm, dense, the terminal one partially stamine; perigynia oblong, white, compressed, few-nerved, less than 1'' long, not fleshy at maturity, abruptly tipped with a very short entire nearly cylindric beak; scales brown-purple with white midvein and margins, oval, obtuse or acute, shorter than the perigynia.

Greenland and Labrador (according to Boott). Also in Europe. Summer.
120. Carex setifolia (Dewey) Britton. Bristle-leaved Sedge. (Fig. 790.)


Glabrous, pale green, culm filiform, smooth, weak, 4'-15' long. Leaves filiform, shorter than the culm, less than 1/4' wide; bracts reduced to bladeless sheaths 2'-5' long; staminate spikes solitary, sessile or very nearly so, 3'-4' long; pistillate spikes 2-4, erect, slender-stalked, 2'-4' long, rather less than 1" thick, loosely few-flowered, the upper commonly overtopping the staminate, the lower one sometimes distant; perigynia oblong, pointed at both ends, 3-angled, 1" long, 1/2" or less thick, polished and nearly black when mature, very faintly few-nerved, tapering into a short entire beak; scales ovate, obtuse or the lower acute, thin, hyaline, shorter than the perigynia; stigmas 3.

In dry sandy or rocky soil, preferring limestone rocks, New Brunswick to the Northwest Territory, south to Pennsylvania, Kentucky and Nebraska. May-July.

121. Carex concinna R. Br. Low Northern Sedge. (Fig. 791.)


Culms filiform, smooth, 2'-6' tall. Leaves about 1" wide, flat, pale green, much shorter than the culm; bracts reduced to green bladeless sheaths or the lower one with an erect subulate blade 3'-6' long; staminate spike solitary, sessile; pistillate spikes 1-3, sessile and clustered or the lower one somewhat distant and short-stalked, erect, 2'-4' long, about 1" thick, compactly few-flowered; perigynia oblong-ovoid, 3-angled, pubescent, short-beaked, few-nerved, about twice as long as the ovate obtuse or subacute green or purplish scales; stigmas 3.

In rocky places, Quebec and Ontario to British Columbia. Summer.

122. Carex Richardsoni R. Br. Richardson's Sedge. (Fig. 792.)


Culms slender, rough, erect, 4'-12' tall. Leaves flat, about 1" wide, the basal shorter than or sometimes equaling the culm, those of the culm very short; bracts bladeless, sheathing, 1'/2'-1' long, usually brown-purple with a white hyaline acute summit; staminate spike solitary, short-stalked; pistillate spikes 1 or 2, erect, narrowly cylindric, short-stalked, 4'-9' long, compactly several-flowered, close together, their stalks partly or wholly enclosed in the sheaths; perigynia obvoid, pubescent, about 1" long, minutely beaked; scales mostly longer than the perigynia, ovate, obtuse or subacute, purple, conspicuously white-margined; stigmas 3.

In dry soil, Ontario to the Northwest Territory and British Columbia, south to western New York, Illinois Michigan and South Dakota. Summer.
123. Carex pedunculata Muh. Long-stalked Sedge. (Fig. 793.)


Densely matted, rather bright green, culms very slender, roughish above, diffuse or reclinling, 3'-10' long. Leaves flat, 1'/'-1'/2" wide, the basal commonly longer than the culms; sheaths green, the upper almost bladeless, the lower with short leaf-like blades; stamineate spike long-stalked, usually with some pistillate flowers at its base; pistillate spikes 2-6, 3'/'-6'/2" long, few-flowered, filiform-stalked and spreading or drooping, scattered, commonly borne at every node, some of them appearing basal; perigynia obovoid, sharply 3-angled, puberulent or becoming glabrous, 2" long, pale green, nerveless, narrowed below into a stipe, tipped with a minute and somewhat oblique entire beak; scales green or purplish, ovate, abruptly cuspidate or the lower subtulate-awned, equalling or the lower considerably exceeding the perigynia; stigmas 3.

In dry woods, Anticosti to Manitoba, south to Virginia, Pennsylvania and Minnesota. May-July.

124. Carex pedicellata (Dewey) Britton. Fibrous-rooted Sedge. (Fig. 794.)


Light green, not stoloniferous, fibrous-rooted, culms slender, roughish above, erect or reclinling, 6'-20' long. Leaves 1'/'-2" wide, shorter than the culms; lower bract narrowly linear or subtulate, 1'/4'-2' long; stamineate spike short-stalked, 4'/'-12' long; pistillate spikes 2-4, short-oblong, few-flowered, sessile and usually separated, or the lowest short-stalked; perigynia oval or oblong, rather less than 1'/4" long and a little more than 1'/2" in diameter, pale, pubescent, slightly 1-ribbed on each side, tipped with a subtulate 2-toothed beak one-fourth the length of the body; scales green, ovate, acute, about equalling the perigynia; stigmas 3.

In dry soil, Nova Scotia to Minnesota, Georgia, Ohio and Michigan. Ascends to 5000 ft. in Virginia. May-July.


Usually lower than the species and the leaves much shorter than the culm; stamineate spike only 2'-5' long; pistillate spikes closer together. Nova Scotia to Connecticut and Michigan.

125. Carex Pennsylvanica Lam. Pennsylvania Sedge. (Fig. 795.)


Dark or dull green, stoloniferous, culms slender, erect, smooth or roughish, 6'-15' tall. Leaves 1'/2'-1'/2" wide, the basal shorter or sometimes exceeding the culm, the old sheaths persistent and fibroillose; lower bract subtulate or scale-like, rarely over 1'/2" long; stamineate spike sessile or very short-stalked, 1'/4'-1" long; pistillate spikes 1-3, short-oblong, few-flowered, sessile, contiguous or the lower somewhat distant; perigynia broadly oval, about 1'/4" long and more than 1'/2" in diameter, pubescent, 1-ribbed on each side, narrowed at the base, tipped with a 2-toothed beak about one-fourth the length of the body; scales ovate, purplish, acute or cuspidate, equalling or a little longer than the perigynia; stigmas 3.

In dry soil, New Brunswick to Manitoba and the Northwest Territory, south to North Carolina, Tennessee and Kansas. Ascends to 3000 ft. in North Carolina. May-June.
126. Carex varia Muhl. Emmons' Sedge. (Fig. 796.)


Rather bright green, stoloniferous, culms filiform, erect or somewhat spreading, roughish above, 6'-18' long. Leaves elongated, ½'-'1½' wide, nearly always shorter than the culms; lower bract scale-like or subulate, rarely ½' long; staminate spike 2'-'4' long, sessile, sometimes scarcely overtopping the upper pistillate one, but usually rather prominent; pistillate spikes 2-4, mostly close together, 2'-'3' long, few-flowered; perigynia oblong, pubescent, about 1' long ½' thick, narrowed at the base, tipped with a subulate minutely 2-toothed beak commonly one-fourth the length of the body; scales ovate, green or purplish-brown, acute, about as long as the perigynia; stigmas 3.

In dry soil, Nova Scotia to western Ontario and Manitoba, south to Georgia and Texas. May-July.

127. Carex Novae-Angliae Schwein. New England Sedge. (Fig. 797.)


Rather dark green, stoloniferous, culms filiform, erect or reclining, 4'-8' long. Leaves about ½' wide, soft, elongated, often exceeding the culms; staminate spike short-stalked, very narrow or almost filiform, 3'-'8' long; pistillate spikes 1-4, distant, subglobose, few-flowered, sessile or the lower short-stalked; lower bract filiform, short or sometimes overtopping the spikes; perigynia narrowly obovoid or oblong, ½' long, ½' thick, pubescent, tipped by a subulate 2-toothed beak about one-fourth the length of the body; scales ovate, greenish-brown, acute or cuspidate; stigmas 2 or 3.

In wet shaded places, New Brunswick to Maine, Massachusetts and northern New York. Summer.

128. Carex deflexa Hornem. Northern Sedge. (Fig. 798.)


Aspect of smaller forms of the preceding species; culms filiform, erect or spreading, 1'-12' long, shorter than or exceeding the narrow bright green leaves. Bracts subulate or very narrowly linear, ½'-'2' long; staminate spike sessile, 1'-'3' long, sometimes oblique, inconspicuous; pistillate spikes 1-4, 2'-'4' long, oblong, few-flowered, the upper sessile, the lower slender-stalked and somewhat separated, commonly also 1 or 2 nearly basal filiform-stalked spikes from the lowest sheaths; perigynia oblong, much narrowed at the base, pubescent, ½' or less long, tipped with a flat 2-toothed beak about one-fourth the length of the body; scales ovate or ovate-lanceolate, green, acute or cuspidate; stigmas 3 or 2.

In open places, Nova Scotia to Ontario, Maine, Vermont and Pennsylvania, mostly at high altitudes. Summer. Carex Peckii Howe (C. albicans Willd., an older name) may be distinct.

Carex deflexa Farwéli Britton.

Densely tufted; culms stiff, erect, 6'-15' tall, commonly much longer than the leaves; stam-
inate spike conspicuous, 3'-6' long, sessile or short-stalked; pistillate spikes 2 or 3, scattered, the lower slender-stalked and subtended by a foliaceous bract which often overtops the culm; perigynia 1'-1½" long. Northern Michigan to British Columbia and Oregon, south in the Rocky Mountains to Colorado. Perhaps a distinct species.

129. Carex praecox Jacq. Vernal Sedge. (Fig. 799.)

*Carex praecox* Jacq. Pl. Austr. 5: 23. fl. 446. 1778.

Dark green, stoloniferous, culms very slender, erect or reclining, smooth, 3'-12' long. Leaves ½"'-1½" wide, almost always much shorter than the culm; lower bract subulate, ½"'-1' long; stamine spike sessile or very short-stalked, usually large and conspicuous; pistillate spikes 1-3, all close together at the summit, oblong, several-flowered, 3'-6" long, about 2½" in diameter, sessile or the lower short-stalked, sometimes pistillate at the summit; perigynia oblong or obovoid, sharply 3-angled, pubescent, brown, about 1" long; tipped with a very minute beak; scales ovate, purple-brown with a lighter mid-vein, acute, cuspidate or the lower rough-awned, about equalling the perigynia; stigmas 3.


130. Carex nigro-marginata Schwein. Black-edged Sedge. (Fig. 800.)


Bright green, strongly stoloniferous, culms filiform, erect or spreading, 2'-8' long. Leaves 1'-2" wide, very much longer than the culms, rather stiff, often 12' or more long; bracts very short and subulate or wanting; stamine spike sessile, inconspicuous, 2'-3' long, purple; pistillate spikes 1-3, few-flowered, sessile at the base of the stamine, about 3" long; perigynia oblong, narrowed at the base into a short stipe, pubescent or nearly glabrous, 1'-1½" long, about ½" thick, 1-ribbed on each side, tipped with a cylindric-subulate 2-toothed beak one-third to one-half as long the body; scales ovate, acute or cuspidate, green with purple margins or variegated, rather longer than the perigynia; stigmas 3.

Dry soil, New York to North Carolina. May-July.

131. Carex umbellata Schck. Umbell-like Sedge. (Fig. 801.)

*C. umbellata* Schck. Riedgr. Nachtr. 75. f. 171. 1806.


Rather light green, closely tufted and matted, stoloniferous, culms filiform, very nearly smooth, 1'-6' long, erect or reclining. Leaves ½"'-1½" wide, usually much exceeding the culm, sometimes 1" long, the old sheaths fibrillose; stamine spike solitary, terminal, ½' or less long, commonly conspicuous; pistillate spikes 1-3, all filiform-stalked from the basal sheaths or 1 or 2 of them sessile or very nearly so at the base of the stamine, ovoid-oblong, several-flowered, 2'-4' long; perigynia oval, finely pubescent, pale, obtusely 3-angled, the body rather less than 1" long, tipped with a subulate 2-toothed beak of nearly its length; scales ovate-lanceolate, acuminate or short-awned, about as long as the perigynia; stigmas 3.

Dry soil, Nova Scotia to the Northwest Territory, New Jersey, the Indian Territory and Oregon. May-July.
132. Carex pubescens Muhl. Pubescent Sedge. (Fig. 802.)

*Cyperaceae.*


Pubescent all over, bright green, stoloniferous, culms slender, usually reclining, 1'-2' long. Leaves flat, soft, elongated, shorter or longer than culm, 2'-3½'' wide; lower bracts 1'-2' long, occasionally overtopping the spikes; staminate spike sessile or nearly so, sometimes with pistillate flowers at its base; pistillate spikes 2-4, oblong-cylindrical, rather loosely several-many-flowered, erect, 4''-10'' long, 2''-2½'' thick, the upper sessile, the lower somewhat separated and short-stalked; perigynia sharply 3-angled, obovoid, narrowed to a stipe-like base, densely pubescent, and, including the subulate straight minutely 2-toothed beak, about 2'' long; scales ovate, scarious-margined, rough-awned or cuspitate, about as long as the perigynia; stigmas 3.

In woods and thickets, Nova Scotia to North Dakota New Jersey, Kentucky and Missouri. June-Aug.

133. Carex Fraseri Andr. Fraser’s Sedge. (Fig. 803.)

Carex Fraseraiana Sims, Bot. Mag. pl. 1391. 1811.

Glabrous, culms smooth, slender, reclining, 10'-18' long. Basal leaves 8'-16' long, 1'-2' wide, perfectly flat, firm, spreading, finely many-nerved with no midvein, obtuse or subacute at the apex, their margins usually finely crumpled in drying; culm leaves reduced to clasping basal sheaths; spike solitary, bractless, terminal, androgynous, ½'-1' long, staminate above, pistillate below, the pistillate portion dense, about ½' in diameter in fruit; perigynia ovoid, pale green, diverging, thin and somewhat swollen, faintly many-nerved, fully 2'' long and rather more than 1'' in diameter, tipped with a short nearly truncate beak; scales ovate, obtuse, much shorter than the perigynia; stigmas 3.


134. Carex picta Steud. Boott’s Sedge. (Fig. 804.)


Dioecious, foliage glabrous, light green, culm slender, smooth, erect or reclining, 6'-12' long, usually much shorter than the leaves. Leaves flat, 1½''-5'' wide; spike solitary and terminal or rarely with a small accessory one near its base, erect, densely many-flowered, the staminate about 1' long, the pistillate cyllindrical but narrowed at the base, 1'-2½' long, 3''-4'' thick, subtended by a short purple sheath; perigynia obovoid, strongly many-nerved, pubescent at least toward the obtuse summit, about 1½'' long, narrowed at the base; scales purple, usually with green margins and midvein, shining, obovate, acute or cuspitate, longer and wider than the perigynia.

In woods, Indiana to Alabama and Louisiana. Local. Summer.
135. Carex scirpoidea Michx. Scirpus-like Sedge. (Fig. 805.)


Dioecious, foliage glabrous, rather bright green, culms erect, slender but stiff, 6'-18' tall, slightly rough. Leaves ½'-1' wide, nearly erect, usually much shorter than the culm; spike solitary or rarely with an additional and very small one near its base, linear-cylindric, densely many-flowered, 8'-15' long, 1½'-2' in diameter, subtended by a short or sometimes subulate bract; perigynia ovate, few-nerved, densely pubescent, ½' long, ½' thick, narrowed at the base, tipped with a very short beak; scales ovate-oval, dark purple with a narrow green midvein, acute, about as long as the perigynia; stigmas 3.

In rocky soil, Greenland to Alaska, south to the higher mountains of New England, Lake Huron, Utah and California. Also in northern Europe and Asia. Summer.

136. Carex Willdenovii Schk. Willdenow's Sedge. (Fig. 806.)


Glabrous and pale green, culms very short, erect, 1'-4' high. Leaves much elongated, nearly erect, rather stiff, 1½'-1½' wide, often 1' long, very much overtopping the spikes, lowest reduced to bladeless sheaths; spikes 1-5, androgynous, staminate above, pistillate below or sometimes completely staminate, about ½' long, appearing nearly basal, one or more of them on filiform stalks 3'-7' long, the stalks of the others much shorter; body of the perigynium oblong, smooth, 1½'-1½' long, rather less than ½' thick, narrowed into a flattened 2-edged rough beak of about its own length; scales lanceolate, acute, acuminate or awned, finely several-nerved, the lower 1 or 2 commonly bract-like, foliaceous and often overtopping the staminate portion of the spike; stigmas 3.

In dry woods and thickets, Massachusetts to Ohio, Michigan and Manitoba, south to Florida, Kentucky and Texas. April-July.

137. Carex Jamesii Schwein. James' Sedge. (Fig. 807.)


*Carex Steudelii* Kunth, Enum. 2: 480. 1837.

Similar to the preceding species, but the leaves rather narrower, soft, spreading or ascending, very much surpassing the spikes, the lowest mere clasping sheaths. Spikes androgynous, one or more of them filiform-stalked, the terminal staminate portion very slender, the pistillate flowers only 1-4 and slightly separated; body of the perigynium subglobose, 1' in diameter, contracted at the base, abruptly tipped by a subulate rough beak of more than its own length; lower scales bract-like, foliaceous, commonly much overtopping the staminate portion of the spike, the upper shorter and sometimes not exceeding the perigynia; stigmas 3.

In dry woods and thickets, southern Ontario and New York to Indiana and Michigan, south to West Virginia and Missouri. April-May.
Cyperaceae.

138. Carex durifolia Bailey. Back's Sedge. (Fig. 808.)


Glabrous, culms scarcely 1' high. Leaves ascending or spreading, 6'-12' long, 1 1/2"-3" wide, very much overtopping the spikes; spikes 1-3, nearly basal, androgynous, 1 or 2 of them very slender-stalked, the staminate flowers few, terminal, inconspicuous, the pistillate 2-6, subtended by leafy bract-like elongated scales which nearly enclose the inflorescence; perigynia oval, smooth, gradually tapering into a stout subulate beak nearly or quite as long as the body, which is about 1 1/2" long and 1/2" thick; stigmas 3.

In woods and thickets, Ontario to Manitoba, south to Massachusetts, New York, Ohio and Michigan. Also in Colorado (according to Bailey). May-June.

139. Carex rupestris All. Rock Sedge. (Fig. 809.)


Culms rather stout, obtusely 3-angled, erect, 1'-6' tall. Leaves 1 1/2"-1' wide, involute in drying, often curved, shorter than or exceeding the culm; bract subulate, erect, shorter than the terminal solitary androgynous spike or wanting; spike 6'-12' long, the pistillate flowers few, basal; perigynia erect, smooth, obovoid or elliptic, firm, faintly few-nerved, about 2" long, the beak stout, cylindric, about one-half as long as the body; scales purple-brown, ovate, obtuse or subacute, wider and longer than the perigynia; stigmas 3.

Labrador and Greenland to British Columbia, south in the Rocky Mountains to Colorado. Also in northern Europe and Asia. Summer.

140. Carex supina Willd. Weak Arctic Sedge. (Fig. 810.)


Glabrous, densely tufted, culms slender or nearly filiform but erect, sharply 3-angled, 4'-10' tall. Leaves about 1 1/2" wide, rough-margined, flat, shorter than the culm, erect or reclining; lower bract short, subulate; staminate spike solitary, sessile or very nearly so, 3'-6' long; pistillate spikes 1-3, sessile near the summit of the culm, subglobose or obovate, 2'-3' long, the upper one sometimes consisting of only 1-3 flowers; perigynia ovoid, smooth, hard, nerveless, about 1' long, less than 1/2" thick, 3-angled, tipped with a very short beak; scales ovate, brown-purple or lighter-margined, obtuse or subacute, equalling or rather longer than the perigynia; stigmas 3.

Northern Minnesota (according to Bailey) and Manitoba to arctic America and Greenland. Also in northern Europe and Asia. Summer.
141. Carex leptalea Wahl. Bristle-stalked Sedge. (Fig. 811.)

Carex polytrichoides Willd.; Wahl. loc. cit. as synonym. 1803.

Light green and glabrous, culms filiform, smooth, erect or spreading, 6'-18' long. Leaves not over \( \frac{3}{4}'' \) wide, mostly shorter than the culm; spike solitary, terminal, androgynous, narrowly linear, 2''-7'' long, rather less than 1'' thick, staminate above, pistillate below; perigynia few, linear-oblong, light green, many-nerved, narrowed at the base, obtuse and beakless at the summit, about 1\( \frac{1}{2}'' \) long and slightly more than \( \frac{1}{2}'' \) thick; scales membranous, the upper obtuse and shorter than the perigynia, the lower acute, the lowest sometimes attenuated into a subulate awn nearly as long as the spike; stigmas 2-3.

In bogs and swamps, Newfoundland to British Columbia, south to Florida, Louisiana, Texas, Colorado and Oregon. Ascends to 4300 ft. in North Carolina. June-Aug.

142. Carex filifolia Nutt. Thread-leaved Sedge. (Fig. 812.)


Densely tufted, pale green and glabrous, culms very slender, smooth, erect, 3'-14' tall, equaling or longer than the leaves. Leaves filiform, rather stiff, about \( \frac{3}{4}'' \) wide, their sheaths persistent and ultimately fibrillose; spike solitary, erect, bractless, staminate above, pistillate below, 3''-15'' long, the pistillate part about 2'' in diameter; perigynia obovoid-oval, triangular, few-nerved or nearly nerveless, rough or somewhat pubescent at the summit, 1'' rather than \( \frac{1}{2}'' \) thick, abruptly tipped by a short cylindrical hyaline entire beak; scales broadly oval, concave with wide scarious margins, obtuse or cuspidate, about as long as the perigynia but much broader; stigmas 3.

In dry soil, Manitoba to British Columbia, south to Nebraska, Colorado and California. May-July.

143. Carex capitata L. Capitate Sedge. (Fig. 813.)


Culms very slender or filiform, stiff, strictly erect, 2'-18' tall, smooth or very nearly so. Leaves filiform, involute, erect, shorter than the culm; spike solitary, terminal, ovoid, bractless, 2''-4'' high, about 2'' in diameter, staminate above, pistillate below; perigynia oblong-elliptic, ascending or nearly erect, light brown, nerveless or very faintly few nerved, 1'' long, \( \frac{1}{2}'' \) thick, tipped with a nearly entire dark brown beak about one-fourth as long as the body; scales broadly ovate, membranous, brown, obtuse or acute, shorter and rather broader than the perigynia; stigmas 2.

Greenland and Labrador to the Northwest Territory and on the higher summits of the White Mountains of New Hampshire. Also in Europe. Summer.
(Fig. 814.)

*Carex nardina* Fries, Mant. 2: 55. 1839.

Culms filiform, smooth, erect, 2'-5' tall, very densely tufted. Leaves filiform, erect, about as long as the culms; spike solitary, terminal, erect, ovoid-oblong, 3'-6' long, less than 2' in diameter, bractless, pistillate above, staminate below; perigynia oblong-elliptic, yellowish brown, nerveless, nearly erect, narrowed at both ends, nearly 2' long, slightly over 3/4'' wide, somewhat hispid above, beakless, the orifice 2-toothed; scales ovate, brown, thin, acute or cuspidate or the upper obtuse, rather longer than the perigynia; stigmas 2.

Labrador and Hudson Bay to British Columbia. Summer.

(Fig. 815.)


Culms very slender, stiff, erect, 3'-8' tall. Leaves almost bristle-form, erect, shorter than or equalling the culm; spike solitary, oblong, terminal, erect, 2'-8' long, staminate above, pistillate below, the pistillate part 2'-3' thick, or sometimes wholly staminate or pistillate; perigynia ovoid-ellipsoid, stipitate, dark brown, 1'-1 1/2'' long, spreading or reflexed when mature, strongly several-nerved, little compressed, rough above, narrowed into a very short 2-toothed beak; scales ovate, light brown spreading, acute or cuspidate, shorter than or equalling the perigynia; stigmas 2.

In bogs. Labrador to the Northwest Territory, south to Vermont, Pennsylvania (according to Bailey), Michigan and in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

(Fig. 816.)


Culms very slender or filiform, stiff, strictly erect, nearly or quite smooth, 10'-2'' tall. Leaves involute-filiform, equalling or usually shorter than the culm; spike solitary, terminal, erect, bractless, 3'-18' long, staminate below and pistillate above or sometimes staminate above and pistillate below, occasionally quite dioecious, very rarely with a small auxiliary spike at its base; perigynia ovoid-ellipsoid, somewhat impressed at the base, brown, about 1 1/2'' long, rather strongly several-nerved on the outer face, faintly few-nerved on the inner, spreading or reflexed at maturity, narrowed into a slender rough 2-toothed beak about one-half as long as the body; scales ovate, acute, equalling or shorter than the perigynia; stigmas 2.

In bogs, Newfoundland and Labrador to southern New Jersey, mostly near the coast. Reported from Minnesota. May-July.
147. Carex chordorhiza L. f. Creeping Sedge. (Fig. 817.)

Carex chordorhiza L. f. Suppl. 414. 1781.

Rootstocks slender, creeping, culms slender, erect or nearly so, 8'-15' tall. Leaves 1'-1½'' wide, shorter than the culm, somewhat involute in drying, straight, the lower ones of the culm reduced to short sheaths; spikes 2-4, aggregated into a terminal ovoid or oblong head 4''-6'' long; staminate flowers terminal; perigynia ellipsoid, slightly more than 1'' long and nearly 1'' wide, flat on the inner side, convex on the outer, strongly many-nerved, abruptly tipped by a short entire beak; scales ovate or ovate-lanceolate, acute or acuminate, equalling the perigynia or a little longer; stigmas 2.

In bogs and shallow water, Anticosti to Hudson Bay and the Northwest Territory, south to Maine, New York, northern Pennsylvania, Illinois and Iowa. Also in Europe. Summer.

148. Carex incurva Lightf. Curved Sedge. (Fig. 818.)


Densely tufted, culms rather stiff, smooth, often curved, 1'-6' long. Leaves less than 1'' wide, shorter than or equalling the culm, usually curved; spikes 2-5, sessile and aggregated into an ovoid or globose dense head 5''-8'' in diameter, appearing like a solitary spike; staminate flowers few, borne at the tops of the spikes; perigynia ovate, slightly swollen, compressed, ½'' long, 1'' wide, contracted at the base and narrowed above into a short conic entire beak, faintly several-many-nerved, scales ovate, brown or brownish, acute or subacute, membranous, shorter than the perigynia; stigmas 2.

Greenland and Hudson Bay to British Columbia, south in the Rocky Mountains to Colorado. Also in Europe and Asia. Summer.

149. Carex stenophylla Wahl. Involute-leaved Sedge. (Fig. 819.)


Densely tufted and strongly stoloniferous, pale green, culms smooth, stiff, erect, 3'-8' high. Leaves involute, about ½'' wide, shorter than or equalling the culm; inflorescence much as in the preceding species; perigynia ovate or ovate-oval, about 1'' long, faintly several-nerved, flat on the inner face, low-convex on the outer, gradually narrowed into a short entire beak; scales ovate, brownish, membranous, acute or acuminate, about equalling the perigynia; stigmas 2.

In dry soil, Manitoba to British Columbia, south to Iowa, Nebraska and Colorado. Also in Europe and Asia. June-Aug.
150. *Carex Douglasi*. Boott. Douglas' Sedge. (Fig. 820.)


Light green, rootstock extensively creeping, culms slender, erect, smooth or nearly so, 4'-12' tall. Leaves 1" wide or less, somewhat involute in drying, sometimes longer than the culm, tapering to a long point; spikes narrowly oblong, acute, 4'-6' long, several or numerous in a dense terminal oblong or ovoid cluster 1'-2' long; staminate flowers terminal or variously distributed, whole spikes occasionally stamineate or the plants even dioecious; perigynia ovate-lanceolate, about 1½" long, faintly several-nerved, on both sides, narrowed at the base, the slender tapering beak more than one-half as long as the body; scales pale greenish brown, lanceolate, scarious, smooth-awned, 2-4 times longer than the perigynia and completely concealing them; stigmas 2.

In dry soil, Manitoba to Nebraska and New Mexico, west to British Columbia and California. June-Aug.

151. *Carex arenaria*. Sand Sedge. Sand-star. (Fig. 821.)

*Carex arenaria* L. Sp. Pl. 973. 1753.

Rootstock extensively creeping, culms erect, slender, slightly sebrous above, 4'-15' high. Leaves 1/" or less wide, very long-pointed, shorter than the culm; lower bract subulate, sometimes 1½" long; spikes oblong, 3'-5' long, aggregated into a terminal ovoid cluster 1'-2' long, the terminal commonly staminate, the middle ones stamineate at the top, the lower usually wholly pistillate; perigynia lanceolate, 1½'-2' long, strongly several-nerved on both sides, the flat strongly 2-toothed beak nearly as long as the body and decurrent on its summit; scales lanceolate, light brown, long-acuminate or awned, about equalling the perigynia; stigmas 2.


152. *Carex conjuncta*. Boott. Soft Fox Sedge. (Fig. 822.)

*Carex conjuncta* Carey, in A. Gray, Man. 541. 1848. Not L. 1753.

*Carex conjuncta* Boott, Ill. 122. 1862.

Light green, culms smooth or roughish above, sharply 3-angled when fresh, flat when pressed, soft, erect, 1½'-3' tall. Leaves shorter than or sometimes equalling the culm, soft, flat, roughly-margined, 2½'-3½" wide; bracts small and bristle-like or wanting; spikes several or numerous, in a terminal elongated sometimes branched cluster, or the lower separated, the stamineate flowers few, terminal; perigynia ovate-lanceolate or lanceolate, pale, 1½" long, thickened at the base, strongly several-nerved, tapering into a roughish 2-toothed beak shorter than the body; scales oblong-lanceolate, cuspidate or short awned, about as long as the perigynia; stigmas 2.

In moist meadows and thickets, New Jersey (according to Bailey), southeastern Pennsylvania to Kentucky, Illinois and Minnesota. June-Aug.
153. Carex stipata Muhl.  Aawl-fruited Sedge.  (Fig. 823.)


Culms smooth, rather weak, erect or nearly so, sharply 3-angled before drying, 1°-3½° tall. Leaves flat, 2′-4′ wide, shorter than the culm, the upper ones sometimes overtopping the spikes; bracts short, bristle-form or wanting; spikes numerous, yellowish brown, crowded into a terminal oblong cluster 1½′-4′ long, the lowest sometimes branched, the staminate flowers few, always terminal; perigynia lanceolate, strongly several-nerved, 2′-2½′ long, about 1′ wide at the base, gradually tapering into a rough flattened 2-toothed beak 1-2 times as long as the body, giving the clusters a peculiarly bristly aspect; scales ovate or lanceolate, thin, hyaline, acuminate, shorter than the perigynia; stigmas 2.

In swamps and wet meadows, Newfoundland to Ontario and British Columbia, south to Florida, Tennessee, Missouri, New Mexico and California. Ascends to 4200 ft. in Virginia. May-July.

154. Carex Crus-Corvi Shuttlw.  Raven's-foot Sedge.  (Fig. 824.)

*Carex Crus-Corvi* Shuttlw.; Kunze, Riedg. Suppl. 128. pl. 32.  1844.


Pale green and glaucous, culms stout, 3-angled, rough above, erect, 2°-4° tall. Leaves flat, 2½′-6′ wide, rough-margined, sometimes equalling the culm, usually shorter; spikes yellowish brown, stamineate above, very numerous in a large compound branching terminal cluster 4′-12′ long, 1′-3′ thick; perigynia elongated-lanceolate, strongly several-nerved, about 4′ long, with a short hard base and a subulate rough 2-toothed beak 3 or 4 times as long as the body; scales ovate or lanceolate, thin, very much shorter than the perigynia; stigmas 2.

In swamps, Indiana to southern Minnesota, south to Florida, Louisiana and Texas. May-July.

155. Carex decomposita Muhl.  Large-paniced Sedge.  (Fig. 825.)


Dark green, culms smooth, very obtusely angled or terete below, rather stout, erect, 1½°-3° tall. Leaves 2′-4′ wide, rough, rather stiff, longer than the culm, equitant at the base; spikes yellowish brown, stamineate above, small and very numerous in a terminal decomposed cluster 2′-5′ long, the lower branches ascending and 1′-2′ long; bracts subulate, ciliate or wanting; perigynia short-obovate, less than 1′ long, hard, somewhat shining, faintly few-nerved, abruptly tipped with a very short slightly 2-toothed beak; scales ovate, scarious-margined, about equalling the perigynia; stigmas 2.

In swamps, New York to Ohio and Michigan, south to Florida and Louisiana. May-Aug.
156. Carex marcida Boott. Clustered Field Sedge. (Fig. 826.)

Light green, culms slender, sharply 3-angled, rough, at least above, 1°-2° tall. Leaves 1" wide or less, much shorter than the culm; bracts short, subulate from a broader base, or wanting; spikes several, stamineate at the summit or some of them wholly stamineate, clustered in a terminal oblong or oblong-cylindric head about 1½' long, the lower ones sometimes compound; perigynia ovate, dark brown, about 1' long, faintly nerved, tapering into a flat serrate beak shorter than the body; scales ovate or ovate-lanceolate, brownish, membranous, acute or cuspidate, about equalling the perigynia; stigmas 2.

In dry soil, Manitoba to British Columbia, south to Nebraska, Kansas, New Mexico and Nevada. June-Sept.

157. Carex teretiuscula Gooden. Lesser Paniced Sedge. (Fig. 827.)

Rather light green, culms slender, erect or reclining, very rough, at least above, 1°-2½° long. Leaves mostly less than 1" wide, shorter than or sometimes equalling the culm; bracts very small or none; spikes several or numerous, stamineate above, in a narrowly oblong compact or interrupted terminal cluster 1'-2' long; perigynia ovate-oval, smooth, dark brown, hard, shining, few-nerved on the outer side, the body slightly more than ½' long, truncate or rounded at the base, short-stalked, tapering into a flat conic beak about its own length; scales thin, ovate, brownish, acute or short-awned, about equalling the perigynia; stigmas 2.

In swamps and wet meadows, Nova Scotia to Hudson Bay and British Columbia, Rhode Island, Pennsylvania and Nebraska. Also in Europe. May-July.

Carex teretiuscula praerica (Dewey) Britton.

Cluster of spikes compound, branched, the top commonly nodding. Ontario to British Columbia, south to Massachusetts, Pennsylvania, Kentucky and Oregon.

158. Carex alopecoidea Tuckerm. Foxtail Sedge. (Fig. 828.)

Carex alopecoidea Tuckerm. Enum. Meth. 18. 1843.
Light green, culms stout but soft, sharply 3-angled, erect or reclining, 2°-3° long, roughish above. Leaves flat, 1½'-3'' wide, shorter than or equalling the culm; bracts almost filiform, commonly short; spikes several or numerous in a compact or somewhat interrupted cluster 1'-2' long, rarely also a separated cluster subtended by a leaf-like bract; stamineate flowers terminal; perigynia ovate or ovate-lanceolate, short-stipitate, 1½'-2'' long, pale brown, faintly few-nerved on the outer side, the tapering rough 2-toothed beak nearly as long as the body; scales ovate or oval, light brown, cuspidate or short-awned, about as long as the perigynia; stigmas 2.

In meadows, New York and Pennsylvania to Michigan and Manitoba (according to Macoun). Local.
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Spikes distinctly separated. Southeastern Michigan.

159. Carex grávida Bailey. Heavy Sedge. (Fig. 829.)

Carex grávida var. laxifolia Bailey, loc. cit. 6. 1880.

Light green, culms slender, 1½°-3° tall, sharply 3-angled, erect, rough above. Leaves flat, 1½
wide, spreading or ascending, equalling or shorter than the culm; bracts filiform, usually very short;
spikes several, in an oblong or ovoid-oblong dense heavy head 1'-1½' long, pale, subglobose, the stami-
nate flowers terminal; perigynia flat, spreading, broadly ovate or suborbicular, 1½"-2" long, at least
1" wide, rounded at the base, sessile or short-stalked, narrowed into a 2-toothed beak about one-third as long as the body, several-nerved on the outer face or nerve-
less; scales ovate-lanceolate, acute, cuspidate or short-
awned, about as long as the perigynia; stigmas 2.

Illinois to South Dakota and Nebraska. May-July.

160. Carex vulpinoidea Michx. Fox Sedge. (Fig. 830.)


Culms slender, stiff, sharply 3-angled, rough above, 1°-3° tall. Leaves 1½'-2½" wide, elongated, often exceeding the culm; bracts bristle-like, short or sometimes 2'-3' long; spikes ovoid-oblong, densely flowered, 2'-3' long, very numerous in a compact or somewhat interrupted cluster, 1½'-5' long, the lower ones sometimes compound, stami-
nate flowers terminal; perigynia ovate or the body broader than long, less than 1° long, rather more than ½" wide, greenish brown, flat, several-nerved on the outer face, nerveless or 1-3 nerved on the inner, ascending or spreading, tipped with a lanceo-
late 2-toothed beak about half as long as the body; scales lanceolate, acuminate or awned, about as long as the perigynia, but narrower; stigmas 2.

In swamps and wet meadows, New Brunswick to Manitoba, south to Florida, Louisiana, Nebraska and Texas. Ascends to 2500 ft. in Virginia. June-Aug.

161. Carex xanthocárpa Bicknell. Yellow-fruited Sedge. (Fig. 831.)


Culms rather stout, rough above, 1°-5° tall, much longer than the leaves. Leaves 1½'-3½" wide; head oblong or ovoid, usually dense, ¾'-2½' long; spikes numerous, ovoid, many-flowered, short; stamineate flowers terminal; bracts mostly short and inconspicuous; perigynia bright yellow, plano-convex, ovate-elliptic, about 1½" long, with a narrowed or cuneate base and a short minutely
2-toothed beak, nerveless, or obscurely few-nerved on the outer face; scales acuminate, short-awned.

In fields, Massachusetts to New York and Ohio, June-Aug.


Lower and slender; leaves 1'-2" wide; head not over 1½" long; bracts usually numerous and longer than the globose spikes; perigynia ovate or suborbicular. Abund-
ant in the vicinity of New York.
162. Carex setaceae Dewey. Bristly-spiked Sedge. (Fig. 832.)

Carex scabrius Bartw.; Boott, Ill. 3: 125. 1862.

Culms 1½°-4° tall, erect, rough above. Leaves 1°-2° long, 1°-3° wide, shorter than the culm; head narrowly oblong, 1½°-2½° long, 3°-5° thick, sometimes branched at the base; bracts bristle-like, longer than the spikes or shorter; spikes ovoid or ovoid-oblong, 2½°-4° long, usually close together; perigynia lanceolate or ovate-lanceolate, tapering from a more or less truncate base to a narrow rough 2-toothed beak, few-nerved, 1½°-1½° long.


163. Carex Sartwélli Dewey. Sartwell’s Sedge. (Fig. 833.)


Culms slender, stiff, erect, rough above, 3-angled 1°-3° tall. Leaves 1° 2” wide, mostly shorter than the culm, long-attenuate at the apex; bracts setaceous, usually very small, or 1 or 2 of the lower sometimes elongated; spikes ovoid or oblong, 2”-4” long, usually densely aggregated in a narrow cluster 1°-2” long, or the lower somewhat separated; staminate flowers terminal or whole spikes occasionally staminate; perigynia elliptic-lanceolate or ovate-lanceolate, about 1” long and rather more than ½” wide, ascending, strongly several-nerved on both faces, tapering into a short 2-toothed beak; scales ovate, obtuse or subacute, pale brown, scarious-margined, about equalling the perigynia; stigmas 2.

In swamps, Ontario to British Columbia, south to central New York, Illinois, Michigan, Arkansas and Utah. May-July.

164. Carex tenélia Schk. Soft-leaved Sedge. (Fig. 834.)

Carex tenella Schk. Riedgr. 23. f. 104. 1801.

Light green, rootstocks very slender, culms almost filiform, rough, commonly reclining, 6°-2° long. Leaves soft, about ½” wide, spreading, shorter than or sometimes equalling the culm; spikes very small, only 1-5-flowered, distant or the upper close together, the staminate flower or flowers uppermost; perigynia ovoid-ellipsoid, nearly terete, hard, finely mawny-nerved, about 1” long and rather more than ½” thick, tipped with a very minute entire beak; scales ovate, hyaline, acute, shorter than or the lower equalling the perigynia; stigmas 2.


Carex Eleocharis Bailey, Mem. Torr. Club, 1: 6, a very slender erect species, with 2 or 3 small brown 1-3-flowered spikes aggregated in a terminal head 1½”-2” long, ovoid slightly swollen marginless plano-convex short-beaked perigynia, collected by Prof. Macoun on the Saskatchewan Plains, probably occurs within the northwestern limits of our area.
(Fig. 835.)

*Carex rosea* Schk. Riedgr. Nachtr. 15. f. 179. 1866.

Rather bright green, culms very slender or filiform, erect or reclining, rough above, 1½-2½" long. Leaves flat, soft, spreading, 1/" or less wide, shorter than the culm; lower bract filiform or bristle-like, ½-2½" long; spikes 4-8, subglobose, 2½-3½" in diameter, 5-15-flowered, the 2 or 3 upper close together, the others distant; staminate flowers few, terminal; perigynia ovate-lanceolate, flat, bright green, stellately diverging, nerveless, shining, 1½-1½" long, rather more than ½" wide, tapering into a stout 2-toothed beak about one-fourth the length of the body; scales ovate-oblong, white, hyaline, half as long as the perigynia; stigmas 2.

In woods and thickets, Newfoundland to Ontario and Manitoba, south to North Carolina, Nebraska and Missouri. Ascends to 2500 ft. in Virginia. May-July.


Culms filiform, spreading; leaves about ½" wide; spikes only 2-6-flowered, scattered; perigynia ascending, lanceolate, about ½" wide. Ontario to Massachusetts, North Carolina and Kentucky.

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(Fig. 836.)


Culms very slender, erect, rather stiff, 8'-18' tall, smooth or roughish above. Leaves about ½" in width, mostly shorter than the culm; lower bract bristle-form, sometimes 2' long, usually shorter; spikes 4-5, subglobose, 4-9-flowered, the upper all close together, the lower 2 or 3 separated; staminate flowers terminal or rarely variously intermixed with the pistillate; perigynia oblong-lanceolate or ovate-lanceolate, radiating or reflexed at maturity, about 1½" long and a little more than ½" wide, smooth, green-brown, compressed, but not as flat as those of the preceding species, somewhat corky-thickened at the base, tapering upwardly into a 2-toothed beak about one-third the length of the body; scales ovate, hyaline, about half as long as the perigynia; stigmas 2.

In woods and thickets, Massachusetts to Ontario, Michigan, Florida, and Texas. May-July.

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(Fig. 837.)


Similar to the preceding species, culms very slender, erect, smooth, 6'-18' tall. Leaves spreading or ascending, soft, about ½" wide, shorter than the culm; lower bract commonly filiform, sometimes elongated; spikes 4-7, 4-10-flowered, all close together in a narrow head ½'-1½' long, or the lower ones separated; perigynia narrowly lanceolate, green, nerveless, smooth, radiating or widely spreading, 1½'-2½' long, ½" wide, the tapering beak about one-half as long as the body; scales lanceolate or ovate, hyaline, acute or acuminate, less than one-half as long as the perigynia; stigmas 2.

Southern Illinois (according to Bailey); Alabama to Texas. April-May.
168. *Carex muricata* L. Lesser Prickly Sedge. (Fig. 838.)

*Carex muricata* L. Sp. Pl. 974. 1753.

Bright green, culms slender, erect or reclining, roughish, at least above, 1°-2 1/2° long. Leaves 1 1/2-1 1/2° wide, shorter than the culms, bracts very short and subulate; spikes 5-10, 4-10-flowered, all clustered into an oblong head, or the lower 1 or 2 somewhat distant; perigynia ovate or ovate-lanceolate, 2° long, 1/2° wide, smooth, shining, nerveless, ascending when young, spreading or radiating when mature, not reflexed, tapering into a rough-edged 2-toothed beak as long as the body; scales ovate or ovate-oblong, green or brownish, acute, somewhat shorter than the perigynia; stigmas 2.

In meadows and fields, eastern Massachusetts to southern New York, Ohio and Virginia. Naturalized from Europe. June-Aug.

169. *Carex sparganioides* Muhl. Bur-reed Sedge. (Fig. 839.)


Rather dark green with nearly white sheaths, culms stout or slender, rough, sharply 3-angled, 2°-3° tall. Leaves broad and flat, 2 1/2°-4 1/2° wide, shorter than or sometimes overtopping the culm, the lower very short; spikes 6-12, oblong or subglobose, 2 1/2°-4° in diameter, several-many-flowered, the upper aggregated, the lower 2-4 commonly separated, sometimes compound and subtended by bristle-like bracts; perigynia flat, ovate, 1 1/2° long, 1° wide, spreading or radiating, pale, narrowly wing-margined, rounded at the base, usually few-nerved on the outer face, the rough 2-toothed beak one-fourth to one-third the length of the body; scales ovate, hyaline, acute or cuspidate, about one half as long as the perigynia; stigmas 2.

In woods and thickets, Massachusetts to Ontario and Michigan, south to Virginia, Kentucky and Missouri. Ascends to 2100 ft. in Virginia. June-Aug.

170. *Carex cephaloidea* Dewey. Thin-leaved Sedge. (Fig. 840.)


Similar to the preceding species, culms slender or rather stout, erect but not stiff, rough above, 2°-3° tall. Leaves flat, 2°-4° wide, thin and lax, somewhat shorter than the culm; bracts bristle-form, usually short, sometimes wanting; spikes 4-8, subglobose, aggregated but commonly distinct, in an oblong cluster 9°-15° long, the staminate flowers terminal; perigynia ovate or ovate-lanceolate, greenish brown, nearly 2° long, 1° wide, ascending, nerveless or faintly few-nerved, tapering into a rough 2-toothed beak one-fourth to one-third as long as the body; scales ovate, white, membranous with a green midvein, short-cuspidate or awncd, about one-half as long as the perigynia; stigmas 2.

In dry fields and on hills, Massachusetts to Pennsylvania, Illinois, Michigan and Wyoming. May-July.
171. Carex cephalophora Muhl. Oval-headed Sedge. (Fig. 841.)


Pale green, culms slender, erect, rough above, 10'-20' tall. Leaves 1'-2' wide, sometimes overtopping the culm, usually shorter; bracts of the lower spikes short, bristle-form; spikes few, subglobose, densely clustered in a terminal short-oblunghed head 4'-8' long, the staminate flowers terminal; perigynia broadly ovate, 1" long or less, pale, nerveless or very faintly few-nerved, tipped with a 2-toothed beak about one-fourth the length of the body; scales ovate, thin, rough-cuspidate or awned, equalling or a little shorter than the perigynia; stigmas 2.

In dry fields and on hills, Maine and Ontario to Manitoba, south to Florida, Missouri and Texas. Ascends to 2500 ft. in Virginia. May-July.

172. Carex Leavenworthii Dewey. Leavenworth’s Sedge. (Fig. 842.)


*Carex cephalophora* var. *augustifolia* Boott, Ill. 123. 1852.

Similar to the preceding species but smaller, culms very slender or almost filiform, erect, roughish, 6'-15' tall. Leaves much narrower, 1/2'-1 1/2' wide, mostly shorter than the culm; bracts of the lower spikes short, bristle-form or wanting; spikes 4'-7, densely crowded in an oblong head 4'-8' long, similar to that of *C. cephalophora* but usually smaller, the lower sometimes compound, the staminate flowers terminal; perigynia orbicular-ovate, rather less than 1' long and about as wide, tipped with a very short 2-toothed beak; scales ovate, acute or cuspidate, shorter and narrower than the perigynia; stigmas 2.

In meadows, Missouri to Louisiana, Arkansas and Texas. May-June.

173. Carex Muhlenbergii Schk. Muhlenberg’s Sedge. (Fig. 843.)


Light green, culms slender but stiff and erect, sharply 3-angled, rough, at least above, 10'-2 1/2' tall. Leaves 1'-2' wide, usually shorter than the culm, somewhat involute in drying; bracts bristle-form, usually short; spikes 4'-10, ovoid or subglobose, distinct but close together in an oblong head 9'-15' long, the staminate flowers terminal; perigynium broadly ovate-oval, 1 1/2' long, 1" wide, strongly nerved on both faces, ascending, tipped with a short 2-toothed beak; scales hyaline with a green midvein, ovate-lanceolate, rough-cuspidate or short-awned, narrower and mostly longer than the perigynia; stigmas 2.

In dry fields and on hills, Massachusetts to Ontario and Minnesota, south to Florida and Texas. May-July.

*Carex Muhlenbergii* Xalapensis (Kunth.) Britton, Mem. Torr. Club, 5: 86. 1894:

*Carex Xalapensis* Kunth, Enum. 2: 380. 1837.

*Carex Muhlenbergii* var. *enervis* Boott, Ill. 124. 1862.

Perigynia nearly or quite nerveless; leaves broader and longer. Southern New York to Missouri, Texas and Mexico.
174. Carex stéristis Wild. Little Prickly Sedge. (Fig. 844.)

C. echínata var. microstachys Boeckl. Linnaea. 30: 125. 1875.
Carex stéristis var. excélsior Bailey. loc. cit. 424. 1893.

Culms slender, stiff, erect or rarely spreading; 8'-18' tall, rough, at least above. Leaves 5/8'-1'' wide, shorter than the culm; bracts very short or sometimes bristle-form; spikes 3-5, subglobose or short-oblong, contiguous or separated, about 2'/2'' thick; staminate flowers usually numerous at the bottom of the upper spike, or whole spikes occasionally staminate, or plants rarely quite dioecious; perigynia pale, laeoceleate, compressed, spreading or reflexed when old, 1'/2'' long, 3/2'' wide, several-nerved on both faces, thickened at the base, tapering into a sharp-edged 2-toothed rough beak more than one-half as long as the body; scales ovate, hyaline, shorter than the perigynia; stigmas 2.


Stouter, sometimes 2'' tall. Spikes 4-8, contiguous or separated; flowers more numerous; perigynia rather larger; spikes very bristly. Range nearly that of the species; perhaps merely a stout form.

175. Carex Atlántica Bailey. Eastern Sedge. (Fig. 845.)


Similar to large forms of the preceding species but stouter, culms very rough above, 1''-2 1/2'' tall. Leaves 1''-1 1/2'' wide, stiff, flat or in drying somewhat involute, the upper sometimes overtopping the spikes; spikes 4-7, spreading, subglobose or short-cylindric, nearly 3'' in diameter, several-many-flowered, the staminate flowers numerous at the base of the terminal one, or this rarely entirely staminate; perigynia broadly ovate, flat, sharp-marginèd, 1''-1 1/2'' long, 1'' wide, cordate or rounded at the base, strongly several-nerved on the outer face, few-nerved on the inner, spreading or reflexed at maturity, abruptly tipped with a stout, rough 2-toothed beak about one-third as long as the body; scales shorter than the perigynia.

In swamps, Newfoundland to Florida. June-July.

176. Carex intérieur Bailey. Inland Sedge. (Fig. 846.)


Similar to C. stéristis, culms very slender, wiry, rather stiff, erect, 1''-2'' tall. Leaves only about 1/2'' wide, shorter than the culm; bract of the lower spike very short; spikes 2-4, nearly globaral, somewhat separated, several-flowered, 2'' in diameter, the terminal one staminate at the base; perigynia ovate or ovate-lanceolate, 1'' or less long, about 1'/2'' wide, faintly few-nerved on the outer face, nearly nerveless on the inner, thickened, rounded or subcordate at the base, spreading or reflexed when old, tapering into a nearly smooth 2-toothed beak one-third to one-half as long as the body; scales ovate, acute or obtuse, shorter than the perigynia; stigmas 2.

Sedge Family.

Leaves about ½" wide; perigynia ovate, cordate, strongly nerved. Massachusetts to Pennsylvania.

177. Carex canescens L.  Silvery Sedge. (Fig. 847.)

*Carex canescens* L. Sp. Pl. 974. 1753.

Pale green and somewhat glaucous, culms slender, erect, roughish above, 10'-2½' tall. Leaves flat, ½"-1½" wide, shorter than the culm; bracts very short or none, or the lowest occasionally bristle-form and longer than its spike; spikes 4-9, short-oblong or subglobose, sessile, densely many-flowered, 2½'-5' long, about 2" in diameter, scattered or the upper close together; staminate flowers basal; perigynia oval or ovate-oval, silvery green or nearly white, faintly few-nerved, ascending, blunt-edged, rather less than 1" long, about ½" wide, rough above, tipped with a minute entire beak; scales hyaline, ovate, acute or obtuse, slightly shorter than or as long as the perigynia; stigmas 2.

In swamps and bogs, Newfoundland to British Columbia, south to Virginia, Michigan, Colorado and Oregon. Ascends to 1200 ft. in Virginia. Also in Europe and Asia. May-July.

178. Carex brunnescens (Pers.) Poir.  Brownish Sedge. (Fig. 848.)

*C. brunnescens* Poir. in Lam. Encycl. Suppl. 3: 286. 1813.

Rather dark green, not glaucous, culms slender, stiff, erect, roughish above, 8'-18' tall. Leaves 1½" wide or less, shorter than the culm; lower bract bristle-form and longer than its spike, or short, or none; spikes 4-8, subglobose or short-oblong, few-flowered, rarely over 2½' long, scattered, or the upper close together; staminate flowers basal; perigynia ascending or spreading, brown, smaller than those of the preceding species, less than 1½" long, tipped with a manifest beak about one-fourth as long as the body; scales ovate, membranous, brownish, about equalling the perigynia; stigmas 2.

In wet places, mostly at high altitudes, Labrador to British Columbia, New York and New England, on the southern Alleghenies, and the Rocky Mountains. Also in Europe. Ascends to 6600 ft. in North Carolina. Summer.

Carex *brunnescens* gracilior Britton.


Culms nearly filiform, weak, often spreading; spikes 4-8-flowered; perigynia spreading, longer-beaked. Range of type, mostly at lower altitudes. Perhaps a distinct species.

179. Carex Norvegica Willd.  Norway Sedge. (Fig. 849.)

*Carex Norvegica* Willd.; Schr. Riedgr. 50. 1801.

Bright green, culms slender but stiff and erect, slightly scabrous above, 6'-16' tall. Leaves 1½" wide or less, shorter than the culm; bracts very short or wanting; spikes 3-6, brown, oblong or subglobose, scattered or rather close together, densely many-flowered, 3½'-6½' long, about 2" in diameter; staminate flowers basal, very numerous at the bottom of the upper spike; perigynia ascending, about 1½" long, elliptic, blunt-edged, narrowed at both ends, brownish, finely many-nerved, tipped with a very short rough beak; scales ovate or oval, brown, obtuse, rather shorter than the perigynia; stigmas 2.

Along salt meadows, Maine to Anticosti. Reported from Minnesota. Also in Europe. Summer.
180. Carex arcta. Northern Clustered Sedge. (Fig. 850.)


Rather light green but not glaucous, culms slender, usually strictly erect, 1°-2½° tall, rough above, longer than or sometimes overtopped by the leaves which are flat and about 1'' wide. Lower bract bristle-form and longer than its spike, or short, or wanting; spikes oblong, many-flowered, 3''-4'' long, about 2½'' in diameter, all aggregated into a terminal ovoid cluster about 1½'' long, the staminate flowers basal; perigynia pale, ovate, many-nerved, mostly spreading, tapering into a rough beak about one-half as long as the body; scales membranous, pale brown, usually acute, shorter than the perigynia; stigmas 2.

In swamps and wet woods, Maine and New Brunswick to Manitoba, Minnesota and British Columbia. June-July.

181. Carex tenuiflora. Sparse-flowered Sedge. (Fig. 851.)


Light green, culms very slender or filiform, erect or reclining, rough above, 8''-1° long. Leaves ½'' wide or rather more, flat, usually much shorter than the culm; spikes only 2-4, clustered at the summit, subglobose, few-flowered, about 2½'' in diameter, bractless or the lowest with a short bract; perigynia pale, elliptic, very obscurely few-nerved, narrowed at both ends, 1½''-1½'' long, more than ½'' wide, narrowed at both ends, beakless, spreading; staminate flowers basal; scales nearly white, hyaline, acute or obtusish, about equalling the perigynia; stigmas 2.


182. Carex Heleonastes. Hudson Bay Sedge. (Fig. 852.)


Culms slender, stiff, erect, very rough above, 6'-18' high. Leaves rigid, erect, becoming involute, less than 1'' wide, shorter than the culm; bracts very short or none; spikes 3-5, subglobose, several-flowered, brown, about 2½'' in diameter, clustered at the summit, the staminate flowers basal; perigynia broadly ovate or ovate-elliptic, blunt-edged, faintly several-nerved, about 1'' long, more than ½'' wide, tipped with a short sharp beak; scales ovate, brown with broad hyaline margins, about as long as the perigynia; stigmas 2.

Hudson Bay to Manitoba and the Canadian Rocky Mountains. Also in Europe. Summer.
183. Carex lagopina Wahl. Arctic Hare's-foot Sedge. (Fig. 853.)


Culms rough, stiff, erect, 6'-16' tall. Leaves flat, not involute, 1'/ or less wide, shorter than the culm, bracts very short or wanting; spikes 3-6, oblong, dark brown, narrowed at the base, 3'-4' long, 1'/-2' thick, densely many-flowered, clustered at the summit or the lower somewhat separated, the staminate flowers basal; perigynia elliptic or obovate, rather less than 1'/ long, firm, several-nerved, narrowed at the base, rather abruptly tipped by the beak; scales ovate, brown, hyaline-margined, acute, shorter than the perigynia; stigmas 2.

Labrador and Greenland to Alaska, south in the Rocky Mountains to Utah. Also in northern Europe and Asia. Summer.

184. Carex glareosa Wahl. Weak Clustered Sedge. (Fig. 854.)


Closely resembles the preceding species, but has weak spreading or reclining culms 3'-18' long. Leaves narrower, flat, about 5'/ wide; spikes 2 or 3, oblong or subglobose, several-flowered, 2'-4' long, about 1'/ in diameter, brown, subtended by very small scale-like bracts, the staminate flowers basal; perigynia oblong-oval, strongly several-nerved, less than 1'/ long, about 5'/ wide, short beaked; scales ovate, acute or obtusish, rich brown, about as long as the perigynia; stigmas 2.

Greenland and Hudson Bay to Gaspe, Quebec, west through arctic America to Alaska. Also in northern Europe and Asia. Summer.

Carex glareosa ursina (Dewey) Bailey, Carex Cat. 3. 1881.


Lower densely tufted; spikes smaller. Perhaps a mere form of the species. Arctic America.

185. Carex trisperma Dewey. Three-fruited Sedge. (Fig. 855.)


Bright green, culms filiform, weak, usually reclin- ing or spreading, very slightly roughened, 1°-2° long. Leaves flaccid, flat, about 5'/ wide, shorter than the culms; spikes 2 or 3, only 2-4-flowered, widely separated, the lowest subtended by a bristle- form bract 5'/-3' long; perigynia oblong, ascending, green, 1'/-2' long, rather more than 5'/ wide, very finely many-nerved, narrowed at both ends and tipped with a very short nearly entire beak; scales ovate or ovate-lanceolate, hyaline with a green mid- vein, acute, somewhat shorter than the perigynia; stigmas 2.

In swamps and wet woods, Newfoundland to Mani- toba, south to Maryland, Ohio, Michigan and (according to Webber) to Nebraska. Ascends to 2500 ft. in Vermont. June-Aug.
186. Carex Deweyana Schwein. Dewey’s Sedge. (Fig. 856.)


Pale green, culms slender, spreading, nearly or quite smooth, 1°-3° long. Leaves 1°-1 ½" wide, flat, soft, shorter than the culm; bracts bristle-form, the lower commonly elongated; spikes 3-6, oblong or subglobose, few-flowered, about 2½” in diameter, sessile, distinctly separated or the upper ones contiguous; staminate flowers basal; perigynia lanceolate or ovate-lanceolate, thin, nerveless, 2½”-2 ½" long, rather less than 1½” wide, the inner face flat, the tapering rough strongly 2-toothed beak at least one-half as long as the body; scales nearly white, hyaline with a green midvein, cuspidate or acute, equaling the perigynia, or shorter; stigmas 2.


187. Carex bromoides Schk. Brome-like Sedge. (Fig. 857.)


Bright green, culms slender, erect or reclining, roughish above, 1°-2° long. Leaves 1½” wide or less, flat, soft, equalling or shorter than the culm; bracts subulate or bristle-form, the lowest commonly elongated, sometimes overtopping the spikes; spikes 3-7, narrowly oblong-cylindric, 4½”-5½” long, about 1½” thick, erect or ascending, mostly close together, loosely several-many-flowered, the staminate flowers either basal, basal and terminal, or forming whole spikes, the plant occasionally quite dioecious; perigynia linear-lanceolate, firm, pale, strongly several-nerved, 2½”-2 ½" long, ½” wide, the inner face flat, the tapering rough 2-toothed beak at least one-half as long as the body; scales oblong-lanceolate, green, acute or acuminate, shorter than the perigynia; stigmas 2.

In bogs and swamps, Nova Scotia to Ontario and Michigan, south to Florida and Louisiana. June-Aug.

188. Carex pratensis Drejer. Northern Meadow Sedge. (Fig. 858.)


Light green, culms slender, erect when young, the summit later nodding, nearly smooth, 1°-1 ½° tall. Leaves about 1½” wide, shorter than the culm, but the upper sometimes overtopping the spikes; lower bract bristle-form, usually short; spikes 3-6, oblong or club-shaped, separated or the upper contiguous, silvery-brown and shining, 3½”-5½” long, about 2½” in diameter, several-flowered, the staminate flowers basal; perigynia lanceolate, thin, pale, nerveless on the inner face, few-nerved on the outer, 3½” long, nearly 1” wide, wing-margined, tapering into a beak nearly as long as the body; scales membranous, lanceolate, acute or acuminate, about as long as the perigynia; stigmas 2.

Labrador to western Ontario, Michigan, Manitoba and Alaska, and in the Rocky Mountains to Colorado. Summer.
189. Carex xerántica Bailey. White-scaled Sedge. (Fig. 850.)


Similar to the preceding species but the culms are stout, stiff, and strictly erect, even when mature. Leaves about 1/4 wide, involute in drying, shorter than the culm; spikes about 5, oblong, densely many-flowered, close together or the lower slightly separated, 4'/-6'/ long, about 2'/ in diameter, the staminate flowers basal; perigynia lanceolate, pale, 2'/-3'/ long, 1'/ wide, nerveless, conspicuously wing-margined, the inner face concave, the rough tapering beak about as long as the body; scales silvery white, lanceolate, acute or acuminate, equaling or a trifle longer than the perigynia; stigmas 2.

Western Manitoba and adjacent Northwest Territory. May-July.

190. Carex siccata Dewey. Dry-spiked Sedge. Hillside Sedge. (Fig. 860.)


Rootstocks long and stout, culms slender, erect, rough above, 1°-2° tall. Leaves erect, about 1'/ wide, the upper sometimes overtopping the culm, the lower short; bracts short or the lowest bristle-form and elongated; spikes 3-6, oblong or subglobose, 2'/-3'/ long, brownish or brown, clustered or more or less separated, the staminate flowers basal or variously situated or whole spikes staminate; perigynia ovate-lanceolate, firm, about 2'/ long and nearly 1'/ wide, wing-margined, strongly several-nerved on both sides, the inner face, concave by the incurved margins, the tapering rough beak nearly as long as the body; scales ovate-lanceolate membranous, acute or acuminate, about equaling the perigynia; stigmas 2.

In dry fields and on hills, Ontario and Manitoba to British Columbia, south to Rhode Island, New York, Michigan, Arizona and California. May-July.

191. Carex Muskingumensis Schwein. Muskingum Sedge. (Fig. 861.)


Culm stout, stiff, erect, very rough above, 2°-3° tall. Leaves flat, long-pointed, 1'/-2'/ wide, shorter than the fertile culms, those of sterile culms crowded near the summit; bracts very short and scale-like; spikes 6-12, oblong-cylindric, densely many-flowered, 6'/-12'/ long, about 2'/ in diameter, erect, close together, pale brown, narrowed and stamineate at the base; perigynia narrowly lanceolate, ascending, about 4'/ long and rather less than 3/4 wide, strongly several-nerved, very flat, narrowed to both ends, scarios-margined, rough-ciliate, the tapering 2-toothed beak at least as long as the body; scales lanceolate, acuminate, one-third to one-half as long as the perigynia; stigmas 2.

In moist woods and thickets, Ohio to Michigan, Manitoba and Missouri. June-Aug.
192. Carex tribuloides Wahl. Blunt Broom Sedge. (Fig. 862.)


Bright green, culms usually stout, erect, roughish above, 5'-3' tall. Leaves flat, 1'-3' wide, shorter than or the uppermost overlapping the culm; lower bract bristleform, sometimes elongated; spikes 6-20, oblong or sometimes top-shaped, blunt, densely clustered or sometimes separated, 3'-6' long, about 2'-4' thick; staminate flowers basal; perigynia lanceolate, thin, greenish brown, flat, ascending or erect, 2'-3' long, 3'-1' wide, several-nerved on each face, with a sharply 2-toothed, rough wing-margined beak; scales lanceolate, whitish, acute, about half as long the perigynia; stigmas 2.


More slender, spikes fewer, smaller (about 3' long, commonly bractless, mostly clustered in a dense head 1' long; perigynia broader and shorter. Range of the type.

Carex tribuloides moniliformis (Tuckerm.) Britton.

Carex scoparia var. moniliformis Tuckerm. Enum. Meth. 17. 1843.


Slender, the culm much exceeding the leaves; spikes all or all but the uppermost separated, 2'-4' long, the rachis somewhat zigzag. Maine and New Brunswick to New York, west to North Dakota.

193. Carex scoparia Schk. Pointed Broom Sedge. (Fig. 863.)


Carex scoparia var. minor Boott, Ill. 116. pl. 569. 1802.

Culms slender, erect, roughish above, 5'-2'-3' tall. Leaves less than 1'-4' wide; lower bract bristle-form or wanting; spikes 3-10, oblong, narrowed at both ends, bright brown, 3'-8' long, 2'-3' in diameter, densely many-flowered, usually aggregated into an ovoid head 8'-18' long; staminate flowers basal; perigynia lanceolate, ascending or erect, 2'-3' long, rather less than 1' wide, narrowly wing-margined, several-nerved on both faces, tapering into the ciliate 2-toothed beak; scales thin, brown, acuminate or cuspidate, shorter than the perigynia; stigmas 2.


194. Carex leporina L. Hare's-foot Sedge. (Fig. 864.)

Carex leporina L. Sp. Pl. 973. 1753.

Culms slender, erect, roughish above, 1'-1'-2' tall. Leaves about 1' wide, flat, shorter than the culm; bracts very short and scale-like or wanting; spikes 4-7, oblong, blunt at the summit, narrowed and staminate at the base, 4'-6' long, about 3' thick, dark brown, shining, clustered but distinct, in a terminal oblong head about 1' long; perigynia ascending or apressed, ovate-lanceolate, 2' long, nearly 1' wide, rather narrowly wing-margined, several-nerved on both faces, the rough tapering 2-toothed beak nearly as long as the body; scales lanceolate, brown, membranous, acute, narrower and shorter than the perigynia; stigmas 2.

195. Carex cristatella Britton. Crested Sedge. (Fig. 865.)


Not Clairv. 1811.


Culms slender or rather stout, $1\frac{1}{2}^\circ$–$2\frac{1}{2}^\circ$ tall, stiff, erect, roughish above, longer than the leaves. Leaves $1\frac{3}{4}''$–$2''$ wide; lower bracts bristle-form, $3/4''$–$1\frac{1}{2}''$ long; heads 6–15, globose or subglobose, $2''$–$3''$ in diameter, all densely aggregated into an oblong head $1''$ long or more or the lower slightly separated; staminate flowers basal; perigynia lanceolate or ovate lanceolate, spreading or ascending, squarrose when mature, green or greenish brown, $1\frac{1}{2}''$–$2''$ long, less than $1''$ wide, narrowly wing-margined, several-nerved on both faces, tapering into a ciliate 2-toothed beak; scales lanceolate, nearly white, much shorter than the perigynia; stigmas 2.


196. Carex adusta Boott. Browed Sedge. (Fig. 866.)


Culms stout, stiff, erect, entirely smooth, $1\frac{1}{2}^\circ$–$2\frac{1}{2}^\circ$ tall, growing in dense tufts. Leaves about $1''$ wide, long-pointed, shorter than the culm; bracts subulate, tapering from a broad nerved base, the lower 1 or 2 usually elongated, nearly erect, often exceeding the spikes; spikes 5–12, subglobose or short-oval, several-flowered; densely clustered and apparently confluent, or slightly separated, bright greenish brown; staminate flowers basal; perigynia broadly ovate, firm, very narrowly wing-margined or wingless, rough above, plano-convex, $2''$–$2\frac{1}{2}''$ long, $1''$–$1\frac{1}{2}''$ wide, tapering into a 2-toothed beak, several-nerved on the outer face, nerveless on the inner, ascending; scales lanceolate, acute or cuspidate, about equaling the perigynia; stigmas 2.


197. Carex foenea Willd. Hay Sedge. (Fig. 867.)

_Carex foenea_ Willd. Enum. 957. 1802.


Rather light green, culm slender, smooth, erect or the summit nodding, $1^\circ$–$3\frac{1}{2}^\circ$ tall. Leaves flat, soft, $1''$–$2''$ wide, shorter than the culm; bracts very short or wanting, or the lowest occasionally manifest; spikes 4–10, subglobose or short-oblong, narrowed at the base, $2\frac{1}{2}''$–$3''$ in diameter, silvery green, all separated on a sometimes zigzag rachis or the upper contiguous; staminate flowers basal; perigynia ovate, thin, about $1\frac{1}{2}''$ long and nearly $1''$ wide, broadly wing-margined, strongly several-nerved on both faces, tapering into a short rough 2-toothed beak; scales hyaline, lanceolate, acuminate, about equaling the perigynia; stigmas 2.

In dry woods, often on rocks, New Brunswick to Pennsylvania, Minnesota and British Columbia. June–July.


Culms stouter, spikes commonly aggregated and larger, less contracted at the base, the summit of the culm erect or nearly so; perigynia thicker. Maine and Virginia to Minnesota.
198. Carex straminea Wild. Straw Sedge. (Fig. 868.)

Carex straminea Wild.; Schk. Riedgr. 49. f. 74. 1801.

Culms very slender, roughish above, 1°-2½° long, the top commonly nodding or recurved. Leaves 1" wide or less, long-pointed, shorter than the culm; bracts short or the lower bristle-form and exceeding its spike; spikes 3-8, subglobose or slightly obovoid, 2''-2½'' thick, yellowish brown or greenish, separated on the commonly zigzag rachis, or contiguous; staminate flowers basal; perigynia spreading or ascending, ovate, brown, about 1½'' long, rather more than ½'' wide, strongly several-nerved on the outer face, fewer-nerved on the inner, wing-margined, the tapering rough 2-toothed beak about as long as the body; scales lanceolate, acute, about equaling the perigynia, but narrower; stigmas 2.


Carex straminea mirabilis (Dewey) Tuckerm. Enum. Meth. 18. 1843.


Larger, culm slender, 2°-5° long; leaves 1½''-2½'' wide; spikes larger, 3'-4'' thick, rather greener; perigynia spreading, narrower, longer than the scales. Range of the type, extending south to North Carolina and Missouri. Perhaps better regarded as a distinct species.

199. Carex silicea Olney. Sea-beach Sedge. (Fig. 869.)


Carex fovea var. sabulonum A. Gray, Man. Ed. 5. 380. 1867.

Not C. sabulonum Turcz. 1837.

Culms slender, rather stiff, erect but the summit recurved or nodding, roughish above, 1°-2½° tall. Leaves 1" wide or rather less, involute in drying, shorter than the culm; bracts always very short; spikes 5-8, ovoid-conic or ovoid-oblong, silvery-green, nearly white or becoming brownish, erect, conspicuously contracted and staminate at the base, 4'-6'' long, about 2½'' thick, all separated or the uppermost close together; perigynia ovate-oval, short-beaked, finely nerved on both faces, wing-margined, appressed, about 2'' long, more than 1'' wide, longer and broader than the lanceolate scales; stigmas 2.


200. Carex tenera Dewey. Marsh Straw Sedge. (Fig. 870.)


C. straminea var. aperta Boott, Ill. 120. pl. 385. 1862.

C. straminea var. tenera Bailey, Bot. Gaz. 10: 381. 1883.

Culm very slender, erect or the summit nodding, roughish above 1°-2° high. Leaves shorter than the culm, usually less than 1'' wide, tapering to a very long point; bracts usually short or wanting, sometimes bristle-form; spikes 4-6, oval, oblate, densely many-flowered, separated or the upper contiguous, greenish-brown, 4'-5'' long, staminate and commonly much contracted at the base; perigynia ovate to ovate-lanceolate, ascending, appressed, strongly several-nerved on both faces, wing-margined, the tapering rough beak more than half as long as the body; scales lanceolate, about as long as the perigynia, but much narrower; stigmas 2.

In wet soil, common along brackish marshes, Maine and Ontario to Virginia and Louisiana. May–June.

Carex tenera invisa (W. Boott) Britton.


Spikes smaller, subglobose or short-oblong, not more than ½'' thick, the lower one usually subtended by a filiform bract ½'-3½' long. Maine to Delaware.
201. Carex festucacea Willd. Fescue Sedge. (Fig. 871.)


Culms slender or rather stout, nearly or quite smooth, stiff, strictly erect, 1°-4° tall. Leaves rather stiff, erect, 1 1/2-2" wide, shorter than the culm; spikes 3-8, green-brown oblong or nearly globular, clustered at the summit but not at all confluent, 2"-4" in diameter, the lower one sometimes subtended by a short filiform bract; perigynia orbicular or very broadly ovate, broadly wing-margined, about 1 1/2" in diameter, little if at all longer than wide, spreading or ascending, several-nerved on both faces, the roughish beak about one-third the length of the body; scales lanceolate or ovate-lanceolate, acute or obtusish, about as long as and narrower than the perigynia; stigmas 2.

In dry or moist soil, New Brunswick to Minnesota, south to Florida and Kansas. May-July.

202. Carex alata Torr. Broad-winged Sedge. (Fig. 872.)


Culms stiff, rather stout, strictly erect, roughish above, 1°-3 1/2° tall. Leaves grass-like, but somewhat rigid, 1"-2" wide, shorter than the culm, spikes oblong or oblong-conic, green-brown, very densely many-flowered, 5"-8" long, 4"-5" thick, usually conspicuously staminate and contracted at the base, pointed or obtuse at the summit, all distinct but usually little separated, bractless, or the lower one subtended by a short filiform bract; perigynia orbicular or obovate-ovaricular, very broadly winged, 2"-2 1/2" in diameter, faintly few-nerved or almost nerveless, erect and appressed, or somewhat curved upward, the short beak not more than one-fourth as long as the body; scales lanceolate, acuminate, scarcely over 3/4" wide, a little shorter than the perigynia; stigmas 2; achene distinctly stipitate.

In moist soil, Massachusetts to Florida, mostly near the coast. May-June.

203. Carex albolutescens Schwein. Greenish-white Sedge. (Fig. 873.)


Similar to the preceding species, but usually lower, culms 1°-2° tall, stout, strictly erect, rough above. Leaves 1"-2" wide, shorter than the culm; bracts filiform or wanting, the lower one sometimes exceeding its spike; spikes 3-8, oblong, usually narrowed at both ends, staminate below, silvery green when young but becoming brownish, 4"-6" long, mostly less than 3" thick, clustered, but distinct, the lowest sometimes separated, and very rarely stalked; perigynia broadly ovate, not twice as long as wide, broadly winged, strongly nerved on both faces, appressed, about 2" long, the roughish beak about one-third as long as the body; scales lanceolate, acuminate, about as long as the perigynia, but much narrower; achene nearly or quite sessile; stigmas 2.

In wet soil, most abundant along salt meadows, but also occurring inland, New Brunswick to eastern Pennsylvania and Florida. May-July.
204. Carex Bicknellii Britton. Bicknell’s Sedge. (Fig. 874.)


Culms loosely tufted, 2°-3½° high, erect or the top inclined, rough above, much longer than the leaves. Leaves mostly nearly basal, 6’-12’ long, 1½”-2½” wide; bracts usually very short; spikes 3-7, ovoid, subglobose, or somewhat obovoid, 4’-6’ long, close together or the lower separated, silvery green or becoming yellowish, staminate at the base; perigynia very broadly ovate, thin, several-nerved on the outer face, 2”-3” long, the broad membranous wing ½” wide, the rough 2-toothed beak one-fourth to one-half as long as the body; achene stalked.

In dry soil, southern New York to Minnesota and Missouri. June-July.

205. Carex sychnocéphala Carey. Dense Long-beaked Sedge. (Fig. 875.)


Culms erect, rather stout, quite smooth, 3’-18’ high. Leaves about 1’ wide, shorter than the culm; lower bracts similar to the leaves, much elongated, 3’-12’ long, about 1” wide at the base, nearly erect; spikes 4-10, green-brown, oblong, densely many-flowered, staminate at the base, aggregated and confluent into an oblong or ovoid head 1’ or less long; perigynia narrowly linear-lanceolate 2½”-3” long, about ½” wide at the base, tapering into a subulate rough 2-toothed beak 2-3 times as long as the slightly margined and few-nerved body; scales linear-lanceolate, long-acuminate, hyaline, shorter and rather narrower than the perigynia; stigmas 2.


ARUM FAMILY.

Herbs with basal long-petioled simple or compound leaves, and spathaceous inflorescence, the spathe enclosing or subtending a spadix. Rootstock tuberous or a corm, in our species mostly with an acrid or pungent sap. Spadix very densely flowered, the staminate flowers above, the pistillate below, or the plants wholly dioecious, or with perfect flowers in some species. Perianth wanting, or of 4-6 scale-like segments. Stamens 4-10 in our species; filaments very short; anthers 2-celled, commonly with a thick truncate connective, the sacs opening by dorsal pores or slits. Ovary 1-several-celled; ovules 1-several in each cell; style short or wanting; stigma terminal, mostly minute and sessile. Fruit a berry or utricle. Seeds various. Endosperm copious, sparse or none.

About 105 genera and 900 species, mostly of tropical regions, a few in the temperate zones.

Flowers without a perianth.
Flowers monoeious or dioecious, borne at the base of the spadix.
Flowers monoeious, covering the whole spadix.
Flowers perfect.

Flowers with a perianth.
Spadix enclosed in a shell-like fleshy spathe.
Spadix naked, terminating the scape.
Spadix naked, borne at the base of a leaf-like spathe.

1. Arisaema.
2. Peliandra.
3. Calla.
4. Spathyema.
5. Ornithium.
6. Acorns.

*Text contributed by the late REV. THOMAS MORONG.
ARUM FAMILY.


Perennial herbs with acrid corms, simple scapes and 1 to 3 slender-petioled divided leaves unfolding with the flowers. Spadix included or exserted, bearing the flowers near its base. Spathe convolute, open or contracted at the throat. Flowers dioecious or monocious, without any perianth, the staminate of 4 almost sessile 2-4-celled anthers which open by confluent slits at the apex, the pistillate with an ovoid or globose 1-celled ovary containing 1 or many orthotropous ovules; style very short or none, tipped with a perinate-capitate stigma. Fruit a globose red berry, the clusters usually large and conspicuous when ripe. Seeds with copious endosperm and an axial embryo. [Greek, in reference to the red-blotched leaves of some species.]

About 50 species, mostly natives of temperate and subtropical Asia. Besides the following, another occurs in the mountains of North Carolina.

Spathe hooded, open at the throat, enclosing the spadix.

1. Arisaema triphyllum (L.) Torr. Jack-in-the-pulpit. Indian Turnip. (Fig. 876.)

_Arisaema triphyllum_ Blume, Rumphia, t: 97. 1815.

Leaves 1 or 2, nearly erect, 10°-3° high, usually exceeding the scape, 3-foliolate, the segments ovate, entire, or sometimes lobed, acute rounded or narrowed at the base, 3'-7' long, 1½'-3½' wide, sessile or very short-stalked; flowers commonly dioecious, yellow, borne on the basal part of the spadix; spadix 2'-3' long, its naked summit blunt, colored; spathe green, and purple-striped, curving in a broad flap over the top of the spadix, acuminate; filaments very short and thick; ovaries crowded; ovules 5 or 6; berries smooth, shining, about 5' in diameter, forming a dense ovoid head 1'-3' long.

In moist woods and thickets, Nova Scotia to Florida, west to Ontario, Minnesota, Kansas and Louisiana. Ascends to 5000 ft. in North Carolina. April-June. Fruit ripe June-July. The acrid bulb made edible by boiling.

2. Arisaema Dracontium (L.) Schott. Green Dragon. Dragon-root. (Fig. 877.)

_Arisaema Dracontium_ Schott, Melet. t: 17. 1852.

Corms clustered. Leaves usually solitary, 8'-4° long, pedately divided into 5-17 segments, much longer than the scape; segments obovate or oblong, 3'-10' long, 9'-4' wide, abruptly acute at the apex, narrowed to a sessile or nearly sessile base, entire or the lateral ones somewhat lobed; scape sheathed by membranous scales at the base; spathe greenish or whitish, narrowly convolute, acuminate, 1'-2' long, enwrapping the spadix, the upper part of which tapers into a slender appendage exserted 1'-7' beyond its apex; inflorescence of the staminate plant nearly as long as the tubular part of the spathe; in the monocious plant the pistillate flowers are borne on the lower part of the spadix; ovary turbinate, with 6-8 bottle-shaped ovules; stigmas depressed; berries reddish-orange in large ovoid heads.

Mostly in wet woods and along streams, but sometimes in dry soil, Maine to Ontario and Minnesota, south to Florida, Kansas and Texas. May-June.

Bog herbs, with entire sagittate acute or acuminate leaves, the long petioles sheathing the shorter scape at the base. Spathe elongated, convolute, or expanded above. Flowers monoecious, covering the whole spadix. Perianth none. Staminate flowers uppermost, consisting at first of irregularly 4-sided oblong flat-topped shields, from the edges of which appear 6-10 imbedded anthers opening by apical pores, the shields ultimately shrivelling and leaving the linear-oblong anthers nearly free. Ovaries ovoid, surrounded at base by 4 or 5 white fleshy scale-like staminodia, 1-celled; ovules solitary or few, amphitropous; style erect, short, thick, tipped with a small stigma. Fruit a green or red berry, 1-3-seeded, when ripe forming large globose heads at the extremity of the finally recurved scape, and enclosed in the persistent leathery base of the spathe. Seeds surrounded by a tenacious jelly; endosperm none. [Greek, referring to the shield-shaped staminate disks.]

The genus consists of the two following species:

Spathe narrow, convolute its whole length, green. Spathe with a whitish dilated summit.

1. Peltandra Virginica (L.) Kunth. Green Arrow-arum. (Fig. 878.)

Peltandra Virginica Kunth, Enum. 3: 43. 1841.

Leaves bright green, somewhat hastate-sagittate, 4'-30' long, 3'-5' wide, acute or acuminate at the apex, firm, strongly veined. Root a tuft of thick fibres; scape nearly as long as the leaves, recurving and immersing the fruiting spadix at maturity; spathe green, 4'-8' long, long-conic, closely investing the spadix throughout, the strongly involute margins undulate; spadix shorter than the spathe, the pistillate flowers covering about one-fourth of its length, the rest occupied by staminate flowers; ovaries globose-ovoid; style nearly ½" long; stigma a little thicker than the style; berries green when ripe.

In swamps, or shallow water, Maine and Ontario to Michigan, south to Florida and Louisiana. May-June.

2. Peltandra sagittaefolia (Michx.) Morong. White Arrow-arum. (Fig. 879.)


Leaves sagittate, sometimes wider than those of the preceding species, acuminate or acute, the basal lobes diverging, obtuse or subacute; petioles 5'-20' long, equalling or longer than the scape; spathe 3'-4' long, with a whitish expanded acuminate apex; spadix scarcely more than one-half as long as the spathe, the staminate flowers borne on its upper half; ovaries ovoid; style scarcely any; stigma broad, depressed, lobed; ripe berries red.

In marshes and springs, southern Virginia (according to Gray) to Florida. May-July.

A bog herb with slender acid rootstocks, broadly ovate or nearly orbicular cordate leaves, and a large white persistent spathe. Spathe ovate-lanceolate or elliptic, acuminate, open. Spadix cylindrical, much shorter than the spathe, densely covered with flowers. Flowers perfect or the very uppermost staminate; perianth none. Stamens about 6; filaments linear, longer than the authors; anther-sacs divaricate, opening by slits. Ovary ovoid, 1-celled; style very short; stigma small, flat, circular. Ovules 6–9, anatropous. Berries obconic, depressed. Seeds hard, smooth, oblong, striate toward the micropyle and pitted at the outer end. Endosperm copious. [An ancient name, taken from Pliny.]

A monotypic genus of the cooler portions of the north temperate zone.

1. **Calla palustris** L. Water Arum.  
(Fig. 88o.)


Petioles 4'-8' long, spreading or ascending. Blades thick, entire, 1½'-4' wide, cuspidate or abruptly acute at the apex, deeply cordate at the base; scape as long as the petioles, sheathed at the base; rootstocks covered with sheathing scales and with fibrous roots at the nodes; spathe r'-2½' long and about r' wide, with an abruptly acuminate involute apex; spadix about r' long; berries red, distinct, few-seeded, forming a large head when mature.

In bogs, Nova Scotia to Minnesota, south to Virginia, Wisconsin and Iowa. Also in Europe and Asia. May-June. Fruit ripe July-Aug.

[Symplocarpus Salisb.; Nutt. Gen. 1: 105. 1818.]

A fetid herb, with large ovate cordate leaves, thick straight rootstocks and a short erect partly underground scape. Spathe swollen, shell-like, thick, pointed, completely enclosing the spadix. Spadix globose or oblong, short-stalked, entirely covered by the perfect flowers. Perianth of 4 hooded sepals. Filaments slightly dilated; anthers 2-celled, short, extorse, opening longitudinally. Ovary nearly buried in the tissue of the spadix, 1-celled with a solitary suspended anatropous ovule. Style pyramidal, 4-sided, thick, elongated; stigma minute. Berries immersed in the spongy axis of the spadix, becoming adnate to the succulent perianth in ripening, 1-seeded, forming large heads. Seeds large. Embryo large, fleshy; endosperm none. [Greek, referring to the spathe.]

A monotypic genus of eastern North America and northeastern Asia.

1. **Spathyema foëtida** (L.) Raf. Skunk Cabbage.  
(Fig. 88i.)

*Dractonium foetidum* L. Sp. Pl. 967. 1753.  
*Symplocarpus foetidus* Nutt. Gen. 1: 106. 1818.

Leaves numerous, in large crowds, 1°-3° long, often 1° wide, strongly nerved, abruptly acute at the apex, thin, entire, their petioles deeply channeled. Rootstock thick, descending, terminating in whorls of fleshy fibers; spathe preceding the leaves, erect, 3'-6' high, 1'-3' in diameter at the base, convolute, firm; purple-brown to greenish yellow, often mottled, its short scape usually subterranean, spadix about 1' in diameter in flower, greatly enlarging and sometimes 6' in diameter in fruit; mature seeds 4'-6'' long.

In swamps and wet soil, Nova Scotia to Ontario and Minnesota, south to Florida and Iowa. Feb.-April. Fruit ripe Aug.-Sept.

Aquatic herbs, with thick rootstocks buried in the mud, oblong-elliptic nerved leaves without a distinct midvein, and slender terete scapes terminated by a cylindric spadix. Spathe enclosing the spadix when very young, soon parting and remaining as a sheathing bract at its base, or falling away. Flowers perfect, bright yellow, covering the whole spadix. Sepals 4-6, scale-like, imbricated upon the ovary (lower flowers commonly with 6, upper with 4). Stamens as many as the sepals; filaments linear, wider than the anthers, abruptly narrowed above; anthers small, with two diverging sacs opening by oblique slits. Ovary partly imbedded in the axis of the spadix, depressed, obtusely angled, 1-celled; ovule solitary, half-anatropous; stigma sessile. Fruit a green utricle. Endosperm none; embryo long-stalked. [Ancient name of some water plant, said to be from the Syrian river Orontes.]

A monotypic genus of eastern North America.

1. **Orontium aquaticum** L. Golden-club.  
(Fig. 882.)


Leaves ascending or floating, depending on the depth of water, deep dull green above, pale beneath, the blade 5'-12' long, 2'-5' wide, entire, acute or cuspidate at the apex, narrowed at the base into a petiole 4'-20' long. Scape 6'-24' long, flattened near the spadix; spadix 1'-2' long, 3'-4' in diameter, frequently attenuate at the summit, much thickened in fruit; spathe bract-like, 2'-4' long, 2-keeled on the back; usually falling away early; utricle depressed, roughened on top with 9 or 10 tubercles.

In swamps and ponds, Massachusetts to central Pennsylvania, south to Florida and Louisiana, mostly near the coast. Ascends to 2000 ft. on the Pocono plateau of Pennsylvania. April-May.


Erect herbs, with very long horizontal branched rootstocks, sword-shaped leaves, and 3-angled scapes keeled on the back and channeled in front, and a seemingly lateral cylindric spadix, the scape appearing as if extending long beyond it, but this upper part is in reality a spathe. Flowers perfect, densely covering the whole spadix. Perianth of 6 membranous concave sepals. Stamens 6; filaments flattened, much longer than the anthers; anthers reniform or sagittate, 2-celled, the cells confluent at maturity. Ovary oblong, 3-4-celled with 2-8 anatropous ovules in each cell; stigma sessile, depressed-capitate. Fruit a 2-3-celled gelatinous berry, few-seeded. Endosperm copious. [Name ancient.]

Two known species, the following widely distributed in the north temperate zone, the other Japanese.

1. **Acorus Călamus** L. Sweet Flag.  
Calamus-root. (Fig. 883.)

*Acorus Calamus* L. Sp. Pl. 324. 1753.

Leaves linear, erect, 2°-6° tall and 1' wide or less, sharp-pointed and sharp-edged, with a ridged mid-vein running their whole length, 2-ranked, closely sheathing each other and the scape below. Spathe a leaf-like extension of the scape projecting 8'-30' beyond the spadix; spadix spike-like, 2'-3½' long, about ½' in diameter, compactly covered with minute greenish-yellow flowers.

In swamps and along streams, Nova Scotia to Ontario and Minnesota, south to Louisiana and Kansas. Also in Europe and Asia. In our territory fruit is rarely, if ever, formed. The hard ovary is usually found to be imperfect, with 2 or 3 abortive cells and ovules. The plant is propagated by its large rootstocks, which furnish the drug Calamus. Interior of stalk sweet. May-July.

**DUCKWEED FAMILY.**

Minute perennial floating aquatic plants, without leaves or with only very rudimentary ones. The plant body consists of a disc-shaped elongated or irregular thallus, which is loosely cellular, densely chlorophyllous and sometimes bears one or more rootlets. The vegetative growth is by lateral branching, the branches being but slightly connected by slender stalks and soon separating. In the autumn these disconnected branches fall to the bottom of the ditch or pond, but rise and again increase in size in the spring. The inflorescence consists of one or more naked monoecious flowers borne on a slight lateral prominence on the edge or upper surface of the plant. Each flower commonly consists of but a single stamen or a single flask-shaped pistil. The anther is provided with two to four pollen-sacs, containing spherical minutely barbellate grains. The pistil is gradually narrowed to the funnel-shaped scar-like stigmatic apex, and produces 1–6 erect or inverted ovules. The fruit is a 1–6-seeded utricle.

The family comprises the smallest of the flowering plants and contains 3 genera, all of which are represented in North America, and about 26 species of wide distribution.

Thallus prominently nerved; with a membranous spathe and a cluster of several rootlets; ovules 2.

1. *Spirodela.*

Thallus slightly nerved; with a membranous spathe and a single rootlet; ovules 1–6.

2. *Lemna.*

Thallus nervedless; without spathe or rootlets; ovule 1.


Thallus disc-shaped, 7–12-nerved. The lateral branches subtended by a single bipartite basilar rudimentary leaf. The thinly-capped rootlets as well as the nerves are provided with a single bundle of vascular tissue. The ovary produces two anatropous ovules. Fruit unknown. [Greek, in allusion to the cluster of rootlets.]

Two species, the following, and *S. oligorhiza*, a native of southern Asia, Australia and the Fiji Islands.

1. *Spirodela polyrhiza* (L.) Schleid.

Greater Duckweed. (Fig. 884.)


In rivers, ponds, pools and shallow lakes, Nova Scotia to British Columbia, south to South Carolina, Texas, northern Mexico and Nevada. Widely distributed in the Old World and in tropical America. Seldom collected in flower.


Thallus disc-shaped, usually provided with a central nerve and with or without two or four lateral nerves. Each thallus produces a single rootlet, which is devoid of vascular tissue and is commonly provided with a thin blunt or pointed rootcap. The ovary contains from one to six orthotropous amphitropous or anatropous ovules. Fruit ovoid, more or less ribbed. Endosperm in one or three layers. [Greek, in allusion to the growth of these small plants in swamps.]

Seven species, in temperate and tropical regions. Besides the following species, *Lemma Angoleensis* is a native of Lower Guinea and *Lemma paniculata* has been found in Asia, Africa and South America.

Ovule 1, amphitropous or orthotropous; endosperm in three layers.

Thalli of two kinds, ovule amphitropous.

Thalli all alike.

Thallus without lateral nerves; ovule orthotropous.

Thallus with lateral nerves; ovule orthotropous.

Thallus with lateral nerves; ovule amphitropous.

Ovules 2–6, anatropous; endosperm in one layer.

1. *L. trisulca.*
2. *L. Valdiviana.*
3. *L. perpusilla.*
4. *L. minor.*
5. *L. gibba.*

* Text contributed by Mr. EDMUND P. SHELTON.
(Fig. 885.)


Thallus lanceolate, submerged and devoid of stomata in the primary aquatic form, ovate to oblong-lanceolate, 6'-9' long, floating and provided with stomata in the later flowering stage. The later and more common form is narrowed at the base to a slender stipe, thin, denticulate, with or without rootlets, and slightly 3-nerved. Several individuals often remain connected, so as to form a chain-like series. Rootcap pointed; fruit symmetrical; seed deeply 12-15-ribbed.

In ditches, springs, ponds, shallow lakes and sloughs, Nova Scotia to the Pacific Ocean, south to New Jersey and New Mexico. Also in Europe, Asia, Africa and Australia. July-August.

(Fig. 886.)

*Lemna Valdiviana* Philippi, Linnaea, 33: 239. 1864.

Thallus oblong-elliptical, 1'/'-1½' long, thin, subfalcate and shortly stalked at the base, provided with numerous stomata, except on the borders, nerveless; rootcap short and blunt; spathe reniform; fruit ovoid-oblong, unsymmetrical; seed prominently 20-ribbed.

In pools and rivers, southern New York and New Jersey and southward, west to California, Arizona and New Mexico. Also in South America. June-July.

(Fig. 887.)


Thallus small, 1'/'-1½' long, obovate, often purplish tinged beneath, unsymmetrical and abruptly narrowed to a very short stalk, provided throughout with numerous stomata, more or less 3-nerved; rootcap pointed; fruit ovoid; seed 40-60-ribbed.

In ponds, rivers, springs and lakes, New York and New Jersey to Minnesota, Nebraska and Missouri. June-July.

(Fig. 888.)


Thallus obovate or subcircular, 1'/'-3' long, thickish, rarely reddish or purplish tinged, short-stalked when young, provided throughout with stomata, obscurely 3-nerved, very rarely 4-5-nerved. Rootcap obtuse or subtruncate. Fruit symmetrical, subturbinated. Seed with a prominent protruding hilum, deeply and unequally 12-15-ribbed.

In ponds, lakes and stagnant waters, throughout North America below 58° N. lat. Also in Europe, Asia, Africa and Australia. Summer.
5. *Lemna gibba* L.  
Gibbous Duckweed.  
(Fig. 889.)


Thallus slightly unsymmetrical, obovate or short-obovate, \(1\frac{1}{2}''-3''\) long, thickish or more or less strongly gibbous beneath, short-stalked when young, soon separating, provided with stomata which are sparse beneath, obscurely 3-5-nerved; rootcap mostly short-pointed, rarely long-pointed or obtuse; fruit symmetrical; seed thick, deeply and unequally ribbed.

In ponds and rivers, Nebraska, Texas, Arizona and California. Also in Mexico, Europe, Asia, Africa and Australia. June-July.

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Thallus small, globose, ovoid-oblong, subcylindric or irregular, rootless, nerveless and leafless. The vegetative growth is from a cleft near one end of the plant, the branch being mostly sessile and soon detached. The ovary contains one orthotropous ovule. Fruit spherical or short ovate, smooth. Endosperm in a single layer. [Name in honor of Nath. Matth. v. Wolff, 1724-1784, Polish physician and naturalist.]

A genus of 12 species, mostly in tropical and subtropical regions. The following and two Mexican species, *W. lingulata* and *W. gladiata*, comprise all the known North American forms.

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Columbia  
*Wolffia*. (Fig. 890.)


Thallus spherical or subellipsoidal \(\frac{1}{2}''-\frac{3}{2}''\) long, with a limited number of stomata (1 to 6), loosely cellular and clear green throughout, not dotted nor gibbous.

Floating as minute alga-like grains just beneath the surface of the water in stagnant ponds, pools and shallow lakes, Ontario to Connecticut and New Jersey, west to Minnesota and Missouri, south to Louisiana. Also in Mexico and South America. June-July.

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Brazil  
*Wolffia*. (Fig. 891.)


Thallus oblong, smaller than the last, \(\frac{1}{4}''-\frac{1}{2}''\) long, flattish, densely cellular, with numerous stomata and dark green above, gibbous, more loosely cellular, with fewer stomata and paler beneath; brown-dotted throughout with minute pigment cells.

Floating on the surface of stagnant waters, Ontario, Connecticut to New Jersey, west to Minnesota and Missouri, south to Louisiana. Also in Brazil. June-July.

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*MAYACA* FAMILY.

Slender branching aquatic moss-like herbs, with linear sessile 1-nerved entire soft leaves, notched at the apex. Flowers solitary, peduncled, white, perfect, and regular, the peduncles bracted at the base. Perianth persistent, consisting of 3 lanceolate green herbaceous sepals and 3 obovate white spreading petals. Stamens 3, hypogynous, alternate with the petals; filaments filiform; anthers
MAVACACEAE.

3. 1836.

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Characters of the family. [Aboriginal name of these plants in Guiana.]

About 7 species are known, all natives of warm and tropical America. Only the following occurs in the United States.


(Fig. 892.)


Stems tufted, 3’-15’ long, usually little branched. Leaves densely clothing the stem and widely spreading, linear-lanceolate, translucent, 2”-3” long, about 3/4” wide; peduncles 2”-6” long, very slender, recurved in fruit; flowers 3”-4” broad, axillary, but borne near the ends of branches, lateral, rarely more than one on each branch; capsule oblong-oval, about as long as the sepals, tipped until dehiscence by the subulate style.

In fresh water pools and streams, southeastern Virginia to Florida and Texas. May-July.


YELLOW-EYED GRASS FAMILY.

Perennial or annual tufted herbs with basal narrow equitant commonly 2-ranked leaves, and erect simple leafless scapes. Flowers perfect, mostly yellow, nearly or quite regular, solitary and sessile in the axils of coriaceous imbricate bracts (scales), forming terminal ovoid globose or cylindrical heads. Sepals 3, the two lateral ones small, keeled, persistent, the other one larger, membranous (wanting in the South American genus Abolboda). Corolla inferior, with a narrow tube and 3 spreading lobes. Stamens 3, inserted on the corolla, usually alternating with as many plumose or bearded staminodia. Ovary sessile, 1-celled or incompletely 3-celled; ovules numerous or few, on 3 parietal placenta, orthotropous; style terminal (unappendaged in Xyris, in Abolboda appended at the base), 3-branched above; stigmas apical. Fruit an oblong 3-valved capsule. Seed-coat longitudinally striate. Embryo apical. Endosperm mealy or somewhat fleshy.

Two genera, Xyris L. and Abolboda H. & B., comprising some 60 species, mostly of tropical distribution in both the Old World and the New.

1. XYRIS L. Sp. Pl. 42. 1753.

Characters of the family as given above. [Greek name for some plant with 2-edged leaves.]

Besides the following species there are some 9 others in the southern United States.

Lateral sepals wingless, the keel fringed with short hairs. 1. X. flexuosa.

Lateral sepals winged, the keel fimbriate or lacerate.

Scapes not bulbous-thickened at the base; leaves flat or but slightly twisted.

Lateral sepals about as long as the bracts, their keels lacerate.

Head oblong, 1½”-3” long; northern. 2. X. montana.

Head oval or ovoid, 3”-8” long; southern.

Keel of lateral sepals lacerate to below the middle.

Keel of lacerate sepals lacerate only above the middle.

Lateral sepals longer than the bracts, their keels long-fimbriate. 3. X. communis.

5. X. fimbriata.

Scapes conspicuously bulbous-thickened at the base; leaves spirally twisted. 6. X. torta.
1. *Xyris flexuosa* Mühl. Slender Yellow-eyed Grass. (Fig. 893.)

*Xyris flexuosa* Mühl. Cat. 5. 1813.

Scapes slender, straight or sometimes slightly twisted, 4'–18' tall, 2-edged above, bulbous-thickened at the base. Leaves narrowly linear, flat or becoming twisted when old, 1'/–6' long, 1/2'/–1½' wide; head globose, or short-oblange, obtuse, 3'/–4' high; bracts broadly oval or slightly obviate, entire or somewhat lacerate at the apex; lateral sepals linear, about as long as the bracts, curved, finely fringed with short hairs on the wingless keel; expanded flowers 3'/–4' broad.

In swamps and bogs, Maine to Minnesota, south to Georgia and Texas. July–Sept.

2. *Xyris montana* H. Ries. Northern Yellow-eyed Grass. (Fig. 894.)


Scapes very slender, straight or slightly twisted, 2-edged above, 2'/–12' tall, not bulbous-thickened at the base. Leaves narrowly linear, 1'/–6' long, 1/4'/–1' wide, not at all twisted but very slightly so; head oblong or ovoid, subacute, 1½'/–3' long; bracts oval or obovate, rounded and finely lacerate at the apex; lateral sepals linear, irregularly serrate-fimbriate on the winged keel above the middle, about as long as the bracts.

In bogs, Nova Scotia to Ontario and Michigan, south to the Pocono Mountains of Pennsylvania and to New Jersey. Our only species occurring on mountains. July–Aug.

3. *Xyris communis* Kunth. Southern Yellow-eyed Grass. (Fig. 895.)

*Xyris communis* Kunth, Enum. 4: 12. 1843.

*Xyris diffornis* Chapm. Fl. S. States, 500. 1860.

Scapes slender, slightly twisted, 2-edged above, 1-edged below, not thickened at the base, 6'/–18' tall. Leaves linear or linear-lanceolate, flat, 3'/–10' long, 1'/–4' wide; head ovoid, or subglobose, blunt or subacute, about ½' long; scales ovate or oval, mostly entire; lateral sepals lanceolate, the winged keel fimbriate from the apex to below the middle; corolla-lobes obovate, 2'/–3' long.

In bogs, Maryland to Florida and Louisiana. Widely distributed in tropical America. June–Aug.
4. **Xyris Caroliniana** Walt. Carolina Yellow-eyed Grass. (Fig. 896.)

*Xyris Caroliniana* Walt. *Fl. Car.* 69. 1758.


Scapes mostly slender, straight or somewhat twisted, 2-edged above, 1°-2° tall, not thickened at the base. Leaves linear or linear-lanceolate, flat, 4'-15' long, 1'-5' wide, head globose, ovoid or broadly oval, blunt, 4'-8' long; scales oval or slightly obovate, entire or somewhat lacerate; lateral sepals linear, about as long as the bracts, the narrowly winged keel lacerate or incised-serrate only above the middle.

In swamps and bogs, Massachusetts to Pennsylvania, Florida and Louisiana, mostly near the coast. Young states of this plant may be mistaken for *X. montana.* June-Aug.

5. **Xyris fimbriata** Ell. Fringed Yellow-eyed Grass. (Fig. 897.)


Scapes rather stout, roughish, straight or somewhat twisted, strongly 2-edged above, 2°-1° high. Leaves flat, one-half as long as the scapes or more, 3'-6' wide; head oblong-cylindric, ½'-1' long or sometimes globose-ovoid and about ½' in diameter; scales obovate, their margins entire or the apex lacerate; lateral sepals longer than the bracts, exserted, long-fringed on the winged keel above the middle.

In wet pine barrens, southern New Jersey to Florida and Mississippi, mostly near the coast. July-Sept.

6. **Xyris torta** J. E. Smith. Twisted Yellow-eyed Grass. (Fig. 898.)

*Xyris torta* J. E. Smith in Rees' Cycl. 1819.

Scapes stout, much spirally twisted, 1-edged below, or 2-edged at the summit, smooth or very nearly so, the base conspicuously bulbous-thickened and with the sheathing leaves sometimes 1' in diameter. Leaves narrowly linear from a broad shining nearly black base, rigid, rather shorter than the scapes, spirally twisted (very markedly so when old); head oblong or oblong-cylindric, acute or subacute, ½'-1' long; bracts oblong-ovate, minutely lacerate-serrulate at the apex or entire; lateral sepals linear, exserted, the winged keel fringed with rather short processes above the middle.

In dry pine barrens, southern New Jersey to Florida, west to Texas, mostly near the coast, extending north to Arkansas (according to Watson and Coulter). May-Aug.

**Pipewort Family.**

Bog or aquatic herbs, perennial or perhaps sometimes annual, with fibrous mostly knotted or spongy roots, tufted grass-like basal leaves, and monoecious (androgy nous) occasionally dioecious very small flowers, in terminal solitary heads, on long slender scapes. Head of flowers involucrate by bracts, each flower borne in the axil of a scarious scale. Perianth of 2 series of segments or rarely of one series. Stamens in the staminate flowers as many or twice as many as the sepals. Ovary 2-3-celled. Ovules 2 or 3. Fruit a 2-3-seeded capsule, loculicidally dehiscent. Seeds pendulous, orthotropous; endosperm farinaceous.

Six genera and about 310 species, widely distributed in warm and tropical regions, a few extending into the temperate zones. The family is most abundantly represented in South America. Perianth of 2 series of segments; sepals and petals 2 or 3; stamens distinct; anthers 2-celled.

Stamens as many as the inner perianth-segments.

Perianth simple, of 3 segments (sepals); stamens 3, monadelphous below; anthers 1-celled.

1. **ERIOCAULON** L. Sp. Pl. 87. 1753.

Acaulescent or very short stemmed herbs, the scapes erect, or when immersed delicate, angular, with a long sheathing bract at the base. Leaves mostly short, spreading, acuminate, parallel-nerved. Head of flowers woolly, white, lead-colored or nearly black. Staminate flowers: Outer perianth-segments 2 or 3, distinct or sometimes connate, the inner united below into a tube, alternate with the outer ones, each with a minute spot or gland near its middle or apex; stamens mostly 4-6, one opposite each perianth-segment, the filaments of those opposite the inner segments the longer; pistil small, rudimentary or none. Pistillate flowers: Outer perianth-segments as in the staminate flowers, the inner indistinct, narrow; stamens wanting; ovary sessile or stalked; style columnar or filiform, stigmas 2 or 3 filiform. Fruit a thin-walled capsule. Seeds oval, covered with minute processes. [Greek, in allusion to the wool at the base of the scape in some species.]

About 110 species, of very wide geographic distribution in tropical and warm regions. Besides the following, 3 others occur in the southern United States, and 3 in Mexico.

Leaf-blades as long as the sheaths, coarsely 3-8-fenestrate-nerved; scapes 7-angled; heads 2'/-3' in diameter.

Leaf-blades much longer than the sheaths, finely 6-20-fenestrate-nerved; scapes 10-12-angled, heads 3'/-6' in diameter.

1. **Eriocaulon septangulare** With. Seven-angled Pipewort. (Fig. 899.)


**Nama thylla articulata** Huds. Fl. Ang. Ed. 2, 415. 1778.


Stem a mere crown. Leaf-blades pellucid, 3-8-fenestrate-nerved, 1'/-3' long, usually as long as the sheaths; scapes weak, twisted, about 7-angled, smooth, 1'/-8' tall, or when submersed sometimes 4'/-10' long; involucral bracts glabrous, or the innermost bearded at the apex, oblong, usually shorter than the flowers; marginal flowers usually staminiate; scales of the receptacle spatulate or obovate, abruptly pointed, brown above, white-woolly; staminate flowers about 1'/-8' high; pistillate flowers scarcely more than half as large; perianth-segments of both kinds of flowers white-bearded.

In still water or on shores, Newfoundland to Ontario and Minnesota, south to Florida and Texas. Also in western Europe. July–Oct.

*Text contributed by the late Rev. Thomas Morong.
2. Eriocaulon compréssum Lam. Flattened Pipewort. (Fig. 900.)

Eriocaulon compréssum Lam. Encycl. 3: 76-1789.


Leaf-blades 6-20-fenestrate-nerved, usually shorter than the sheaths and tapering to a long sharp point, rigid, or when submersed thin and pellucid. Stem a mere crown; scapes stout, rigid, glabrous, 10-14-angled, 1°-3° tall; smooth, flattened when dry, 10-12-angled; involucral bracts rounded, obtuse, scarious, shining, smooth, imbricated in 3 or 4 series; heads 3'-6' in diameter, frequently dioecious; receptacle glabrous; flowers 1/2'-2' high, otherwise similar to those of the preceding species.

In still shallow water, southern New Jersey to Florida and Texas. Also in Cuba. At flowering time the styles and stigmas are much exserted, standing above the heads like projecting threads. May-Oct.

3. Eriocaulon decangulâre L. Ten-angled Pipewort. (Fig. 901.)

Eriocaulon decangulâre L. Sp. Pl. 87. 1753.

Stems short and thick, 1'-2' long. Leaf-blades finely many-nerved, tapering to a blunt point, 6'-20' long, 2'-8' wide, usually much longer than the sheaths; scapes stout, rigid, glabrous, 10-14-angled, 1°-3° tall; heads 4'-8' in diameter; involucral bracts ovate, often eroded, denticulate at the apex and pubescent below, imbricated in 4 or 5 series; receptacle pubescent with many-celled hairs; flowers 2'-3' high, densely woolly at the base; scales longer than the flowers, acute, white-bearded; as are the spatulate perianth-segments.

In swamps, southern New Jersey and Pennsylvania to Florida and Texas. Also in Cuba. June-Oct.

2. DUPÂTYA Vell. Fl. Flum. 35. 1825.


Perennial or rarely annual herbs, our species with the habit of Eriocaulon. Stems very short. Leaves awl-shaped, tufted. Scapes slender, several-angled, erect, twisted in growth, sheathed at the base by a long acute bract. Flowers androgynous, in globular or hemispheric heads, each in the axil of a scale or the scales sometimes obsolete. Involucral bracts imbricated in 3 or 4 series. Perianth of 2 series, each of 2 or 3 segments in the staminate flowers, the outer segments distinct, the inner connate; stamens 2 or 3, inserted on the inner perianth and opposite its lobes. Pistillate flowers with the outer segments distinct, the inner often connate above the 2-celled, 2-3-ovuled ovary; style cleft into 2 or 3 entire or 2-cleft stigmas. Fruit a 2-3-celled, 2-3-seeded capsule, loculicidally dehiscent. [Name in honor of Dupaty.]

About 215 species, mostly natives of tropical America. Only the following is known in the United States.
LACHNOCÀULON Kunth, Enum. 3: 497. 1841.

Tufted herbs with the habit of Eriocaulon, the leaves linear. Scape several-angled, sheathed at the base by an entire bract about as long as the leaves; heads globose. Receptacle pilose. Flowers androgy nous. Perianth of 3 segments. Staminate flowers with 3 stamens united below into a thickened tube which is coalescent with a body, variously regarded as a corolla or as a rudimentary pistil, bearing at its apex 3 fimbriate or entire lobes alternate with the filaments; anthers 1-celled, minute. Pistillate flowers with a sessile 3-celled, 3-ovuled ovary surrounded by copious woolly hairs at the base; styles united below, spreading above into 3 divisions which are 2-parted, there being thus 6 stigmas. [Greek, referring to the woolly scapes of some species.]

Four known species, natives of the southern United States.

1. Lachnocaulon anceps (Walt.) Morong. Hairy Pipewort. (Fig. 903.)

Leaves glabrous or sparingly pubescent, 1"-3' long, tapering to an obtuse callous point. Scapes slender, 2'-20' tall, 2-4-angled, clothed with long soft appressed upwardly pointed hairs; sheaths equaling or shorter than the leaves; heads globose, 1'-3' in diameter; involucral bracts ovate or oblong, shorter than the flowers, usually brown; flowers about 1" high; scales brown, spatulate, surrounded at the base by the yellowish silky hairs of the receptacle and white-bearded at the apex; perianth of the staminate flowers short-stalked, pubescent at the base, woolly and fimbriate at the summit; segments of the pistillate perianth white, glabrous, obtuse; ovary densely villous around the base; seeds strongly ribbed.

In moist pine barrens, Virginia to Florida. The white pistillate flowers mingled with the brown staminate ones impart a mixed gray and dark appearance to the heads. March–June.

**PINE-APPLE FAMILY.**

Epiphytic herbs (some tropical species terrestrial), mostly scurfy, with elongated entire or spinulose-serrate leaves. Flowers spiked, panicled, or solitary, regular and perfect, usually conspicuously bracted. Perianth of 3 thin distinct or somewhat united sepals, and 3 clawed distinct or united petals. Stamens 6, usually inserted on the base of the corolla. Ovary inferior or superior, 3-celled; ovules numerous in each cell, anatropous; style short or elongated; stigmas 3. Capsule 3-valved in our species. Seeds numerous, the testa membranous. Embryo small, situated at the base of the copious endosperm.

About 35 genera and 900 species, all natives of tropical and subtropical America.


Epiphytic plants of various habit, with narrow entire leaves and white, yellow or purple flowers. Sepals distinct and separate or very nearly so. Petals distinct. Stamens hypogynous or the three inner ones inserted on the bases of the petals; filaments filiform; anthers linear or linear-oblong. Ovary superior; style subulate; stigmas short. Capsule septicidally 3-valved. Seeds erect, narrow, supported on a long funiculus which splits up into fine threads. [Dedicated to Elias Tillands, Swedish (?) botanist of the seventeenth century.]

About 350 species, natives of warm and tropical America. Besides the following some 9 others occur in the southern United States.

1. Tillandsia usneoides L. Long Moss. Florida Moss. (Fig. 904.)


Stems very slender, thread-like, flexuous, hanging clustered in festoons from the branches of trees, 3°-20° long, gray and, like the filiform leaves, densely silvery-scurfy all over. Leaves scattered, 1'-3' long, scarcely ½” thick, their bases somewhat dilated; flowers sessile and solitary or rarely 2 together in the axils of the leaves; sepals about 3” long, pale green; petals yellow, the blade about 2” long; stamens about as long as the calyx; capsule linear, 9”-15” long, at length splitting into 3 linear valves.

Eastern Virginia to Florida, west to Texas and Mexico. Very widely distributed in tropical America.


**SPIDERWORT FAMILY.**

Perennial or annual leafy herbs with regular or irregular perfect and often showy flowers in cymes, commonly subtended by spathe-like or leafy bracts. Perianth of 2 series; a calyx of mostly 5 persistent sepals, and a corolla of mostly 3 membranous and deciduous or fugacious petals. Stamens mostly 6, hypogynous, rarely fewer, all similar and perfect or 2 or 3 of them different from the others and sterile; filaments filiform or somewhat flattened; anthers 2-celled, mostly longitudinally dehiscent. Ovary superior, sessile or very nearly so, 2-3-celled; ovules 1 or several in each cell, anatropous or half anatropous; style simple; stigmas terminal, entire or obscurely 2-3-lobed. Seeds solitary or several in each cell of the capsule. Capsule 2-3-celled, loculicidally 2-3-valved. Embryo small. Endosperm copious.

About 25 genera and 350 species, mostly natives of tropical regions a few in the temperate zones.

Perfect stamens 3, rarely 2; petals unequal; bracts spathe-like.
Perfect stamens 6, rarely 5; petals all alike; bracts leafy.

1. *Commelina*.
2. *Tradescantia*. 
I. **Commelina** L. Sp. Pl. 40. 1753.

Erect ascending or procumbent, somewhat succulent, branching herbs, with short-petioled or sessile leaves, and irregular mostly blue flowers in sessile cymes subtended by spathe-like bracts. Sepals somewhat unequal, the larger ones sometimes slightly united. Petals blue, unequal, 2 of them larger than the third. Perfect stamens 3, rarely 2, one of them incurved and its anther commonly larger. Sterile stamens usually 3, smaller, their adherers various. Filaments all glabrous. Capsule 3-celled. Seeds 1 or 2 in each cavity, the testa firm, roughened, smooth, or reticulated. [Dedicated to Kaspar Commelin, 1667–1731, Dutch botanical.]

About 95 species of wide distribution in warm and temperate regions. Besides the following, some 3 others occur in the southern United States.

Ventral cavities of the ovary 2-ovuled, the dorsal 1-ovuled.

Capsule 3-celled, commonly 5-seeded.

Creeping, glabrous or nearly so; margins of the spathe not united.

Stout, erect, the sheaths bearded; margins of the spathe united.

Capsule 2-celled, 4-seeded.

All 3 cavities of the ovary only 1-ovuled.

Cavities of the capsule all dehiscent.

Dorsal cavity of the capsule indehiscent.

1. **Commelina nudiflora** L. Creeping Day-flower. (Fig. 905.)

**Commelina nudiflora** L. Sp. Pl. 31. 1753.

**Commelina comnunis** W. & A. Car. 68. 1788.

**Commelina agraria** K. Thunb. Enum. 4: 38. 1843.

Glabrous or very nearly so throughout, stems procumbent or creeping, rooting at the nodes, 1½–2½ long. Leaves lanceolate or ovate-lanceolate, 1½–3½ long, 4½–8½ wide, acute or acuminate at the apex, their sheaths sometimes ciliate; spathe acute or acuminate, 8½–12½ long, peduncled, the 2 bracts not united by their margins; flowers few in each spathe, 3½–6½ broad; ventral cells of the ovary 2-ovuled, the dorsal 1-ovuled; capsule commonly 5-seeded (2 seeds in each of the ventral cells, 1 in the dorsal); seeds oblong, reticulated, about 1½ long.

Along streams and in waste places, New Jersey to Indiana and Missouri, south to Florida, Texas and through tropical America to Paraguay. Widely distributed in Asia and Africa. July–Oct.

2. **Commelina hirtella** Vahl. Bearded Day-flower. (Fig. 906.)


**Commelina hirtella** Vahl. Enum. 2: 166. 1806.

**Commelina erecta** A. Gray, Man. Ed. 2. 486. 1856.

Not L. 1753.

Stem stout, erect or ascending, 3½–4½ high.

Leaves lanceolate, acuminate, roughish, 4½–7½ long, 1½–1½ wide, their sheaths ½–1½ long, fringed with rather stiff and long brownish hairs and sometimes pubescent; spathes sessile or short-peduncled, often clustered at the summits of the stem and branches, the 2 bracts acute, united by their margins, rather strongly cross-veined; ventral cells of the ovary 2-ovuled, the other 1-ovuled; capsule 5-seeded; seeds ellipsoid, brown, somewhat more than 1½ long, smooth, minutely puberulent.

In moist soil, southern New Jersey to Missouri, south to Florida and Texas. Aug.–Oct.
3. Commelina communis L. Asiatic Day-flower. (Fig. 907.)

Commelina communis L. Sp. Pl. 40. 1753.
Commelina Willdenovii Kunth. Enum. 4: 37. 1843.

Glabrous or nearly so, stems ascending or decumbent, rather slender, sometimes rooting at the nodes, 1°-3° long. Leaves lanceolate or oblong-lanceolate, 3'-5' long, 1'-1½' wide, acuminate at the apex, narrowed or rounded at the base, smooth; sheath white-membranous with green veins, sometimes ciliate, ½'-1½' long; spathes few, peduncled, their 2 bracts acute or acuminate, nearly 1' long, glabrous or sometimes pubescent, distinct; flowers deep blue, ½' or more broad; ventral cells of the ovary 2-ovuled, the dorsal 1-ovuled; capsule 2-celled, each cell 2-seeded; seeds compressed, dark brown, roughened.


4. Commelina erecta L. Slender Day-flower. (Fig. 908.)

Commelina erecta L. Sp. Pl. 41. 1753.

Somewhat pubescent or glabrous, stems commonly tufted, erect or ascending, 1°-2° tall, the roots somewhat thickened. Leaves linear-lanceolate, 3'-6' long, 4½'-1½' wide, acuminate at the apex, narrowed at the base; sheaths ½'-1½' long, often pubescent; spathes peduncled or sessile, the 2 bracts more or less pubescent, acute or acuminate, distinct, 10'-20' long; flowers ½' or more broad; ovary 3-celled, each cell 1-ovuled; capsule papery, all its cells dehiscent, each 1-seeded; seeds ash-colored, nearly or quite smooth, puberulent.

In moist soil. Southern Pennsylvania (according to Watson), south to Florida, Texas and in tropical America. Aug.-Oct.

5. Commelina Virginica L. Virginia Day-flower. (Fig. 909.)


Similar to the preceding species, somewhat pubescent or glabrous, stems diffusely branched, rather stout, 1½'-3° high. Leaves lanceolate or linear-lanceolate, 3'-5' long, 5½'-12' wide, acuminate at the apex; sheaths inflated, often pubescent, the orifice sometimes fringed; spathes several, usually peduncled, the 2 bracts acute or acuminate, 5¼'-12' long, distinct; flowers 1' broad or less, showy; capsule 3-celled, each cell 1-seeded, the dorsal one indehiscent and roughened.

In moist soil, southern New York to Illinois and Michigan, south to Florida, Nebraska, Texas and through tropical America to Paraguay. June-Sept.

Perennial, somewhat mucilaginous herbs, with simple or branched stems, mostly narrow and elongated leaves, and showy regular flowers in terminal or terminal and axillary umbels subtended by leaf-like or scarious bracts. Sepals 3, distinct, herbaceous. Petals 3, obovate, ovate or orbicular, sessile. Stamens 6, all alike and fertile, or those opposite the petals shorter; filaments bearded or glabrous. Ovary 3-celled, the cells 2-ovulate. Capsule 3-celled, loculicidally 3-valved, 3-12-seeded. [In honor of John Tradescant, gardener to Charles I, died 1638.]

About 35 species, natives of tropical and temperate America. Besides the following, some 6 others occur in the southern United States.

**Umbel or umbels sessile, subtended by long leaf-like bracts.**

- Umbels solitary or 2-4; stem straight; leaves narrow.
- Stems glabrous or merely pubescent, 8'-2½' tall.
- Sepals oblong-lanceolate, 4'-10' long; flowers 1'-2' broad.
- Sepals lanceolate, 3'-4' long; flowers less than 1' broad.
- Whole plant long villous; nearly or quite acaulescent.
- Umbels 3-8, axillary and terminal; stem mostly flexuous; leaves broad.
- Umbel peduncled, subtended by small scarious bracts; leaves narrow.

1. **Tradescantia Virginiana** L. **Spiderwort.** (Fig. 910.)


Glabrous or slightly pubescent, succulent, glaucous or green, stems stout, 8'-3' tall. Leaves more or less channelled, or in some forms nearly flat, linear or linear-lanceolate, long-acuminate, often more than 1' long, 4'-1' wide; bracts foliaceous, commonly rather wider and shorter than the leaves; umbels solitary and terminal or rarely 2-4, loosely several-many-flowered; pedicels glabrous or pubescent, slender; flowers blue or purplish, rarely white, 1'-2' broad, very showy; sepals oblong or oblong-lanceolate, acute or obtuse, glabrous or pubescent, 4'-10' long, much longer than the capsule.

In rich soil, mostly in woods and thickets, southern New York to Ohio and South Dakota, south to Virginia, Kentucky, and Arkansas. Ascends to 4000 ft. in Virginia; variable, perhaps includes several species; May-Aug.

**Tradescantia Virginiana occidentalis** Britton.

Leaves narrowly linear, 2'-3' wide; flowers commonly smaller. Wisconsin to Missouri, Texas and New Mexico. May be a distinct species.

2. **Tradescantia montana** Shuttlw. **Mountain Spiderwort.** (Fig. 911.)

*Tradescantia montana* Shuttlw. in *Distrib. Pl. Rugel.

Green and glabrous or somewhat pubescent, stems slender, simple or sparingly branched, 1°-2° tall. Leaves lanceolate or linear-lanceolate, 4'-10' long, 2'-6' wide, mostly distant, their sheaths enlarged; bracts similar to the leaves but shorter; umbels mostly solitary and terminal, sessile in the bracts, rather densely flowered; pedicels and calyx glabrous or pubescent; flowers less than 1' broad; sepals lanceolate, acute, about 3' long.

In woods and thickets, mountains of southwestern Virginia to Kentucky and Georgia. June-Aug.
3. *Tradescantia brevicaulis* Raf.  Short-stemmed Spiderwort.  (Fig. 912.)


Villous with long spreading hairs, stems only 1'–6' high, the plant often appearing nearly acanthescent; leaves mostly basal, 6'–12' long, 4'–8' wide, grass-like, linear-lanceolate, acuminate, ciliate, at least at the base, glabrous or villous toward the apex; bracts similar to the leaves, but usually more elongated; umbel 4–12-flowered, sessile in the bracts, the pedicels slender, 1'–2' long, villous; sepals obovate; corolla about 1' broad, blue or rose-purple.

In dry soil, Illinois, Kentucky and Missouri.  April–May.

4. *Tradescantia pilosa* Lehm.  Zigzag Spiderwort.  (Fig. 913.)


More or less puberulent or short pilose, stem stout, 1°–3° high, commonly flexuous, often branched. Leaves broadly lanceolate, acuminate at the apex, mostly narrowed at the base, 6'–15' long, ½'–2' wide, dark green above, paler beneath; bracts usually narrower and shorter than the leaves; umbels 3–8, terminal and axillary or on short axillary branches, densely many-flowered; pedicels and calyx pubescent and more or less glandular, rarely nearly glabrous; corolla lilac-blue, 9'–15' broad.


5. *Tradescantia rosea* Vent.  Roseate Spiderwort.  (Fig. 914.)


Glabrous, stem very slender, erect, mostly quite simple, 6'–12' tall. Leaves very narrowly linear, grass-like, nearly erect, channelled, 4'–7' long, ⅓'–1½' wide, clasping at the base; bracts very short and scarious; umbel terminal, long peduncled, few-flowered, subtended by small pointed bracts; pedicels slender, short; sepals lanceolate, acute, 2'–3' long, shorter than the petals; corolla rose-color, 6'–8' broad; filaments hairy; style slender, long-exserted.

In dry woods, Maryland to Missouri, south to Florida and Texas. April–Aug.

PONTEDEERÁE Family.

Perennial aquatic or bog plants, the leaves petioled, with thick blades, or long and grass-like. Flowers perfect, more or less irregular, solitary or spiked, subtended by leaf-like spathes. Perianth free from the ovary, corolla-like, 6-parted. Stamens 3 or 6, inserted on the tube or the base of the perianth; filaments filiform, dilated at the base or thickened at the middle; anthers 2-celled, linear-oblong or rarely ovate. Ovary 3-celled with axile placenta, or 1-celled with 3 parietal placenta; style filiform or columnar; stigma terminal, entire or minutely toothed; ovules anatropous, numerous, sometimes only 1 of them perfecting. Fruit a many-seeded capsule, or a 1-celled, 1-seeded utricle. Endosperm of the seed copious, mealy; embryo central, cylindric.

About 5 genera and 25 species, inhabiting fresh water in the warm and temperate regions of America, Asia and Africa.

Flowers 2-lipped, stamens 6; fruit a 1-seeded utricle.
Flowers regular; stamens 3; fruit a many-seeded capsule.


Leaves thick with many parallel veins, the petioles long, sheathing, arising from a horizontal rootstock. Stem erect, 1-leaved, with several sheathing bract-like leaves at the base. Flowers blue, ephemeral, numerous, spiked, the spike (or spadix) peduncled and subtended by a thin bract-like spathe. Perianth 2-lipped, the upper lip of 3 ovate lobes, the middle lobe longest, the lower lip of 3 linear-oblong spreading lobes. Stamens 6, borne at unequal distances upon the perianth-tube, 3 of them opposite the lower lip, the others opposite the upper lip; anthers oblong, subversatile, introrse. Ovary 3-celled, 2 of the cells abortive and empty. Fruit a 1-seeded utricle, enclosed in the thickened tuberculate-ribbed base of the perianth. [In honor of Giulio Pontedera, 1688-1757, professor of botany in Padua.]

Seven or eight species, natives of America.

1. Pontederia cordata L. Pickerel-weed. (Fig. 915.)


Stem rather stout, 1'-6' tall. Leaves ovate, cordate-sagittate, 4'-8' long, 2'-6' wide at the base, the apex and basal lobes obtuse; basal lobes often with long narrow stipule-like appendages on the sheathing petiole; spadix and inflorescence glandular-pubescent; perianth about 4'' long, it and the filaments, anthers, and style bright blue, its tube curved, slightly longer than the lobes, middle lobe of the upper lip with 2 yellow spots at the base within; ovary oblong, tapering into the slender style; stigma minutely 3-6-toothed.

Borders of ponds and streams, Nova Scotia to Minnesota, south to Florida and Texas. After flowering the lobes and upper part of the perianth-tube wither above, while the persistent base hardens around the fruit. The flowers are trimorphous. June-Oct.


Pontederia lancifolia Muhl. Cat. 34. 1813.

Leaves lanceolate, rounded or narrowed at the base, 2'-10' long; 3'-8' wide. Ontario to New Jersey, Cuba and Texas.


Herbs with creeping, ascending or floating stems, the leaves petioled, with cordate, ovate, oval or reniform blades, or grass-like. Spathes 1-flowered or several-flowered. Flowers small, white, blue or yellow. Lobes of the perianth nearly or quite equal, linear. Stamens 3, equal or unequal, inserted on the throat of the perianth. Ovary fusiform, entirely or incompletely 3-celled by the intrusion of the placenta; ovules numerous; stigma 3-lobed. Fruit an ovoid many-seeded capsule, enclosed in the withered perianth-tube. Seeds ovoid, many-ribbed. [Greek, referring to the unequal anthers of some species.]

About 9 species, 2 in tropical Africa, the others American; only the following in the United States.

*Text contributed by the late Rev. Thomas Morong.
Leaves mostly reniform, sometimes cordate-ovate.
Leaves ovate or oval, sometimes slightly cordate.
Leaves linear, grass-like, floating.

1. **Heteranthera reniformis** R. & P. Mud Plantain. (Fig. 916.)

*Heteranthera reniformis* R. & P. Fl. Per. 1: 43. 1798.


Stems creeping in the mud, rooting at the nodes. Leaves cordate or reniform, rarely cordate-ovate and acute, the blades 6'-15' long, 8'-16' wide; petioles sheathing, 1'-4' long; spathe 2-5-flowered; tube of the perianth straight or slightly curved, slender, about 4' long, its lobes shorter; flowers white or pale blue; anthers basifixed, the 2 upper oval, the other on a longer filament and linear.

In mud or shallow water, Connecticut to New Jersey, Illinois and Kansas, south to Louisiana, and in South and Central America.

2. **Heteranthera limosa** (Sw.) Willd. Smaller Mud Plantain. (Fig. 917.)

*Pontederia limosa* Sw. Prodr. 57. 1788.


Stems commonly much branched from the base, 6'-15' long. Leaves numerous, oval or ovalate, obtuse at the apex, rounded or slightly cordate at the base, 1' long or less; petioles 2'-5' long; spathe 1-flowered, often on peduncles 1' long or more; flowers white or blue, usually larger than those of the preceding species; filaments equal or nearly so; anthers linear, often sagittate.

In mud or shallow water, Virginia to Kentucky and Missouri, south to Florida, Louisiana and throughout tropical America.

3. **Heteranthera dubia** (Jacq.) MacM. Water Star-grass. (Fig. 918.)


*Heteranthera graminea* Vahl. Enum. 2: 45. 1806.

*Schollera graminea* A. Gray, Man. 511. 1848.

*Heteranthera dubia* MacM. Met. Minn. 135. 1892.

Aquatic, stem slender, forked, often rooting at the nodes, 2'-3' long. Leaves linear, flat, elongated, acutish, finely parallel-nerved, their sheaths thin, furrowed at the top with small acute stipule-like appendages; flowers light yellow, the perianth-segments narrow; stamens nearly equal; tube of the perianth 1'-1½' long; spathe 1-2-flowered; filaments dilated below; anthers linear, 2' long, sagittate; style shorter than the stamens; stigma several-lobed; capsule 3-celled with 3 parietal placentae, many-seeded.

In still water, Ontario to Oregon, south to Florida and Mexico. Also in Cuba. Occasionally occurs in a small form on muddy shores. July-Oct.
Family 17. JUNCACEAE Vent. Tabl. 2: 150. 1799.*

RUSH FAMILY.

Perennial or sometimes annual, grass-like, usually tufted herbs, commonly growing in moist places. Inflorescence usually compound or decompound, paniculate, corymbose, or umbelliform, rarely reduced to a single flower, bearing its flowers singly, or loosely clustered, or aggregated into spikes or heads. Flowers small, regular, with or without bractlets (prophylla). Perianth 6-parted, the parts glumaceous. Stamens 3 or 6, rarely 4 or 5, the anthers adnate, introrse, 2-celled, dehiscing by a slit. Pistil superior, tricarpous, 1-celled or 3-celled, with 3-many ascending anatropous ovules, and 3 filiform stigmas. Fruit a loculicidal capsule. Seeds 3-many, small, cylindric to subglobose, with loose or close seed-coat, with or without caruncular or tail-like appendages.

Seven genera and about 200 species, widely distributed.

Leaf-sheaths open; capsule 1- or 3-celled, many-seeded; placenta parietal or axial. 1. Junco.

Leaf-sheaths closed; capsule 1-celled, 3-seeded, its placenta basal. 2. Juncoidea.


Usually perennial plants, principally of swamp habitat, with glabrous herbage, stems leaf-bearing or scapose, leaf-sheaths with free margins, and leaf blades terete, gladiate, grass-like, or canneled. Inflorescence paniculate or corymbose, often unilateral, sometimes congested, bearing its flowers either singly and with 2 bractlets (prophylla), or in heads and without bractlets, but each in the axil of a bract; bractlets almost always entire; stamens 6 to 3; ovary 1-celled or by the intrusion of the placenta 3-celled, the placenta correspondingly parietal or axial; seeds several-many, usually distinctly reticulated or ribbed, often tailed.

About 150 species, most abundant in the north temperate zone. The species bloom in summer. [Latin, from junco, to bind, in allusion to the use of these plants for withes.]

A. Lowest leaf of the inflorescence terete, not conspicuously canneled, erect, appearing like a continuation of the stem, the inflorescence therefore appearing lateral; stem leaves none.

1. Flowers bracteolate, inserted singly on the branches of the inflorescence. GENUINI.

Perianth-parts green, or in age straw-colored.

Perianth-parts equalling or exceeding the capsule, all acute.

Stamens 6; leaf of the inflorescence much shorter than the stem.

Capsule without a distinct apical papilla.

Capsule with a distinct apical papilla.

Stamens 6; leaf of inflorescence about equaling the stem, or longer.

Perianth-parts reaching only the middle of the capsule, inner obtuse.

Perianth-parts with a chestnut-brown stripe down either side of the midrib.

2. Flowers not bracteolate, inserted in heads on the branches of the inflorescence. THALASSICI.

Perianth-parts pale brown; seed tailless.

Perianth-parts green, or in age straw-colored; seed tailed.

B. Lowest leaf of the inflorescence not appearing like a continuation of the stem, or if so, conspicuously canneled along the upper side, the inflorescence usually appearing terminal.

1. LEAF-BLACE TRANSVERSELY FLATTENED (INSERTED WITH ITS FLAT SURFACE FACING THE STEM), OR TERETE AND CANNELED, NOT PROVIDED WITH SEPTA.

Flowers bracteolate, inserted singly on the branches of the inflorescence, sometimes clustered or congested, but never in true heads. POTHYPHILLI.

Annual; inflorescence, exclusive of its leaves, more than one-third the height of the plant.

8. J. biflorus.

Perennial; inflorescence, excluding leaves, not one-third the height of the plant.

Leaf-blade flat, but sometimes involute in drying.

Inflorescence 1-3-flowered; leaves with fibrilate auricles.


Inflorescence, except in depauperate specimens, several-many-flowered; leaves with entire auricles.

Cauline leaves 1 or 2, rarely wanting; perianth-parts obtuse.

Cauline leaves none; perianth-parts acute or acuminate.

Inflorescence usually much exceeded by its lowest leaf; flowers seldom plainly secund; perianth 1 1/2"-2 1/2" long, usually exceeding the capsule; capsule oblong-viroid, broadly rounded at the apex, the placenta intruded half way to the axis.

11. J. latus.

Inflorescence rarely exceeded by its lowest leaf; flowers plainly secund on the branches; perianth 1 1/2"-2" long, equalling the capsule; capsule oblong, 3-sided, truncate at the apex; placenta meeting in the axis. 12. J. secundus.

Leaf-blade terete, canneled along the upper side.

Lowest leaf of inflorescence not four lengths of the panicle; capsule oblong to obviolate.

Seed tailed.

13. J. Vaseyi.

Seed not tailed.

Perianth 1 1/2"-1 1/2" long, plainly exceeded by the capsule.

14. J. Greenei.

Perianth 1 3/4"-2" long, not exceeded by the capsule.

15. J. dichotomus.

Lowest leaf of the inflorescence rarely less than four times as long as the panicle; capsule globose-ovoid.

16. J. salicinus.

*Text contributed by Mr. Frederick V. Coville.
** Flowers not bracteolate, in true heads on branches of the inflorescence. Graminifolii.

Stem erect; capsule oblong or obovoid, obtuse at the apex.

Stamens 3, with red-brown anthers; capsule not mucronate. 17. *J. marginatilis.*

Stamens 6, with yellow anthers; capsule mucronate. 18. *J. longistylis.*

Stem creeping, floating, or ascending; capsule subulate. 19. *J. repens.*

2. LEAF-BLADE NOT TRANSVERSELY FLATTENED, COMMONLY TERETE, HOLLOW, PROVIDED WITH SEPTA.

* Leaf-blade usually channelled along the upper side; septa usually imperfect, not externally evident; inflorescence of 1-4 heads; plants of arctic or alpine range. ALPINI.

Body of the seed 3/4" in length or more.

Leaf-sheath not auriculate. 20. *J. castaneus.*


Body of the seed less than 1/2" in length.

Lowest leaf of inflorescence foliaceous, erect; capsule deeply retuse at apex. 22. *J. biglumis.*

Lowest leaf of inflorescence membranous, spreading; capsule obtuse and mucronate at the apex. 23. *J. virginius.*

** Leaf-blade not channelled along the upper side (except in *J. bulbosus*), the sepal perfect (except in *J. polycophalilns*), and usually externally evident; inflorescence, except in depauperate specimens, of several to many heads; plants not of arctic-alpine range. SEPTATI.

† Stamens 6, one opposite each perianth-part.

Heads reduced to one, or rarely two flowers.

Heads 2-many-flowered.

Epidermis not roughened.

Plants with two kinds of leaves, one normal, the other basal, submersed, and capillary.

Plant low, less than 10" high. 25. *J. bulbosus.*

Plant tall, more than 10" high. 26. *J. militaris.*

Plants without submersed capillary leaves.

Capsule oblong, either abruptly acuminate or bluntly acute.

Branches widely spreading; capsule sharply acute, tapering into a conspicuous point. 27. *J. articulatus.*

Branches usually strict; capsule broadly acute, or obtuse, with a short point. 28. *J. Richardsonianus.*

Capsule subulate.

Leaf-blades erect; inner perianth-parts longer than the outer.

Leaf-blades abruptly divergent from the stem; outer perianth-parts longer than the inner. 29. *J. nodosus.*

Epidermis of the leaves roughened with minute tubercles.

Capsule less than three-fourths as long as the perianth.

Capsule more than three-fourths as long as the perianth. 30. *J. Torreyi.*

†† Stamens 3, none opposite the inner perianth-parts.

Capsule tapering evenly into a prominent subulate beak.

Leaf-blade vertically flattened and with incomplete septa, only rarely compressed and with complete septa.

Leaf-blade terete or nearly so, the sepal complete.

Uppermost cauline leaf with a well-developed blade.

Uppermost cauline leaf with a rudimentary blade rarely exceeding 1" in length. 31. *J. Caesariiunus.*

Capsule obtuse to acute at the apex, sometimes mucronate, but not prolonged into a beak.

Seed 3/4"-1/2" long.

Perianth about 1" long, the fruiting head not more than 2" high. 36. *J. brachycapillus.*

Perianth 1 1/4-2" long, or if shorter, the fruiting head 2" high or more. 37. *J. Canadensis.*

Seed 1'/-3/4" long.

Perianth and mature capsule 1'/-2" long.

Perianth 1'/-2" long, or if less the whole plant not 20" high. 38. *J. acuminatus.*

Perianth 1'/-3/4" long, the whole plant more than 20" high. 39. *J. robustus.*

Perianth and mature capsules 2'/-3" long.

35. *J. megacephalus.*

32. *J. brachycapillus.*

33. *J. polycaphalilns.*

34. *J. scirpoideus.*

31. *J. Caesariiunus.*

30. *J. Torreyi.*

29. *J. nodosus.*


27. *J. articulatus.*


25. *J. bulbosus.*

24. *J. pelocarpus.*

23. *J. virginius.*

22. *J. biglumis.*


20. *J. castaneus.*

19. *J. repens.*

** Juncus effusus L. Common Rush. Bog Rush. Soft Rush. (Fig. 919.)

*Juncus effusus* L. Sp. PL 326. 1753.

Plant 1 1/4-4" high, densely tufted, erect. Root-stock stout, branching, proliferous; stem soft, merely striate beneath the inflorescence; basal leaf-blades reduced to filiform rudiments; inflorescence many-flowered, 1'-4" high, in one form congested into a still smaller compact cluster; lowest bract of the inflorescence 2'-10" long, much shorter than the stem; perianth 1'/-1'1/2" long, its parts green, lanceolate, acuminate; stamens 3, the anthers shorter than the filaments; capsule obovoid, 3-celled, mucilaginous, regularly dehiscent; seed 1'/-1/2" in length, obliquely oblong, reticulate in about 16 longitudinal rows, the reticulations smooth and two or three times broader than long.

In swamps and moist places, nearly throughout North America, except the arid and high northern portions. Ascends to 3000 ft. in Virginia. Also in Europe and Asia.
2. Juncus conglomerat us L. Glomerate Rush. (Fig. 920.)


Plant 1°-2½° high, densely tufted, erect. Root-stock stout, with proliferous branches; stem distinctly ribbed just beneath the inflorescence; leaf-blades wanting or reduced to minute filiform rudiments; inflorescence congested, seldom more than 10'' high; lowest bract of the inflorescence 2°-6° long, much shorter than the stem; perianth 1½°-2½° long, its parts green, lanceolate, acuminate; stamens 3, about two-thirds as long as the perianth; anthers shorter than the filaments; capsule nearly as long as the perianth, obovoid, obtuse or retuse at apex, tipped with the base of the style; seed ½''-⅔'' in length, obliquely oblong, acute or abruptly apiculate at both ends, reticulate in about 16 longitudinal rows, the reticulations smooth and two or three times broader than long.

In the sphagnum bogs of Newfoundland. Resembling in appearance specimens of *J. effusus* with congested inflorescence. Also in northern Europe and Asia.

3. Juncus filiformis L. Thread Rush. (Fig. 921.)


Perennial, stems 4'-25' tall, erect, about ½'' in diameter, arising from a creeping rootstock; basal leaves reduced to bladeless sheathes; involucral leaf usually longer than the stem; inflorescence rarely with more than 20 flowers or more than 1' high, commonly with less than 8 flowers and less than 10'' high; perianth 1½°-3½° long, its parts nearly equal, green with hyaline margins, narrowly lanceolate, acute, or the inner obtuse; stamens 6, about half as long as the perianth; anthers shorter than the filaments; style very short; capsule obovoid, green, barely pointed, about three-fourths as long as the perianth, 3-celled; seed obliquely oblong, about ⅔'' long, pointed at either end, with an irregularly wrinkled coat, seldom developing reticulations.

Labrador to British Columbia, south to the mountains of Pennsylvania, to Michigan, and in the Rocky Mountains to Utah and Colorado. Also in Europe and Asia.

4. Juncus gymnocarpus Coville. Pennsylvania Rush. (Fig. 922.)


Stems erect, 1°-2½° high, about 1'' thick, arising at intervals from a creeping proliferous rootstock about 1½'' in diameter; basal leaves reduced to bladeless clasping sheathes; panicle commonly 7''-15'' high, spreading, its subtending leaf usually 4'-10' long; perianth 1'' in length or a little less, its parts with a green midrib, equal, lanceolate, the outer acute, the inner obtuse; stamens 6, nearly as long as the perianth, the anthers shorter than the filaments; capsule almost twice as long as the perianth, broadly ovoid, conspicuously mucronate, brown and shining, barely dehiscent, 3-celled; seed obliquely obovoid or oblong, somewhat misshapen by compression in the capsule, about ½'' long, none with perfect markings seen.

In swamps, mountains of Schuylkill and Lebanon counties, Pennsylvania.
5. *Juncus Bálticus* Willd. Baltic Rush. (Fig. 923.)


Stems erect, 8'–36' high, ½'–1½' thick, arising at intervals from a stout creeping rootstock 1'–1½' thick; basal leaves reduced to bladeless sheaths; panicle commonly 1'–2½' high; perianth 1½''–2¼'' long, its parts lanceolate, acute, or the inner sometimes obtuse, nearly equal, brown with a green mid-rib and hyaline margins; style ½''–1'' long; stigmas a little shorter; stamens 6, about two-thirds the length of the perianth; authors about ¾'' in length, much longer than the filaments; capsule about as long as the perianth, pale to dark brown, narrowly ovoid, conspicuously mucronate, 3-celled; seeds usually with a loose coat, nearly ½'' long, oblong to narrowly ovoid, oblique, about 40-striate.

On shores, Labrador to Alaska, southern New York, Ohio and Nebraska; far south in the western mountains. Also in Europe and Asia. Variable.

On brackish marshes, New Jersey to Texas. Long confused by American authors with the following species.

6. *Juncus Roemerianus* Scheele. *Roemer’s Rush*. (Fig. 924.)


Stems 20''–4'' tall, erect, arising singly from a tough scaly horizontal rootstock 2½''–5'' thick; inner sheaths bearing erect blades of about the same length as the stem; inflorescence 2½''–6'' high, diffusely spreading, its leaf 4''–10' long; heads 2–6-flowered; perianth pale brown, 1''–1¼'' long, the parts linear-oblong, the outer acuminate, the inner shorter and bluntly acute; flowers imperfectly dioecious; stamens 6, on fertile plants reduced to sterile staminodia; capsule brown, about as long as the perianth, narrowly ovoid, obtuse or truncate, mucronate, 3-celled; placenta very thick and spongy, about one-third as broad as the valve; seed dark brown, ¾''–1½'' long, ovoid, abruptly apiculate, indistinctly reticulate or distinctly 20–26-ribbed and the intervening spaces imperfectly cross-lined.

In brackish marshes, New Jersey to Texas. Long confused by American authors with the following species.

7. *Juncus maritimus* Lam. Sea Rush. (Fig. 925.)


Stems 20''–40'' high, 1''–2'' thick, erect from a stout horizontal rootstock. Outer basal leaves reduced to bladeless sheaths, the innermost foliose, with a long terete stout blade about equalling the stem; leaf of the inflorescence erect, sometimes 1° long, sometimes barely exceeding the panicle; panicle 3'–8' high, its branches stiff, erect; heads 2–6-flowered; perianth 1½''–1¾'' long, its parts green, lanceolate, with hyaline margins, the outer acuminate, the inner a little shorter; flowers perfect; stamens 6, two-thirds as long as the perianth; filaments about as long as the anthers; capsule 1½''–1¾'' long, narrowly ovoid, acute, mucronate, brown above, 3-celled, with thin placenta; seed brown, about ½'' long, the body narrowly and obliquely oblong, about ¾'' in length, 20–30-ribbed, indistinctly reticulate, tailed at either end.

8. Juncus bufonius L. Toad Rush. (Fig. 926.)


Plant branching from the base, annual, erect, seldom exceeding 8' in height, the stems in large plants with 1 or 2 leaves below the inflorescence; leaf-blade flat, \( \frac{5}{8}'' - \frac{3}{4}'' \) wide, in low plants often much narrower and filiform-involute; inflorescence about one-half as high as the plant, with blade-bearing leaves at the lower nodes; flowers inserted singly on its branches, in one form fasciculate; perianth-parts \( 2'' - 3\frac{1}{2}'' \) long, lanceolate, acuminate, equal; stamens usually 6, sometimes 3, seldom half as long as the perianth; anthers shorter than the filaments; capsule about two-thirds as long as the perianth; narrowly oblong, obtuse, mucronate, 3-celled; seed broadly oblong, with straight tips, \( \frac{1}{6}'' - \frac{1}{4}'' \) long, minutely reticulate in 30-40 longitudinal rows, the areolae broader than long.

A cosmopolitan species, occurring throughout North America, except the extreme north, and frequenting dried-up pools, borders of streams and roadsides in clayey soil.

9. Juncus trifidus L. Highland Rush. (Fig. 927.)


Densely tufted, 4'-12' high; stems closely set on a stout rootstock, erect, about \( \frac{3}{4}'' \) thick; basal leaves reduced to almost bladeless sheaths, the uppermost with a rudimentary blade and fimbriate auricles; stem leaf \( 1 \), inserted near the inflorescence, with a narrower slender, flat or involute blade; inflorescence a cluster of 1-3 flowers, the lowest subtending bract similar to the stem leaf, the succeeding one much smaller or wanting; perianth dark brown, \( 1\frac{1}{2}'' - 1\frac{3}{4}'' \) long; stamens 6; anthers about as long as the filaments; capsule equalling the perianth, coriaceous, 3-celled, obovate with a conspicuously mucronate-aristate top; seeds few, narrowly obovate, acute at the base, irregularly angled, minutely striate both longitudinally and transversely.

Greenland and Labrador, south on the higher mountains of New England and New York to Sam's Point, N. Y. Also in northern Europe and Asia.

10. Juncus Gerardi Lois. Black-grass. (Fig. 928.)


Tufted, 8'-28' high, with creeping rootstocks. Basal leaves with rather loosely clasping auriculate sheaths, the long blades flat, or when dry involute; 1 or 2 cauline leaves usually present, similar to the basal; inflorescence paniculate, sometimes exceeded by its lowest bract; panicle erect, strict or slightly spreading; perianth \( 1'' - 1\frac{1}{2}'' \) long, its parts oblong, obtuse, with green midrib and broad dark brown margins, straw-colored in age; stamens 6, barely exceeded by the perianth; anthers much longer than the filaments; capsule one-fourth to one-half longer than the perianth, obovate, mucronate, dark brown, shining, 3-celled; seed dark brown, obovate, acute at base, broadly obtuse and often depressed at the summit, marked by 12-16 conspicuous ribs, the intervening spaces cross-lined.

On salt meadows, Gulf of St. Lawrence to Florida; rare in western New York and the vicinity of the Great Lakes. Occurs also on the northwest coast, and in Europe.
11. *Juncus tenuis* Willd. Slender Rush. Yard Rush. (Fig. 929.)


Tufted, 8'-30' high; basal leaves with blades 3'-1/2' wide, sometimes involute in drying, about half the height of the stem; stem leaves none; inflorescence usually much exceeded by its lowest leaf, 4' high or less, the flowers rarely secund; perianth 1 1/2'-2 1/2' long, its parts lanceolate, acuminate, exceeding the capsule, widely divergent, touching the capsule for about half their length; stamens 6, about half as long as the perianth; anthers shorter than the filaments; capsule oblong to obovoid, rounded at the top, imperfectly 3-celled; seed 1/2'-3/4' long, narrowly oblong to obovoid, with oblique ends, reticulated in about 16 rows, the areolae two or three times broader than long.

In dry or moist soil, especially on paths, almost throughout North America, now migrating to all parts of the world. Variable.

12. *Juncus secundus* Beauv. Secund Rush. (Fig. 930.)


Tufted, 6'-16' high; leaves usually less than one-third the height of the plant; inflorescence longer than its lowest leaf or only slightly exceeded by it, 10'-4' high, the flowers secund on the usually somewhat incurved branches; perianth-parts 1 1/4'-1 3/4' long, equalling or barely exceeding the capsule and appressed to it for about two-thirds their length, often reddish above; stamens 6, about one-half as long as the perianth; capsule narrowly ovoid, 3-sided above the middle with straight sides and a truncate apex, completely 3-celled, the placenta meeting in the axis; seed 1/4'-1/2' long, narrowly oblong to ovoid, obliquely tipped, with 12-16 longitudinal rows of areolae two or three times broader than long.

In dry soil, New Jersey and Pennsylvania to North Carolina. Occasional in the middle Mississippi Valley.

13. *Juncus Vaseyi* Engelm. Vasey's Rush. (Fig. 931.)


Stems erect, tufted, 1'-2 3/4' high, 3/4' in diameter or less; basal leaves with minutely auriculate sheaths, the uppermost bearing a terete channeled blade half to three-fourths as long as the stem; stem leaves none; inflorescence 1 3/4' in height or less, 4-40-flowered, the lowest bract usually not exceeding the inflorescence; perianth 1 1/2'-2' long, the parts subulate-lanceolate, with hyaline margins, the inner slightly shorter; stamens 6, about two-thirds as long as the perianth; anthers shorter than the filaments; style almost wanting; stigmas short; capsule slightly exceeding the perianth, narrowly oblong, obtuse or truncate, with a short tip, 3-celled; seed long-tailed, with a linear-oblong oblique body about 1/4' long, 20-21-ribbed, the intervening spaces with faint transverse markings.

Maine and Ontario to Michigan, Illinois and Iowa.
14. Juncus Greenei Oakes & Tucker. Greene’s Rush. (Fig. 932.)


Stems erect, densely tufted, 8'-21/2' high. Basal leaves with slender terete channeled blades one-half or rarely two-thirds the length of the stem; stem leaves none, or a single one below the inflorescence; panicle 10'-20' high, rather compact, somewhat umbeloid, much exceeded by its lowest bract; perianth 11/4'-11/2' long, its parts stiff, lanceolate, sharply acute, with brownish red stripes and apex, the inner shorter; stamens 6, half to two-thirds as long as the perianth; authors about as long as the filaments; style and stigmas very short; capsule one-fourth to one-half longer than the perianth, ovate-lanceolate in outline, truncate at the summit, 3-celled; seed obliquely oblong, 1/4'-1/3' long, slightly reticulated in about 20-24 rows, the areolae nearly square.

New Brunswick to New Jersey, near the coast; Michigan, Wisconsin, Minnesota and Ontario.

15. Juncus dichotomus Ell. Forked Rush. (Fig. 933.)


Closely tufted, 1'-3' high; leaves all basal except those of the inflorescence; sheaths usually reddish, the blades terete, channeled along the upper side, about one-half the height of the stem; inflorescence paniculate, subsecund, 11/4'-33/4' high, usually exceeded by its lowest bract; perianth about 2' long, its parts subulate-lanceolate, green when young, straw-colored when old; stamens 6, about one-half as long as the perianth, the anthers shorter than the filaments; capsule slightly shorter than the perianth, oblong, obtuse, mucronate, 1-celled, the placentae intruded half way to the center; seed oblong, dark brown, obliquely apiculate, less than 1/4' long, reticulate in about 14 longitudinal rows, the smooth areolae about as long as broad.

In dry soil, Maine to Florida and Texas, near the coast.

16. Juncus setaceus Rostk. Awl-leaved Rush. (Fig. 934.)


Densely tufted from stout branching rootstocks. Stems terete, spreading and recurved above, 11/2'-3' long; leaves all basal except those of the inflorescence, the uppermost sheath usually bearing a long terete blade similar to the stem, but channeled; the other sheaths with filiform blades less than 1/2' in length; involucral leaf appearing like a continuation of the stem, 4'-10' long; inflorescence appearing lateral, 2' long or less; perianth 1/4'-21/2' long, its parts lanceolate, acuminate, rigid, widely divergent in fruit; stamens 6; anthers usually longer than the filaments; capsule globose, shining, mucronate, 1-celled, with intruded placentae, barely dehiscent; seed subglobose, 1/4'-1/3' long, reticulate in about 12 longitudinal rows, the areolae large.

In marshes, Delaware to Florida and Texas, near the coast, extending north in the Mississippi Valley to Missouri.
17. **Juncus marginatus** Rostk. Grass-leaved Rush. (Fig. 935.)


Stems erect, tufted, 6'-30' high from branching rootstocks, somewhat bulbous at the base, compressed, 2-4-leaved. Leaf-sheaths auriculate; blades 3'/'-1'/2' wide, 2-4 conspicuous veins in addition to the mid-rib; inflorescence 4' high or less, the panicle composed of 2-20 turbinate to subspherical 5-10-flowered heads; perianth 1'/2'-1'/2' long, the outer parts ovate, acute, the inner slightly longer, obovate, obtuse, with hyaline margins; stamens 3, nearly as long as the perianth; anthers ovate, reddish brown when dry, much shorter than the filaments; capsule equaling the perianth, obovoid, truncate or retuse, almost 3-celled, the placenta deeply intruded; seed oblong, 1'/2'-2' long, pointed at either end, 12-16-ribbed.

Grassy places, Maine to Ontario, Florida and Nebraska.

18. **Juncus longistylis** Torr. Long-styled Rush. (Fig. 936.)


Stems erect, loosely tufted, 8'-30' high, rather stiff, slender, compressed, 1-3-leaved, the leaves mostly below the middle. Leaf blades 3'/4'-1'/2' wide, acute, striate, the midrib well defined; inflorescence 2' high or less, usually of 2-10 irregular 3-8-flowered heads, or reduced to a single larger one; perianth 2'/2'-3' long, the parts equal, brown, lanceolate, acuminate, with hyaline margins; stamens 6, half to two-thirds as long as the perianth, the yellow linear anthers longer than the filaments; style about 1'/2' long; stigmas 1'/2'-1'/2' long; capsule shorter than the perianth, oblong, brown, angled above, obtuse or depressed at the summit, mucronate, 3-celled; seed oblong, white-tipped, about 1'/2' long, 14-20-ribbed.

Western Nebraska and the Rocky Mountain region.

19. **Juncus repens** Michx. Creeping Rush. (Fig. 937.)


Perennial by prostrate rooting branches; stems tufted, compressed, ascending, floating or prostrate, 2'-20' long. Leaves with compressed sheaths 10' in length, auriculate, the blades 1'-3'/4' long, 1'/2'-1' broad, filiform-acuminate; inflorescence of 1-8 heads, one or more heads often occurring also at the lower nodes; heads 5-10-flowered; flowers 3'-5' long, the outermost slightly recurved; perianth-parts subulate-lanceolate, the outer keeled, about one-third shorter than the inner; stamens 3, half to one third the length of the perianth; filaments longer than the yellow anthers; capsule subulate, beakless, about as long as the outer perianth-parts, 3-celled, the valves membranous, breaking away from the axis in dehiscence; seed oblong, acute at either end, 1'/2'-1' long, finely reticulate in 25-40 longitudinal rows.

In swamps and streams, Delaware to Florida, Cuba and Texas, and in Lower California.
20. **Juncus castaneus** Smith. Chestnut Rush. Clustered Alpine Rush. (Fig. 938.)


Stems erect, 4'-20' high, terete, leafless, or with a single leaf, arising singly from a slender rootstock. Basal leaves 3-5, the outer sheaths short, loose, the inner clasping, sometimes 4' long, not auriculate, their blades tapering from an involute-tubular base to a slender channeled acanthus apex; inflorescence strict, usually exceeded by its lowest bract, the other bracts membranous and mostly equaling the flowers; heads 1-3, 3-12-flowered; pedicels ½''-1¼'' long; perianth brown or black, 2''-3½'' long, its parts lanceolate, acute; stamens nearly as long as the perianth; anthers about ½'' long; capsule brown, paler toward the base, 1½-2 times as long as the perianth, narrowly oblong, tapering to an acute summit, imperfectly 3-celled; seed 1¼''-2'' long, contracted into long slender tails, the body about ½'' long.

Newfoundland to Alaska, south along the Rocky Mountains to Colorado. In Europe and Asia.

21. **Juncus stygius** L. Moor Rush. (Fig. 939.)


Rootstock none; stems 3''-10'' high, single, or few together, erect, 1-3-leaved below, leafless above; leaf-sheaths 5''-10'' long, clasping, nerved, auriculate; blades erect or nearly so, 10''-4'' long, slightly compressed, channeled on the upper side, tapering to a blunt point; inflorescence of 1-4 heads; heads 1-4-flowered; lowest bract usually exceeding the flowers; perianth 1½''-2½'' long, pale, its parts lanceolate, 3-nerved, equal, with membranous margins, obtuse or acute; stamens half as long as the perianth or more; anthers oblong, shorter than the filaments; capsule 3''-4'' long, pale brown, spindle-shaped, acute, mucronate, 3-celled below, few-seeded; seed spindle-shaped, 1½''-1½'' long, with a loose coat, the body about ½'' long, narrowed into thick tails.

Newfoundland to Maine, northern New York, Michigan and Minnesota; also in British Columbia and Europe.

22. **Juncus biglumis** L. Two-flowered Rush. (Fig. 940.)


Stems 1'-8' high, loosely tufted on a branched rootstock, erect, nearly terete. Leaves 1-5, all basal, the outermost sheath usually 4'' long or less, the innermost sometimes much longer, inconspicuously or not at all auriculate, the blades nearly terete; inflorescence a capitate cluster of 1-4 flowers, its lowest bract erect, folioid, green with brown membranous margins below; perianth 1½''-1¾'' long, dark brown, its parts membranous, oblong, obtuse, nearly equal; stamens equaling the perianth; anthers linear-oblong; capsule longer than the perianth, cylindric-oblong, 3-sided, retuse at the summit, with 3 keeled shoulders, purplish black, or with purple-margined valves, imperfectly 3-celled; seed ½''-3'' long, fusiform, the body narrowed into short stout tails.

Baffin Bay to Alaska and British Columbia. Also in Europe and Asia.
23. *Juncus triglumis* L. Three-flowered Rush. (Fig. 941.)


Stems 3'-7' high, loosely tufted on a branched rootstock, erect, terete. Leaves 1-5, all basal, with sheaths clasping and conspicuously auriculate, the blades subterete, blunt, 1/4" in diameter, usually less than half the height of the plant; inflorescence a capitate cluster of 1-5 (usually 3) flowers, the lowest 2 or 3 bracts nearly equal, divergent, about as long as the flowers, usually brown, obtuse and membranous; perianth 1-1/2'-2' long, its parts oblong-lanceolate, obtuse; stamens nearly as long as the perianth; anthers linear, short; capsule about equaling the perianth, oblong, obtuse, mucronate, 3-angled, imperfectly 3-celled; seed about 1' long, its body oblong, abruptly contracted into long slender tails.

Labrador and Newfoundland to Alaska, south in the Rocky Mountains to Colorado. Also in Europe and Asia.

24. *Juncus pelocarpus* E. Meyer. Brownish-fruited Rush. (Fig. 942.)


Rootstock slender; stems 3'-20' high, 1-5-leaved; basal leaves 2-4, with loose auriculate sheaths, mostly with slender terete blades seldom exceeding 5' in length; stem leaves 1-5, similar to the basal; inflorescence 4' in height or less; secondary panicles rarely produced from the axils of the upper leaves; panicle loose, with distant heads of 1 or sometimes 2 flowers; perianth 1-1/2'-1 1/2' long, the parts linear-oblong, green to reddish-green, obtuse or the inner sometimes acute, the outer usually the shorter, all of them frequently modified into rudimentary leaves; stamens 6, about two-thirds as long as the perianth; anthers slightly exceeding the filaments; style commonly 1/2" and stigmas 1" long; capsule subulate-linear, its slender beak exceeding the perianth, 1-celled; seed oblong to ovoid, 1/4'-1/2" long, reticulate in about 24 rows, the areolae smooth.

Newfoundland to New Jersey and Minnesota.


*Juncus subtilis* E. Meyer, Syn. Luz. 31. 1823.

Much smaller, depressed, 1-few-flowered. Northern Maine and adjacent Canada.

25. *Juncus bulbosus* L. Bulbous Rush. (Fig. 943.)


Tufted, 2'-8' high; stems erect, or procumbent and rooting at the joints, usually bulbous. Leaves of two kinds, the basal mostly submersed, filiform, the cauline stouter, all with auriculate sheaths to 1' long or less. The septa of the blades inconspicuous; panicle of 1-10 heads; heads top-shaped to hemispheric, 4-15-flowered, some of the flowers often transformed into tufts of small leaves; perianth 1'-1 1/2'-2' long, its parts nearly equal, linear-lanceolate, obtuse, brown, or with a green midrib; stamens 3, shorter than the perianth; anthers a little shorter than the filaments; capsule narrowly oblong, obtuse, mucronate, slightly exceeding the perianth, brown above, 1-celled; seed narrowly oblong, about 1/4" long, acute at base, obtuse and apiculate above, 25-30-ribbed.

Labrador and Newfoundland. Common in Europe.
26. Juncus militaris Bigel. Bayonet Rush. (Fig. 944.)
Juncus militaris Bigel. PI. Rost. 1d. 2, 139. 1824.
Stems 20°-4° high, erect, stout, 1 1/2°-3° thick below, arising from a stout rootstock. Leaves of two kinds, the submersed borne in dense fascicles on the rootstock and developing filiform, nodose blades sometimes 20° long; basal leaves reduced to loose bladeless sheaths, sometimes 10° long; stem leaves 1 or 2, the lower with a long stout terete blade 1°-2° thick at the base, the upper, when present, reduced to a bladeless sheath; inflorescence 3°-6° high, its bracts with obsolete blades; heads top-shaped to semiglobose, 6-12-flowered; perianth 1 1/2°-1 1/4° long, its parts narrowly linear-subulate, the inner longer than the outer; stamens 6, nearly as long; anthers slightly exceeding the filaments; capsule ovoid, acuminate, beaked, 1-celled, few-seeded, about equalling perianth; seed obovoid, about 1/4° long, reticulated in about 24 rows. Shallow margins of lakes, ponds or streams, Nova Scotia to northern New York and Maryland.

27. Juncus articulatus L. Jointed Rush. (Fig. 945.)
Juncus articulatus L. Sp. PI. 327. 1753.
Rootstock branching; stems erect or ascending, 8°-2° high, tufted, somewhat compressed, 2-4-leaved; basal blade-bearing leaves only 1 or 2, usually dying early; stem leaves with rather loose sheaths and conspicuously separtate blades; inflorescence rarely exceeding 4° in height, its bracts spreading; heads hemispheric to top-shaped, 6-12-flowered; perianth 1°-1 1/2° long, the parts nearly equal, lanceolate, acuminate, reddish brown with a green midrib or green throughout; stamens 6, one-half to three-fourths as long as the perianth; anthers shorter than the filaments; capsule longer than the perianth, brown, 3-angled, sharply acute, tapering into a conspicuous tip, 1-celled; seed obovate-obovoid, about 1/4° long, reticulated in about 16-20 rows, the areolae finely cross-lined. Labrador to Massachusetts, New York, Michigan and British Columbia. Also in Europe and Asia. On ballast ground about Philadelphia and Camden a form occurs with obtuse perianth-parts and broadly acute capsules, apparently introduced.

28. Juncus Richardsonianus Schult. Richardson's Rush. (Fig. 946.)
J. Richardsonianus Schult. in R. & S. Syst. 7: 201. 1829.
Juncus alpinus var. insignis Fries; Engelm. Trans. St. Louis Acad. 2: 458. 1866.
Stems erect, 6°-20° high in loose tufts, from creeping rootstocks, 1-2-leaved; stem leaf or leaves usually borne below the middle; panicle 2°-8° high, sparse, its branches strict or slightly spreading; heads 3-12-flowered; perianth 1°-1 1/4° long, the inner parts shorter than the outer, obtuse, usually purplish toward the apex, the three outer paler, obtuse, mucronate or acute; stamens 6, half to two-thirds as long as the perianth; anthers much shorter than the filaments; capsule ovoid-oblong, slightly exceeding the perianth, straw-color or brown, broadly acute or obtuse, with a short tip; seed about 1/4° in length, narrowly obovoid to oblong, apiculate, acute or acuminate at the base, lightly reticulate in about 20 rows, the areolae finely cross-lined. Nova Scotia to British Columbia, south to Pennsylvania, Nebraska and Washington.
29. Juncus nodosus L. Knotted Rush. (Fig. 947.)


Stems 6'-2" high, erect, arising singly from tuber-like thickenings of a slender, nearly scaleless rootstock; stem leaves 2-4, and like the basal ones with long erect blades, the upper overtopping the inflorescence; panicle shorter than its lowest bract, seldom exceeding 2½', bearing 1-30 heads; heads spherical, several-many-flowered, 3½"-6" in diameter; perianth 1½'-1½" long, its parts lanceolate-subulate, usually reddish brown above, the inner longer than the outer; stamens 6, about one-half as long as the perianth; anthers equaling the filaments; capsule lanceolate-subulate, 3-sided, 1-celled, exceeding the perianth; seed oblong, acute below, apiculate above, rarely more than ½" long, reticulate in 20-30 rows, the areolae finely cross-lined.

Nova Scotia to Virginia, Nebraska and British Columbia. Also in Nevada.

30. Juncus Torreyi Coville. Torrey's Rush. (Fig. 948.)


Stems 8'-40' high; rootstock slender, with tuber-form thickenings at intervals of a few centimeters, each supporting a single stem; stem stout, 1-4-icaved; blade stout, terete, 5'-1' thick, abruptly divergent from the stem; inflorescence congested, consisting of 1-20 heads, exceeded by its lowest bract; heads 5'-8" in diameter; perianth 2½'-2½" long, its parts subulate, the outer longer than the inner; stamens 6, about half as long as the perianth; capsule subulate, 3-sided, 1-celled, its beak ½"-¾" long, exceeding the perianth and holding the valves together throughout dehiscence; seed ¾"-¾" in length, oblong, acute at both ends, reticulate in about 20 longitudinal rows, the areolae finely cross-lined.

Western New York to Texas and the Pacific Coast.

31. Juncus Caesariensis Coville. New Jersey Rush. (Fig. 949.)


Stems 20'-40' high, stout, erect, 1¼" in thickness, slightly roughened; basal leaves few, the uppermost, like the cauline, with inconspicuously articulate sheaths and long erect terete roughened blades; inflorescence 1'-4' high, with spreading branches, its lowest bract with a small blade sometimes 1½" long; heads 2-5-flowered; perianth 2½'-2½" long, the parts lanceolate-acuminate, stiff, green, striate, the inner longer than the outer; stamens 6, about half as long as the perianth; filaments about equalling the anthers; style and stigmas long; capsule lanceolate-oblong, 3-sided, mucronate-acuminate, incompletely 3-celled; seed tailed at both ends, altogether about ½" long, the body about ¾" long, closely striate, almost devoid of transverse lines.

Sandy swamps of southern New Jersey.
32. Juncus brachycarpus Engelm. Short-fruited Rush. (Fig. 950.)


Rootstocks bearing 1–6 stems; stems erect, 8′–36′ high, terete, 1–4-leaved; blades terete, 1′ thick or less, seldom exceeding 6′ in length, the upper much shorter; inflorescence sometimes 4′ high and with 20 spherical heads, or smaller and even reduced to a single head; perianth 1½′–2′ long, its parts subulate, the inner about three-fourths as long as the outer; stamens 3, about half as long as the perianth; capsule one-half to two-thirds as long as the perianth, oblong, acute, mucronate, 1-celled, dehiscent through the tip; seed oblong, acute at both ends, about ½′ long, reticulate in about 16 longitudinal rows, the areolae smooth and nearly square.

Southern Ontario, through the Mississippi Valley to Oklahoma, Texas and Mississippi; also from North Carolina to Maryland.

33. Juncus polycephalus Michx. Many-headed Rush. (Fig. 951.)


Stem stout, about 3′ high, compressed, 2–4-leaved. Leaves 20′ in length or less, the upper shorter; blades vertically flattened, 1½′–4′ broad, the septa incomplete, or the blades rarely narrower, merely compressed, and with complete septa; inflorescence 3½′–12′ high, its leaves with nearly obsolete blades; heads globose, 3½′–5′ in diameter; perianth 1½′–2′ long, its parts subulate; stamens 3, one-half to three-fourths as long as the perianth; anthers shorter than the filaments; capsule subulate, 1-celled, exceeding the perianth, the valves remaining united by the slender beak, their margins finally involute; seed narrowly oblong, about ½′ long, acute at each end, with nearly straight tips, reticulate in about 12 rows, the areolae smooth.

In swamps, Virginia to Florida and Texas.

34. Juncus scirpoideus Lam. Scirpus-like Rush. (Fig. 952.)


Juncus scirpoideus var. macrostemon Engelm. Trans. St. Louis Acad. 2: 467. 1868.

Stems 8′–3′ high, erect, terete, in clusters from short, horizontal rootstocks. Stem leaves 1–3; blades terete, 1′ thick or less, usually less than 4′ long, the septa perfect; basal leaves similar, but with longer blades; inflorescence strict or slightly spreading, sometimes 6′ in length; heads 2–30, either simple, globose, 3′–4′ in diameter in flower, and 4′–5½′ in fruit, or lobed, and of slightly greater diameter; perianth 1½′–1¾′ long, its parts subulate, the inner somewhat shorter; stamens equalling the inner perianth-parts, the short anthers exserted at the mouth of the perianth; capsule subulate, 1-celled, its long beak exceeding the perianth; seed oblong, abruptly apiculate at either end, ¾′–¾′ long, reticulate in 14–20 longitudinal rows, the areolae smooth.

New York to Florida and Louisiana.
35. Juncus megacephalus

M. A. Curtis. Carolina Rush. (Fig. 953.)


Stems 1°-3° high, tufted from a branching root-stock, stout, 2-3-leaved. Leaves with auricled sheaths, the blades of the basal 8' long or less, those of the stem with successively shorter blades, the uppermost rarely 10'' in length; inflorescence 6' high or less, its lowest leaf almost bladeless, the others scarious; panicle of 1-40 heads; heads spherical, 4'-6' in diameter; perianth 1½'-1¾' long, its parts subulate, the outer longer than the inner; stamens 3, half to two-thirds the length of the inner perianth-parts; anthers included, shorter than the filaments; capsule subulate, beaked, equalling the perianth, 3-sided, 1-celled; seed oblong, ½'-¾' long, acute at either end, reticulate in 12-14 rows, the areolae smooth.

Virginia? North Carolina to Florida.

36. Juncus brachycéphalus (Engelm.) Buch. Small-headed Rush. (Fig. 954.)


Stems 1°-2½° high, tufted from a branching root-stock, erect or occasionally reclining and rooting at the nodes, 2-4-leaved; leaves all with well developed blades, the lower commonly 4'-8' long; inflorescence commonly 2½'-6' high, with spreading branches, its lowest bract foliaceous; heads top-shaped, 2-5-flowered; perianth 1½'-1¾' long, its parts green, or reddish brown above, with hyaline margins, lanceolate, obtuse or sometimes acute, the outer shorter than the inner; stamens 3; anthers much shorter than the filaments; capsule reddish brown, about one-half longer than the perianth, ovoid-oblong, acute to obtuse, tipped, 3-sided, 1-celled; seed ½'-¾' long, with narrowly oblong body, short-tailed at either end, 20-30 ribbed, somewhat cross-barred, the intervening spaces finely cross-lined.


37. Juncus Canadensis J. Gay. Canada Rush. (Fig. 955.)

*J. Canadensis* J. Gay; Laharpe, Monog. Jone. 134. 1825.


Stems 1°-4° high, erect, stout, 2-4-leaved, few in a tuft, from a branched rootstock. Basal leaves usually decayed at flowering-time; stem leaves with large loose auricled sheaths commonly 2'-4' long, and a stout erect blade usually 4'-10' long; panicle 3'-10' in height, the branches moderately spreading; heads usually crowded, top-shaped to hemispheric or sub-spheric, 5-40-flowered; perianth 1½'-2' long, the parts narrowly lanceolate, acute, the inner longer than the outer; stamens 3, one-half to two-thirds as long as the perianth, anthers much shorter than the filaments; capsule lanceolate, acute, mucronate, 3-sided, 1-celled, reddish-brown, exceeding the perianth by ½'' or less; seed ½'' to nearly 1'' long, tailed at either end, the body with a smooth shining coat, about 40-striate.

New Brunswick to Minnesota, Georgia and Louisiana.
RUSH FAMILY.


Stems 1½'-3° high, slender, frequently weak and reclining; heads few, scattered; seed with very short tails. Rhode Island to Pennsylvania and Georgia.

Juncus Canadensis brevicaudatus Engelm. Trans. St. Louis Acad. 2: 146. 1866.


38. Juncus acuminatus Michx. Sharp-fruited Rush. (Fig. 956.)

Plant 10'-3° high; rootstock short and inconspicuous. Stems few or several in a tuft, erect, 1-3-leaved; blades of the lower leaves 4'-8' long, \( \frac{1}{2}''-1'' \) thick, the upper shorter; inflorescence 2'-6' high, and with 5-50 heads, rarely larger, or reduced to a single head, its branches usually spreading; heads top-shaped, hemispheric or subspheric, 3-20-flowered; perianth 1½''-1½'' long, its parts lanceolate-subulate, nearly equal; stamens 3, about one-half as long as the perianth; anthers shorter than the filaments; capsule ovate-lanceolate, broadly acute, mucronate, 1-celled, equalling the perianth, light brown at maturity, the valves separating through the apex; seed oblong, about \( \frac{1}{4}'' \) in length, tipped at either end, reticulate in 16-20 longitudinal rows, the areolae transversely many-lined.

Maine to southern Ontario and Minnesota, south to Georgia and Mexico. Also on the northwest coast. Heads often prolificous.


Juncus debilis A. Gray, Man. 506. 1848.

Smaller, densely tufted, 10'-20' high, the stems often weak and procumbent; perianth shorter, 1½''-1½'' long; capsule linear-oblong, obtuse, about one-third longer than the perianth, short-tipped. New Jersey to South Carolina.

39. Juncus robustus (Engelm.) Coville. Stout Rush. (Fig. 957.)

Juncus acuminatus var. robustus Engelm. Trans. St. Louis Acad. 2: 463. 1868.

Plant about 3° high. Stems single or few in a tuft, stout, nearly terete, commonly 1½''-2'' thick below, 1-2-leaved; blades erect, terete, conspicuously many-septate, 8'-2° long, 1½''-1½'' thick, usually reaching or exceeding the inflorescence; inflorescence 4'-10' high, with moderately spreading branches and innumerable (commonly 300-500) heads, the blade of its lowest leaf sometimes half as long as the inflorescence; heads 2-10-flowered; perianth 1½''-1½'' long, its parts nearly equal, lanceolate-subulate; stamens 3, one-half to two-thirds as long as the perianth; capsule equalling or one-third exceeding the perianth, straw-colored at maturity, narrowly to broadly oblong, obtuse with a short tip, 3-sided when dry, 1-celled, the valves separate and involute after dehiscence; seed nearly as in J. acuminatus.

Southern Illinois to southeastern Kansas, Oklahoma, Louisiana and Texas.
40. Juncus diffusissimus

Buckley. Diffuse Rush. (Fig. 958.)


Plant 1°-2° high. Stems few in a tuft, from a short-branched inconspicuous rootstock, erect, slender, terete or slightly compressed, 2-4-leaved; blades 4'-8' long, 1/2'-3/4' thick; inflorescence diffusely branched, widely spreading, 4'-5' high and broad, its lowest bract with a blade either obsolete or sometimes nearly as long as the panicle; heads 3-12-flowered; perianth 1 1/4'-1 3/4' long, its parts subulate, equal; stamens half to two-thirds as long as the perianth; anthers shorter than the filaments; capsule narrowly linear-lanceolate in outline, 2'-2 1/2' long, acute to obtuse at the apex, with a short tip, 3-sided, light brown, 1-celled; seed oblong to obovoid, 1/2'-1'/ long, acute at the base, abruptly tipped, reticulate in about 16 rows, finely cross-lined.

Southeastern Kansas to Mississippi and Texas.

2. JUNCOIDES

Adans. Fam. Pl. 2: 47. 1763.

[**Luzula** DC. Pl. Fr. 3: 158. 1805.]

Perennial plants, with herbage either glabrous or sparingly webbed, stems leaf-bearing, leaf-sheaths with united margins, and leaf-blades grass-like. Inflorescence umbelloid, paniculate, or corymbose, often congested; flowers always bracteolate, the bractlets usually lacerate or denticulate; stamens 6 in our species; ovary 1-celled, its 3 ovules with basal insertion; seeds 3, indistinctly reticulate, sometimes carunculate at base or apex, but not distinctly tailed. [Greek, meaning like *Juncus*.

About 40 species, widely distributed, mostly flowering in spring.

Inflorescence umbelloid, 1 or 2 flowers on each of its branches.

Inflorescence theoretically paniculate, the flowers often crowded in spike-like clusters.

Outer perianth-parts shorter than the inner; introduced species.

Perianth-parts equal or nearly so: native species.

Flowers 1-3 together, on the branches of an open panicle.

Flowers crowded into one or more thick spikes or spike-like clusters.

Inflorescence nodding.

Inflorescence erect or spreading, or its individual branches rarely nodding.

Inflorescence of 1-3 spike-like or capitate flower-clusters, or the leaf-blades sharply pointed.

Inflorescence crowded into a single cluster; leaves flat, usually with a blunt apex.

Inflorescence in 1-4 clusters; leaves narrowed above, involute-channeled, apex very sharp.

Inflorescence of 2-12 spike-like or capitate clusters; leaf-blades with blunt points.

1. Juncoïdes pilosum (L.) Kuntze. Hairy Wood-rush. (Fig. 959.)


Tufted, often somewhat stoloniferous. Stems erect, 2-4-leaved, 1/2°-1° high; leaf-blades 1 1/2'-'4' wide, flat, slightly webbed, especially when young, acuminate into a blunt almost gland-like point; stem leaves with similar but successively shorter blades; inflorescence an umbelliform flower-cluster, with a bract 5'-12' high, the filiform pedicels equal or nearly so, 1-flowered or sometimes 2-flowered; perianth 1 1/4'-1 1/2' long, its parts triangular-ovate, acuminate, brown with hyaline margins, about twice as long as the toothed bractlets; capsule about one-fourth exceeding the perianth, its valves ovate, acuminate; seed about 1/2' long, its body about 1' in length, provided at the summit with a conspicuous hooked caruncle.

New Brunswick to Alaska, south to New York, Michigan and Oregon, and in the Alleghanies to North Carolina. Also in Europe and Asia.
2. Juncoïdes nemorosum (Poll.) Kuntze. Forest Wood-rush. (Fig. 960.)


Loosely tufted or somewhat stoloniferous. Stems slender, \(10^\circ-30^\circ\) high, 1-6-leaved below the inflorescence; leaf-blades \(1\frac{1}{2}''-3''\) wide, ciliate, flat, tapering to a slender sharp tip; inflorescence diffusely paniculate or corymbose, the few lower bracts foliaceous, and the lowermost branch often inserted \(\frac{4}{2}\) below the next or more; flowers in clusters of 3-8, the bractlets ovate, entire or sparingly denticulate above, about one-third as long as the perianth; perianth about \(1\frac{2}{2}''\) in length, its parts from reddish brown with pale margins to dirty white throughout, ovate-lanceolate, acute, the outer about one-fifth shorter than the inner; capsule ovoid, acuminate, rarely equalling the perianth; seed obliquely ovoid about \(\frac{3}{2}''\) long.

A European species, naturalized at Riverdale, N. Y.

3. Juncoïdes parviflorum (Ehrh.) Coville. Small-flowered Wood-rush. (Fig. 961.)

Juncus parviflorus Ehrh. Beitr. 6: 130. 1791.

Stems single or few in a tuft, stoloniferous, erect, \(10^\circ-30^\circ\) high, 2-5-leaved; leaves glabrous, their blades \(1\frac{1}{2}''-5''\) wide, tapering to a sharp or blunt apex; inflorescence a nodding decompound panicle, commonly \(1\frac{1}{2}''-4''\) high, its lowest bracts foliaceous, seldom more than one-fourth the length of the panicle; flowers borne singly, or sometimes 2 or 3 together, on the branches of the inflorescence, on slender pedicels; bractlets ovate, entire or rarely somewhat lacerate, perianth \(\frac{3}{2}''-1\frac{1}{2}''\) in length, its parts ovate, acuminate, slightly exceeded by the green to brown ovoid capsule; seed narrowly oblong, \(\frac{3}{4}''-\frac{3}{2}''\) in length, attached to its placenta by slender implexed fibers.

Labrador to British Columbia, New Hampshire, New York and Minnesota; in the mountains to Arizona and California. Also in Europe and Asia.

4. Juncoïdes spicatum (L.) Kuntze. Spiked Wood-rush. (Fig. 962.)


Luzula spicata DC. Fl. Fr. 3: 161. 1805.

Closely tufted, without rootstocks. Stems erect, \(4'-16'\) high, distantly 1-3-leaved, tapering to a filiform summit; leaf-blades \(\frac{1}{2}''-1\frac{1}{2}''\) broad, often involute, especially above, tapering to a sharp apex, sparingly webby, especially at the base; inflorescence a nodding spike-like, often interrupted panicle, commonly \(\frac{1}{2}''-1''\) in length, usually exceeded by its lowest involute-foiliaceous bract; bractlets ovate-lanceolate, acuminate, equalling the perianth, sparingly lacerate; perianth brown, with hyaline margins, \(\frac{1}{2}''-1\frac{1}{2}''\) long, its parts lanceolate, aristate-acuminate; capsule broadly ovoid, bluntly acute, about two-thirds as long as the perianth; seed narrowly and obliquely ovoid, about \(1\frac{1}{2}''\) long.

Labrador to Alaska, mountains of New England, Colorado and California. Also in Europe and Asia.
5. **Juncoides nivale** (Laest.) Coville. Arctic Wood-rush. (Fig. 963.)


Luzula arctica Blytt, Norg. Fl. 1: 299. 1861.

Stems tufted, 2'-4' high, erect, 1 or 2-leaved. Leaves with sheaths glabrous at the mouth, their blades 1'-2'' broad, seldom exceeding 1 1/2'' in length, very minutely roughened on the back, at least toward the apex, flat and tapering to a usually blunt and callous tip; inflorescence an erect oblong to ovate, spike-like cluster, 1/2'' in height or less, exceeding its lowest semifoliaceous bract; bractlet and perianth dark purple, the former ovate and sparingly lacerate at the hyaline apex; perianth-parts 1'/2'-1'' in length, narrowly oblong, more or less broadly acute at the paler apex, sometimes denticulate above; capsule subspherical, obtuse or broadly acute, exceeding the perianth; seed narrowly oblong, about 1/2'' long.

Baffin Bay to Alaska. Also in arctic and alpine Europe and Asia.

6. **Juncoides hyperboreum** (R. Br.) Sheldon. Northern Wood-rush. (Fig. 964.)


**Juncoides hyperboreum** Sheldon, Bull. Geol. Surv. Minn. 9: 63. 1894.

Stems tufted, commonly 4'-8' high, erect, 1-2-leaved above the base. Leaves with sheaths sparingly ciliate at the mouth, their blades erect, 1/2''-1 1/2'' wide at the base, commonly 2 1/2'-7' long, usually involute in age, not roughened on the back, tapering into a very sharp point; inflorescence erect, exceeding its lowest foliose bract, consisting of a single oblong cluster 1/2'' in length or less, or its one or two lower divisions on peduncles 1/2''-1 1/2'' long; bracts and bractlets membranous, fimbriate; perianth-parts brown, paler above, about 1 1/4'' long, ovate-lanceolate, acuminate, denticulate, or slightly lacerate at the apex; capsule about three-fourths as long as the perianth, ovoid, obtuse; seed rather narrowly oblong, about 1/2'' long.

Arctic America, Labrador and the higher mountains of New England. Europe and Asia.

7. **Juncoides campesstris** (L.) Kuntze. Common Wood-rush. (Fig. 965.)


**Juncoides campesstris** DC. Fl. Fr. 3: 161. 1805.


Stems densely tufted, erect, 4'-20' high, 2-4-leaved. Leaf-blades flat, 1''-3 1/2'' broad, tapering at the apex to a blunt almost gland-like point, sparingly webbed when young; inflorescence umbeloid; lower bracts foliose, the lowest often exceeding the inflorescence, its several branches straight, unequal, each bearing an oblong to short-cylindric dense spike; floral bracts ovate, acuminate; bractlets similar but smaller, fimbriate at the apex; perianth 1''-1 1/2'' long, brown, its parts lanceolate-ovate, acuminate; capsule obovoid or broadly oblong; seed with an oblong body about 1/2'' in length, supported on a narrower white loosely cellular, strophiole-like base about one-half as long.

In woodlands, almost throughout the United States and British America. Also in Europe and Asia. Variable. One of our earliest flowering plants.
BUNCH-FLOWER FAMILY.


BUNCH-FLOWER FAMILY.

Leafy-stemmed herbs (some exotic genera scapose), with rootstocks or rarely with bulbs, the leaves broad or grass-like, parallel-veined, the veins often connected by transverse veinlets. Flowers perfect, polygamnous, or dioecious, regular, racemose, panicked or solitary. Perianth of 6 separate or nearly separate, usually persistent segments. Stamens 6, borne on the bases of the perianth-segments. Anthers small, 2-celled, oblong or ovate, or confluently 1-celled and cordate or reniform, mostly versatile and extrorsely dehiscent (in Tofieldia and Abama). Ovary 3-celled, superior or rarely partly inferior; ovules few or numerous in each cavity, anatropous or amphitropous. Styles 3, distinct, or more or less united. Fruit a capsule with septicidal dehiscence (loculicidal in Abama and Uvularia). Seeds commonly tailed or appendaged. Embryo small, in usually copious endosperm.

About 36 genera and 140 species, widely distributed. Flowers numerous in terminal erect racemes or panicles.

Anthers oblong or ovate, 2-celled.

Anthers introrsely dehiscent.

Capsule septicid-al; flowers involucrate by 3 bractlets.

Capsule loculicidal; flowers not involucrate.

Anthers extrorsely dehiscent.

Flowers perfect.

Leaves basal, oblanceolate; seeds numerous.

Stem very leafy; leaves linear; seeds few.

Flowers dioecious: stem leafy.

Anthers cordate or reniform, confluently 1-celled.

Stems glabrous.

Perianth-segments not gland-bearing.

Flowers perfect; perianth-segments obtrorse.

Flowers polygamnous; perianth-segments acuminate.

Perianth-segments bearing 1 or 2 glands, or a spot.

Stem and inflorescence pubescent.

Perianth-segments clawed, free from the ovary.

Perianth-segments not clawed, adnate to the base of the ovary.

Flowers solitary, terminal or opposite the leaves, drooping.


Perennial herbs, with short erect or horizontal rootstocks, fibrous roots, slender erect stems leafless above or nearly so, linear somewhat 2-ranked and equitant leaves clustered at the base, and small perfect white or green flowers in a terminal raceme. Pedicles bracted at the base, solitary or clustered. Flowers usually involucrate by 3 scariosus somewhat united bractlets below the calyx. Perianth-segments oblong or obovate, subequal, persistent, glandless. Stamens 6; filaments filiform; anthers ovate, sometimes cordate, introrse. Ovary sessile, 3-lobed at the summit; styles 3, short, recurved. Capsule 3-lobed, 3-beaked, septicid-al to the base, many-seeded. Seeds tailed or appendaged in most species. [Dedicated to Tofield, an English correspondent of Hudson.]

About 15 species, natives of the north temperate zone, 1 or 2 in the Andes of South America. Besides the following another occurs in the southeastern States and two in northwestern America.

Stem glabrous; seeds unappendaged.

Stem viscid-pubescent; seeds appendaged.

Capsule oblong, 3" high; perianth segments thin.

Capsule ovoid, 1½"-2" high; perianth-segments rigid in fruit.

1. Tofieldia.

2. Abama.

3. Xerophyllum.

4. Helonias.

5. Chamaelirium.

6. Chrosperma.

7. Slenanthium.

8. Zygodenus.


10. Veratrum.

11. Uvularia.

1. Tofieldia palustris Huds. Scottish Asphodel. (Fig. 966.)


Glabrous, stem slender, scape-like, leafless or bearing a few leaves near the base, 2'-10' tall. Leaves tufted, 3½'-4' long, ½'-2' wide; raceme oblong or subglobose in flower, dense, elongating to an inch or less in fruit, the lower flowers first expanding; pedicels usually solitary, minutely involucrate, ½'-1' long in fruit; flowers greenish white, 1' broad; perianth-segments obovate, obtuse, much shorter than the oblong-globose minutely beaked capsule; seeds oblong, unappendaged.

Greenland and Labrador to Alaska, south to Quebec, the shores of Lake Superior, and the Canadian Rocky Mountains. Also in Europe and Asia. Summer.
2. **Tofieldia glutinosa** (Michx.) Pers. Glutinous Tofieldia. (Fig. 967.)


Stem viscid-pubescent with black glands, 6'-20' tall, bearing 2-4 leaves near the base. Basal leaves tufted, 2'-7' long, 1'/'-3' wide; raceme oblong and ½'-1½' long in flower, longer in fruit, the upper flowers first expanding; pedicels commonly clustered in 3's (1's-4's), ascending, viscid-pubescent, becoming 2''-6'' long in fruit; involucral bracts minute, united nearly or quite to their apices, borne just beneath the flower; flowers 3''-4'' broad; perianth-segments oblone, mostly obtuse, membranous; capsule oblong, about 3'' high, ½'' in diameter, thin-walled, twice as long as the perianth, the beaks ½'' long or less; seeds tailed at each end.

In bogs, Newfoundland to Alaska, south to Maine, Ohio, Michigan, Wyoming and Oregon, and in the southern Alleghenies. May–June.

3. **Tofieldia racemosa** (Walt.) B.S.P. Viscid Tofieldia. (Fig. 968.)

*Glutinsa* Tofieldia Walt. Fl. Car. 126. 1788


Similar to the preceding species but rather stouter and taller, stem 1°-3° high, the glutinous pubescence rougher. Leaves very narrowly linear, 6'-18' long, 1½'-3' wide; raceme 1'-4' long in flower, often loose, somewhat longer in fruit, the uppermost flowers first expanding; pedicels mostly clustered in 3's, ascending, 2''-3'' long in fruit; involucral bractlets about ½'' long, united to above the middle, borne just beneath the flower; perianth-segments narrowly oblone, obtuse, rigid; capsule ovate, 1½'' long, little longer than the calyx, its beaks ½'' long; seeds tailed at each end.

In swamps, southern New Jersey to Florida and Alabama. This and the two preceding species are also known as False Asphodel. June–Sept.

2. **ABÁMA** Adans. Fam. Pl. 2: 47. 1763.

*Narthecium* Juss. Gen. 47. 1789.

Perennial herbs, with creeping or horitzontal rootstocks, fibrous roots, erect simple stems and linear grass-like basal leaves, those of the stem short and distant. Flowers small, greenish-yellow, perfect, borne in a terminal raceme. Pedicels bracted at base and usually bearing a small bractlet. Perianth-segments persistent, linear or linear-lanceolate, obscurely 3-5-nerved, glandless. Stamens 6; filaments subulate, woolly; anthers linear-oblong, erect, introrse. Ovary sessile; style very short or none; stigma slightly 3-lobed. Capsule oblong, loculicidally dehiscent, many-seeded, the linear seeds tailed at each end. [Greek, signifying without step, the plants reputed to cause lameness in cattle.]

Four known species, natives of the northern hemisphere. Besides the following, another occurs in northwestern America.
1. Abama Americâna (Ker.) Morong. American Bog-aspodel. (Fig. 96q.)

Nartheicum Americanum Ker, Bot. Mag. pl. 1505. 1812.


Glabrous, stems wiry, stiff, erect, 10'-18' tall. Basal leaves 3'-8' long, 1' wide or less, finely 7-9-nerved; lower stem leaves ½'-2' long, the upper much smaller; raceme 1'-2' long, dense; perianth-segments narrowly linear, 2½'-3½' long, slightly exceeding the stamens; filaments white-woolly; pedicels ascending, 3½'-4½' long in fruit; capsule about 5'' long, 1'' in diameter at the middle, erect, nearly twice as long as the perianth-segments, tapering to a subulate beak; seeds, including the appendages, 3½'-4½' long.

In pine barren swamps, southern New Jersey. June-Sept.


Tall perennial herbs, with thick short woody rootstocks, simple erect leafy stems, the leaves narrowly linear, rough-margined, the upper ones shorter than the lower. Flowers very numerous, medium-sized, white, in a large dense terminal raceme, the lower ones first expanding. Perianth withering-persistent, its segments oblong or ovate, 5-7-nerved, spreading, glandless. Stamens 6, rather shorter than the perianth-segments; filaments subulate, glabrous; anthers oblong. Ovary sessile; 3-grooved; styles 3, filiform, reflexed or recurved, stigmatic along the inner side; ovules only 2-4 in each cell. Capsule ovoid, 3-grooved, loculicidally and sometimes also septicidally dehiscent. Seeds 5, oblong, not at all appendaged, or only minutely so. [Greek, signifying a dry leaf.]

Three species, the following of the southeastern United States, the others of western America.

1. Xerophyllum asphodeloides (L.) Nutt. Turkey-beard. (Fig. 97o.)

Xerophyllum setifolium Michx. Fl. Bor. Am. 1: 211. 1803.


Stem stout, becoming stiff, 2½'-5' tall, densely leafy below and at the base, sparsely leafy above. Leaves very narrowly linear, slightly dilated at the base, the lower 6'-18' long, 1'' wide or less, except at the broader base, the upper successively shorter and narrower; flowering raceme 3'-6' long, 2'-3' in diameter, its summit conic; flowering pedicels spreading, filiform, 6'-18' long, in fruit erect; perianth-segments ovate-oblong, obtuse, about 3'-long; styles rather longer than the ovary; capsule ellipsoid, obtuse, 2'' long, 1½'-1½' in diameter; seeds mostly 2 in each cell.

In dry pine barrens, southern New Jersey to eastern Tennessee and Georgia. May-July. Ascends to 5000 ft. in North Carolina.


A perennial glabrous bog herb, with a stout rootstock, thick fibrous roots, basal oblong-eolate persistent leaves and rather large perfect purple flowers, racemed at the summit of an erect hollow bracted scape. Perianth-segments spreading, spatulate, persistent. Stamens 6, hypogynous, longer than the perianth-segments; filaments filiform; anthers ovate. Ovary ovoid, 3-grooved, 3-celled, slightly 3-lobed, many-ovuled; styles 3, stigmatic along the inner side, deciduous. Capsule obovoid, deeply 3-lobed, the lobes divergent, ventrally dehiscent above. Seeds numerous, linear, white-appendaged at each end. [Name from the Greek, in allusion to its growth in swamps.]

A monotypic genus of eastern North America.

An erect glabrous slightly fleshy herb, with a bitter tuberous rootstock. Basal leaves spatulate, those of the stem lanceolate. Flowers small, white, dioecious, in a long narrow bractless spike-like raceme. Perianth of 6 linear-spataulate 1-nerved segments. Staminate flowers with 6 stamens, the filaments filiform, the anthers subglobose, 2-celled; pistillate flowers with a 3-celled oblong ovary, 3 short styles, stigmatic along the inner side, and usually with 6 staminodia. Capsule oblong, slightly 3-lobed, loculicidally 3-valved. Seeds 6-12 in each cavity, broadly winged at both ends, narrowly winged on the sides. [Greek, signifying a low lily.]

A monotypic genus of eastern North America.

1. Chamaelirium luteum (L.) A. Gray. Blazing-star. (Fig. 972.)

Veratrum luteum L. Sp. Pl. 1044. 1753.

Chamaelirium luteum A. Gray, Man. 503. 1848.

Staminate plant 1½'-2½' tall, the pistillate often taller, sometimes 4° high and more leafy. Basal leaves 2'-8' long, ½'-1½' wide, mostly obtuse, tapering into a long petiole; stem leaves lanceolate, the or upper linear, acute or acuminate, sessile or the lower short-petioled; staminate raceme or nodding finally erect, 3'-9' long, the pedicels spreading, 1"'-2" long; pistillate raceme erect; flowers nearly 3' broad; capsule oblong or somewhat obovoid, 4"'-7" long, 2"'-5" in diameter.

In moist meadows and thickets, Massachusetts to southern Ontario and Michigan, south to Florida and Arkansas. Called also Devil's-bit, Unicorn root and Drooping Starwort. May-July.


An erect glabrous herb, with an ovoid-oblong coated bulb, and numerous long blunt basal leaves, a few short ones on the stem. Flowers perfect, white, in a dense terminal raceme, the lower ones first expanding. Perianth of 6 distinct glandless persistent obtuse segments. Stamens inserted on the bases of the sepals; anthers small, reniform. Ovary ovoid, 3-lobed, 3-celled. Capsule 3-celled, dehiscent above the middle, the cavities 1-2-seeded, its 3 divergent lobes tipped with the subulate styles. Seeds ovoid, reddish brown. [Greek, referring to the colored seeds.]

A monotypic genus of eastern North America.
1. **Chrosperma muscaetóxicum** (Walt.) Kuntze. Fly-poison. (Fig. 973.)


*Chrosperma muscaetóxicum* Kunze, Rev. Gen. PI. 708. 1891.

Bulb 1½"-2" long, nearly 1" in diameter. Stem 1½"-4" tall. Basal leaves 2"-15" wide, shorter than the stem, the upper few and distant, bract-like; raceme at first ovoid-conic, becoming cylindrical, 2'-5' long; pedicels ascending, 4"-10" long; bractlets ovate, 1"-2" long; sepals ovate-oblong, obtuse, 2"-3" long; filaments filiform, about equaling the sepals; capsule 2"-3" in diameter above the middle, scarcely as long; seeds about 1½" long.

In dry sandy woods, Long Island and eastern Pennsylvania to Florida, Tennessee and Arkansas. Ascends to 3000 ft. in Virginia and to 2100 ft. in Pennsylvania. May-July.

7. **STENÁNTHIUM** Kunth, Enum. 4: 189. 1842.

Erect glabrous bulbous herbs, with leafy stems and small white or greenish, polygamous flowers in an ample terminal panicle. Leaves narrowly linear, keeled. Perianth-segments narrowly lanceolate, acuminate, glandless, spreading, persistent, adnate to the base of the ovary. Stamens shorter than the perianth-segments, inserted on their bases; anthers small, cordate or reniform. Ovary ovoid. Capsule ovoid-oblong, 3-lobed, finally dehiscent to the base, the lobes with short slightly divergent beaks. Seeds about 4 in each cavity, oblong, angled, somewhat flattened. [Greek, in allusion to the narrow perianth-segments.]

The genus comprises only the two following species:

Leaves 2½'-3½' wide; capsule reflexed.

Leaves 3½'-10½' wide; capsule erect.

1. **Stenanthium gramíneum** (Ker) Morong. Grass-leaved Stenanthium. (Fig. 974.)

*Heloniá graḿíneu* Ker, Bot. Mag. pl. 1599. 1813.


*Stenanthium augusťfolium* Kunth, Enum. 4: 190. 1843.


Stem slender, 3°-4° tall. Leaves grass-like, some of them often 1° long or more, 2½'-3½' wide, the upper, reduced to small linear lanceolate bracts subtending the branches of the panicle; panicle open, simple or somewhat compound, 1°-2° long, its branches nearly filiform, often flexuous, spreading or drooping; bracts ½"-1" long, equalling or longer than the pedicels; flowers 4"-6" broad; perianth-segments linear lanceolate; capsule ovoid-oblong, with a top-shaped base, 3½'-4½' long, reflexed.

In dry soil, Virginia and Kentucky to Florida and Alabama, chiefly in the mountains. Ascends to 6000 ft. in North Carolina. Fruit apparently scarce. Aug-Sept.

Glabrous erect perennial herbs, from bulbs or rootstocks, with leafy stems. Leaves narrowly linear. Flowers perfect or polygamous, greenish, yellowish or white, in a terminal panicle or raceme. Perianth withering-persistent, its segments lanceolate or ovate, separate or united below, sometimes adnate to the lower part of the ovary, bearing 1 or 2 glands or a spot just above the narrowed base. Stamens free from the perianth segments and about equaling them in length; anthers cordate or reniform. Capsule 3-lobed, 3-celled, the cavities not diverging, dehiscent to the base. Seeds several or numerous in each cavity, oblong or linear, angled. [Greek, referring to the two glands of some species.]

About 10 species, natives of North America and Mexico, 1 in Siberia. Plant with a thick rootstock; glands of the perianth-segments 2, orbicular. Plants bulbous; gland only 1, sometimes faint or a mere spot.

Gland distinctly obcordate; perianth-segments 4°-5° long.

Gland not obcordate; perianth-segments 2°-4° long.

Gland with a poorly defined or irregular margin; perianth free from the ovary; western species

Leaves 3°-5° wide; flowers mostly perfect.

Leaves 2°-3° wide; flowers polygamous.

Gland a mere yellow spot; perianth adnate to the ovary; eastern coast species.

1. Zygadenus glaberrimus Michx.

Large-flowered Zygadenus. (Fig. 976.)


Rather dark green, slightly glaucous, stem stout, 2°-4° tall, from a thick rootstock. Leaves 3°-6° wide, long-acuminate, channelled, often 1° long or more, the upper gradually smaller, appressed, passing into the short ovate bracts of the panicle; panicle 6°-12° long, its branches rather stout, stiff, ascending; panicle 6°-12° long, its branches rather stout, stiff, ascending; pedicels stout, longer than the bractlets; flowers white, mostly perfect, 1°-1½° broad, perianth-segments lanceolate or oblong-lanceolate, narrowed into a short claw, bearing 2 orbicular glands; styles subulate; capsule narrowly ovoid, shorter than the perianth.

In swamps, Virginia to Florida, near the coast. July-Sept.
2. Zygadenus élegans Pursh. Glaucous Zygadenus. (Fig. 977.)


Plant very glaucous, bulb ovoid, about 1' long, its coats membranous. Stem slender, 6'-12' tall; leaves 2'-7' wide, keeled, the lower 4'-12' long, the upper much shorter; bracts lanceolate, rather large, green or purplish; inflorescence a simple raceme or a large panicle, sometimes 1' long, open, its branches slender, ascending; flowers greenish, 8'-10' broad; perianth-segments oval or obovate, obtuse, united below and adnate to the base of the ovary, bearing a single large obovate gland just above the short claw; capsule oblong, nearly 1' long, exceeding the perianth.

In moist places, New Brunswick to Alaska, south to Vermont, New York, Missouri, and in the Rocky Mountains to New Mexico. June-Aug. Ascends to 4000 ft. in the Black Hills.

3. Zygadenus Nuttallii (A. Gray) S. Wats. Nuttall's Zygadenus. (Fig. 978.)


Light green, scarcely glaucous, stem 1'-2' high. Bulb large, coated; leaves 3'-8' wide, shorter than the stem, strongly conduplicate, the upper very short; inflorescence racemose or paniculate bracts membranous, scarious, shorter than the slender pedicels; flowers mostly perfect, about 6' broad; perianth-segments oval or ovate, obtuse, free from the ovary, thin, short-clawed, bearing a roundish spot-like gland; capsule 4'-6' long.

On prairies, Kansas and Colorado to Texas. May-June.

4. Zygadenus venenosus S. Wats. Poisonous Zygadenus. (Fig. 979.)


Pale green, stem slender, 6'-2' tall, from a small coated bulb. Leaves conduplicate, roughish, 2'-3' wide, shorter than the stem, the upper small and distant; inflorescence a simple or somewhat branched raceme, 2'-4' long in flower, elongating in fruit, the slender pedicels longer than the scarious lanceolate bracts; flowers yellow or yellowish, polygamous, about 4' wide; perianth-segments ovate or elliptic, obtuse or acutish, short-clawed, free from the ovary, bearing a roundish gland with an irregular margin; fruiting pedicels erect; capsule longer than the perianth.

South Dakota and Montana to British Columbia, south to Nebraska, Utah and California. May-June.
5. Zygadenus leimanthoides (A. Gray) S. Wats. Pine-barren Zygadenus. (Fig. 980.)

MELANTHACEAE.

Stem slender, 1°-4° high, from a narrowly ovoid fibrous-coated bulb, its base sheathed by short leaves which soon become fibrous. Leaves 2''-4'' wide, green on both sides, often 1° long, blunt, or the upper acuminate and much shorter; panicle 4'-12' long, its branches densely many-flowered, spreading or ascending; bractlets much shorter than the slender pedicels; flowers mostly perfect, white or greenish, about 4'' broad; perianth-segments oblong, obtuse sessile, not clawed, adnate to the very base of the ovary, bearing a basal yellowish spot; capsule ovoid, 4'' high, much longer than the perianth.

In swamps or wet soil, especially in pine barrens, southern New Jersey to Georgia. Ascends to 4000 ft. in North Carolina. July-Aug.


Tall leafy herbs, perennial by thick rootstocks, the stem, at least its upper part, and the inflorescence, pubescent. Leaves oval, oblanceolate or linear, sheathing or the upper sheathless. Flowers greenish, white or cream-colored, darker in withering, monoecious or polygamous, slender pedicelled in a large terminal panicle. Perianth of 6 spreading separate persistent clawed segments, free from the ovary. Stamens shorter than the segments and adnate to them; anthers cordate or reniform, their sacs confluent. Ovary ovoid; styles 3, subulate, spreading. Capsule 3-lobed, 3-celled, the cavities several-seeded, tipped by the styles. Seeds very flat and broadly winged, several in each cavity. [Greek, signifying black flower.]

The genus comprises only the following species:
Perianth-segments with 2 glands at the base of the blade.

Blade of the perianth-segments oblong, entire; leaves linear.
Blade of the perianth-segments nearly orbicular, undulate; leaves oblanceolate.

Perianth segments oblanceolate, glandless; leaves oval.

1. Melanthium Virginiicum L. Bunch-flower. (Fig. 981.)


Stems rather stout, 2½°-5° high. Leaves linear, acuminate, often 1° long, 4''-12'' wide, the lower sheathing, the upper smaller, sessile, the uppermost very small; panicle 6'-18' long, usually dense, its branches ascending; pedicels much longer than the ovate-oblong bracts; flowers 6''-16'' broad, greenish yellow, turning brown; perianth-segments obtuse, the blade oblong, flat, entire, sometimes obcordate, at least twice as long as the claw, bearing 2 dark glands at its base; capsule 5'-7'' long, the persistent styles erect, 1'-1½'' long; seeds 8-10 in each cavity, 2'-3'' long.

In meadows, wet woods and marshes, Rhode Island to New York and Minnesota, south to Florida and Texas. June-Aug.
2. Melanthium latifolium Desr. Crisped Bunch-flower. (Fig. 982.)


Melanthium latifolium Desr. in Lam. Encycl. 4: 25. 1797.

Stem stout or slender, 2°-4° tall. Leaves oblongate, acute, 6"-8" wide, the lower clasping, the upper sessile and much smaller; panicle usually 1° long or more, its branches ascending or spreading; flowers 6'-8' broad, greenish white, turning darker; blade of the perianth-segments orbicular or ovate, undulate and crisped, longer than the claw or about equaling it, bearing 2 glands at the base; capsule 6'-8' long, its cavities 4-8 seeded; seeds rather larger than those of the preceding species; flowers fragrant.


Lower leaves 6'-10' wide, and upper pedicels 12' long. West Virginia.

3. Melanthium parviflorum (Michx.) S. Wats. Small-flowered Melanthium. (Fig. 983.)


Stem slender, 2°-5° tall. Lower leaves broadly oval or oblongate, acute, 4'-8' long, 1½'-4' wide, with narrow sheathing bases, the upper narrowly linear-lanceolate, acuminate; panicle 1°-2° long, loose and open, its very slender branches divergent or ascending; pedicels filiform, much longer than the bracts, somewhat longer than the perianth-segments; flowers 4'-6' broad, greenish; perianth-segments oblanceolate, glandless, short-clawed or sessile; capsule 5'-6' long, the cavities 4-6-seeded; seeds 3'-4' long.

In dry woods, mountains of Virginia to South Carolina. June-Aug.


Tall perennial herbs, with thick short poisonous rootstocks, the leaves mostly broad, clasping, strongly veined and plaited, the stem and inflorescence pubescent. Flowers greenish or yellowish or purple, rather large, polygamous or monoecious, on short stout pedicels in large terminal panicles. Perianth-segments 6, glandless or nearly so, not clawed, adnate to the base of the ovary. Stamens opposite the perianth-segments and free from them, short, mostly curved. Anthers cordate, their sacs confluent. Ovary ovoid; styles 3, persistent. Capsule 3-lobed, 3-celled, the cavities several-seeded. Seeds very flat, broadly winged. [Ancient name of the Hellebore.]

About 10 species, natives of north temperate zone. Besides the following another occurs in the southern United States and 2 on the Pacific coast.

Flowers yellowish green; perianth-segments pubescent, ciliate.
Flowers purple; perianth-segments glabrous or nearly so.

1. V. viride.
2. V. Woodii
1. Veratrum viride Ait. American White Hellebore. Indian Poke. (Fig. 984.)


Rootstock erect, 2'-3' long, 1'-2' thick, with numerous fibrous-fleshy roots. Stem stout, 2°-6° tall, very leafy; leaves acute, the lower broadly oval or elliptic, 6'-12' long, 6'-12' wide, short-petioled or sessile, sheathing, the upper successively narrower, those of the inflorescence small; panicle 6'-10' long, densely many-flowered, its lower branches spreading or somewhat drooping; pedicels 1'-3' long, mostly shorter than the bracts; flowers yellowish green, 6'-12' broad; perianth-segments oblanceolate, ciliate-serrulate, twice as long as the stamens; ovary glabrous; capsule 10'-12' long, 4'-6' thick, many-seeded; seed 4'-5' long. In swamps and wet woods, Quebec to Alaska, south to Georgia, Tennessee, Minnesota and British Columbia. Ascends to 4000 ft. in the Adirondacks. May-July.

2. Veratrum Woodii Robbins. Wood's False Hellebore. (Fig. 985.)

Veratrum Woodii Robbins in Wood, Classbook, Ed. 41. 557. 1855.

Rootstock short, erect. Stem slender, 2°-5° tall; leaves mostly basal, oblanceolate, often 1° long, 2'-4' wide, narrowed into sheathing petioles about as long as the blade; upper leaves small and linear-lanceolate; panicle open, 1°-2° long, its branches ascending; pedicels shorter than the perianth, about as long as the bracts; flowers 6'-8' broad, purple; perianth-segments oblanceolate, obtuse, nearly or quite glabrous, entire, little longer than the stamens; ovary pubescent when young, becoming glabrous; capsule 6'-8' long, few-seeded. In dry woods and on hills, southern Indiana to Missouri. June-July.

II. UVULÀRIA L. Sp. Pl. 304. 1753.

Erect forked herbs, perennial by rootstocks. Stem leafy above, scale-bearing below, the leaves alternate, sessile or petiolate. Flowers large, solitary at the ends of the branches or rarely 2 together, peduncled, drooping. Perianth bell-shaped or narrower; segments distinct, deciduous, each bearing a nectary at the base. Stamens 6, free, or adnate to the very bases of the perianth-segments; filaments filiform; anthers linear, the sacs longitudinally dehiscent. Ovary 3-lobed, 3-celled, short-stalked or sessile; styles united to about the middle, stigmatic along the inner side above; ovules several in each cell. Capsule ovoid or oblong, 3-angled or 3-winged, loculicidally dehiscent. Seeds globose, 1-3 in each cavity. [Name Latin, from uvula, a palate, in allusion to the hanging flowers.]

Five or six species, natives of eastern North America. Capsule oblong, 3-angled, truncate or rounded; leaves perfoliolate.

Glabrous, glaucous; perianth-segments papillose within. Leaves pubescent beneath; perianth-segments smooth.

Capsule acutely 3-angled or 3-winged, acute at each end; leaves sessile. Leaves thin, slightly rough-margined, narrowed at both ends.

Leaves firm, manifestly rough-margined, sometimes subcordate.

1. U. perfoliata.
2. U. grandiflora.
1. *Uvularia perfoliata* L.  
**Perfoliate Bellwort.** (Fig. 986.)

*Uvularia perfoliata* L. Sp. Pl. 305. 1753.

Glabrous and glaucous or pale green. Stems 6'-20' high, slender, forked above the middle, usually with 1-3 leaves below the fork; leaves oval, oblong or ovate-lanceolate, acute at the apex, rounded or sometimes narrowed at the base, smooth-margined, 2'-5' long when mature, small at flowering time; flowers 10'-16'' long, pale yellow; peduncle becoming 1/2'-1' long in fruit; perianth-segments granular-papillose within, sometimes but slightly so; stamens shorter than the styles or equalling them, the connective sharp-tipped; capsule obovoid, truncate, thicker than long, 4''-5'' long, obtusely 3-angled, with concave sides and grooved angles, its lobes dehiscent above.

In moist woods and thickets, Quebec and Ontario to Florida and Mississippi. Ascends to 3500 ft. in Virginia. Flowers fragrant. May-June.

**Large-flowered Bellwort.** (Fig. 987.)


Stems rather stouter than that of the preceding species, naked or with 1 or 2 leaves below the fork. Leaves perfoliolate, oblong, oval or ovate, pubescent beneath, at least when young, glabrous above, becoming 2'-5' long; flowers lemon-yellow, 1'-1 1/2' long; perianth-segments smooth on both sides or very slightly granular within; stamens exceeding the styles, the connective blunt; capsule obtusely 3-angled, truncate, 4'-5'' long, the lobes dehiscent above.

In rich woods, Quebec to Minnesota, south to Georgia, Tennessee and Iowa. April-June.

3. *Uvularia sessilifolia* L.  
**Sessile-leaved Bellwort.** (Fig. 988.)

*Uvularia sessilifolia* L. Sp. Pl. 305. 1753.  

Glabrous, stem slender, naked or bearing 1 or 2 leaves below the fork. Leaves oblong or oblong-lanceolate, 1 1/2'-3' long when mature, thin, sessile, acute at each end, roughish-margined, pale or glaucous beneath; flowers greenish yellow, 8''-15'' long; perianth-segments smooth; styles exceeding stamens; anthers blunt; peduncle 1/2'-1' long in fruit; capsule sharply 3-angled, narrowed at both ends, short-stipitate, about 1' long, 6''-8'' thick.

In moist woods and thickets, New Brunswick and Ontario to Minnesota, south to Georgia and Arkansas. May-June.


Leaves smaller, bright green on both sides: flowers light yellow; capsule scarcely stipitate. Pine barrens of New Jersey. Perhaps referable to the following species.
4. Uvularia pubérula Michx. Mountain Bellwort. (Fig. 989.)


Stem rather stout, sparingly rough-pubescent with short hairs, at least on the forks. Leaves oblong, oval or ovate; rough-margined, firm and 1½–3' long when mature, sessile, acute at the apex, obtuse, subcordate or sometimes narrowed at the base, shining, green on both sides, the midvein sometimes pubescent; flowers light yellow, about 1' long; styles exceeding the stamens; capsule sharply 3-angled, acute at both ends, sessile or very nearly so on the short peduncle, 10'-12' long.

In mountain woods, Virginia and West Virginia to South Carolina. Ascends to 5000 ft. in Virginia. May–June.


Lily Family.

Scapose or leafy-stemmed herbs from bulbs or corms, or rarely with rootstocks or a woody caudex (Agave), the leaves various. Flowers solitary or clustered, regular, mostly perfect. Perianth parted into 6 distinct or nearly distinct segments, or these more or less united into a tube, inferior or partly superior (Alctris). Stamens 6, hypogynous or borne on the perianth or at the bases of its segments; anthers 2-celled, mostly introrse, sometimes extrorse. Ovary 3-celled; ovules few or numerous in each cavity, anatropous or amphitropous; styles united; stigma 3-lobed or capitate. Fruit a loculicidal capsule (Calochortus), or in Agave sometimes fleshy and indehiscent. Seeds various, winged or wingless. Embryo in copious endosperm.

About 125 genera and 1300 species, widely distributed.

*Plants bulbous, or with rootstocks, or fibrous-fleshy roots.

Ovary superior, not adnate to the perianth.

- Roots fibrous-fleshy; scape tall; flowers orange or yellow.
- Low fleshy herb with a short rootstock; flowers white.
- Plants with bulbs or corms.
- Flowers umbellated.
- Perianth 6-parted.
  - Odor characteristically onion-like; ovules 1 or 2 in each cavity.
  - Odor not onion-like; ovules several in each cavity.
- Perianth funnelform, the tube about as long as the lobes.
- Flowers solitary, racemose, corymbed or panicled.
- Anthers not introrse.
  - Perianth-segments all alike or nearly so; capsule loculicidal.
  - Anthers versatile; tall herbs.
  - Anthers not versatile; low herbs.
- Stem leafy; flowers leafy-bracted.
- Leaves only 2, appearing basal; flowers bractless.
- Outer segments narrower than the inner; capsule septicidal.

1. Hemerocallis.
2. Leucojum.
3. Allium.
5. Androstephum.
7. Fritillaria.
8. Erythronium.
10. Quanaxis.
11. Ornithogalum.
12. Muscari.


Tall glabrous herbs, with fibrous fleshy roots, basal linear leaves and large mostly orange or yellow flowers clustered at the ends of leafless scapes. Perianth funnelform, its lobes oblong or spatulate, much longer than the cylindrical tube. Stamens 6, inserted at the summit of the perianth-tube, shorter than the lobes, declined; filaments filiform; anthers linear-oblong, the sacs introrsely dehiscents. Ovary oblong, 3-celled; ovules numerous in each cavity; style slender, declined, tipped with a small capitate stigma. Capsule oblong or ovoid, thick-walled, 3-angled, transversely wrinkled, loculicidally 3-valved. [Greek, signifying beautiful for a day.]

About 5 species, natives of Europe and Asia.
1. **Hemerocallis fulva L.** Day Lily.  
(Fig. 990.)


Scapes 3°-6° high, stout, mostly longer than the leaves. Leaves 4"-6" wide, channelled, tapering to an acute tip; scape bearing several short bracts above; flowers 6-15, short-pedicelled, tawny orange, panicled, 4'-5' long, opening for a day; tube of the perianth 1'-1½' long, the lobes oblong, somewhat spreading, netted-veined; the three outer nearly flat, acutish; the 3 inner undulate and blunt.


*Hemerocallis flava* L., the Yellow Day Lily, with bright yellow flowers, their lobes parallel-veined, is occasionally found near old gardens.


A low acaulescent rather fleshy herb, from a short rootstock, the roots thick, fibrous. Outer leaves membranous, acute, short; inner leaves linear, elongated, the innermost reduced to bracts. Flowers large, white, umbellate from the subterranean axils. Pedicels filiform. Perianth with a very narrow tube and a salverform limb, persistent, the 6 linear-oblong lobes spreading, nervèd, shorter than the tube. Stamens borne near the top of the perianth-tube, shorter than the lobes; filaments filiform; anthers linear, their sacs introrsely dehiscent. Ovary ovoid, 3-celled; style filiform stigma small. Capsule oval or obovoid, 3-angled, sessile, obtuse, loculicidal. Seeds several in each cavity, angled. [Greek, meaning white lily.]

A monotypic genus of northwestern North America

1. **Leucocrinum montanum** Nutt.  
*Leucocrinum.* (Fig. 991.)


Root-fibres very thick, numerous. Inner leaves 2'-10' long, 1'-3' wide; flowers 3-8; pedicels ½'-2' long; perianth-limb about ½' broad, the lobes acute; perianth-tube 1'-2' long, less than 1½' in diameter; filaments 3'-4' long; anthers coiled, at least when dry; capsule 3'-4' long, erect, leathery; seeds 4-6 in each cavity, black.

In sandy soil, South Dakota and western Nebraska to California. Ascends to 5500 ft. in the Black Hills. April-June.


Bulbous herbs, characteristically odorous (aliaceous), the bulbs solitary, or clustered on short rootstocks. Leaves narrowly linear, or rarely lanceolate or oblong, sheathing, basal, or sometimes also on the stem. Stem (usually a scape) simple, erect. Flowers white, purple, pink or green, in a terminal simple umbel, subtended by 2 or 3 membranous separate or united bracts. Pedicels slender, not jointed. Perianth persistent, the 6 segments separate, or united by their very bases. Stamens inserted on the bases of the perianth-segments; filaments filiform or dilated, sometimes toothed; anther-sacs introrsely dehiscent. Ovary sessile or nearly so, completely or incompletely 3-celled; style filiform, jointed, usually deciduous; stigmas small; ovules 1-6 in each cavity. Capsule loculicidal. [Latin for garlic.]

About 275 species of wide distribution. Besides the following, some 40 others occur in the western United States.
Leaves oblong-lanceolate, absent at flowering time.
Leaves linear, present at flowering time.

Bulb-coats membranous, not fibrous reticulated.
Umbel capitate; pedicels shorter than the flowers.
Flowering umbel nodding.
Flowering umbel erect.
Leaves flat or channelled, all nearly basal.
Leaves terete, hollow, several on the stem; flowers often replaced by bulblets.

Bulb-coats fibrous-reticulated.
Capsule not crusted.
Flowers mostly replaced by bulblets; scape 1°-2° tall.
Flowers rarely replaced by bulblets.
Scape 1°-2° tall; pedicels 8"-12" long; perianth segments thin.

Capsule-valves with 2 short crests.

1. Allium tricoccum Ait. Wild Leek. (Fig. 992.)


Bulbs ovoid, clustered, 1'-2' high, seated on a short rootstock, their coats fibrous-reticulated.
Leaves oblong-lanceolate or elliptic, appearing early in the spring, but withering and disappearing before flowering time, 6'-12' long, 1'-2' wide, narrowed at both ends, tapering into a long petiole; scape 4'-15' tall; bracts of the umbel usually 2, at first enclosing the flowers, membranous, acuminate, deciduous; umbel many-flowered, erect; pedicels slender, becoming rigid, 6"'-10" long; flowers white; perianth-segments oblong, obtuse, 2''-3'' long; filaments lanceolate-subulate, about as long as the perianth; ovule 1 in each cavity of the ovary; capsule deeply 3-lobed, about 3'' broad, 1'/2'-2' high, its valves not crested; seeds globose, black, smooth.


2. Allium Schoenoprasum L. Chives. Chive Garlic. (Fig. 993.)


Bulbs narrowly ovoid, clustered, 1' high or less, their membranous coats not fibrous-reticulated. Scape rather stout, 8'-2' high, bearing below the middle 1 or 2 elongated linear terete hollow leaves about 1/2' in diameter, or the leaves all basal; bracts of the umbel 2, broadly ovate, veiny; umbel many-flowered, capitate, the pedicels 1'-2' long; flowers rose-color, longer than the pedicels; perianth-segments 4'-6' long, lanceolate, acuminate; stamens much shorter than the perianth; filaments subulate, half-terete; ovules 2 in each cavity of the ovary; capsule obtusely 3-lobed, about half as long as the perianth.

3. Allium cernuum Roth. Nodding Wild Onion. (Fig. 994.)

*Allium cernuum* Roth; Roem. Arch. 1: Part 3, 40. 1798.

Bulbs usually clustered on a short rootstock, narrowly ovoid, with a long neck, 1'-2½' high, the coats not fibrous-reticulated. Scape slender, slightly ridged, 1½-2½' high; leaves linear, channeled or nearly flat, 1'-2½' wide, mostly shorter than the scape, bluntish, umbel many-flowered, nodding in flower, subtended by 2 short deciduous bracts; pedicels filiform, 8'-15' long; flowers white, rose or purple; perianth-segments ovate-oblong, acute or obtusish, 2½'-3½' long; stamens longer than the perianth; filaments nearly filiform; ovules 2 in each cavity of the ovary; capsule 3-lobed, rather shorter than the perianth, each valve bearing 2 short processes near the summit.


4. Allium stellatum Ker. Prairie Wild Onion. (Fig. 995.)

*Allium stellatum* Ker, Bot. Mag. pl. 1576. 1813.

Bulbs solitary or several together, narrowly ovoid, 1'-2' long, their coats membranous. Scape slender, 8'-18' tall, somewhat ridged above; leaves linear, 3½'-½' wide, nearly flat; umbel several-many-flowered, erect, subtended by 2 lanceolate or ovate acuminate bracts; pedicels filiform, 6½'-10½' long; flowers rose-color; perianth-segments ovate-oblong, acute, 2½'-3½' long, equalling or rather shorter than the stamens; filaments filiform, slightly widened at the base; capsule shorter than the perianth, 3-lobed, about 6-seeded, each valve bearing 2 erect processes or crests below the apex.


5. Allium vineale L. Wild Garlic. Field Garlic. Crow Garlic. (Fig. 996.)

*Allium vineale* L. Sp. Pl. 299. 1753.

Bulb ovoid, 1' high or less, its coats membranous. Stem 1½-3½' tall, bearing 2-4 narrowly linear terete hollow somewhat channeled leaves below the middle at flowering time, the early basal leaves similar, numerous, 4'-10' long; bracts of the umbel 2, lanceolate, acuminate, deciduous; umbel many-flowered, erect, the flowers often wholly or in part replaced by small ovoid bulblets which are tipped with a long capillary appendage; pedicels 3½'-12½' long, filiform, the lower spreading or drooping; flowers green or purple, about 2½' long; perianth-segments ovate lanceolate, stamens included or slightly exserted; filaments flattened, broad, the 3 interior ones bearing a tooth on each side just below the anther; capsule 3-lobed, shorter than the perianth.

In fields and meadows, Connecticut to Ohio, Missouri and Virginia. Naturalized from Europe. A troublesome weed in the Middle States, infesting pastures, and tainting the flavor of spring butter. June-July.
6. *Allium Canadense* L. Meadow Garlic. (Fig. 997.)


Bulb ovoid, solitary, usually less than 1' high, the outer coats fibrous-reticulated. Scape terete, 8'-2° tall; leaves basal or nearly so, narrowly linear, flat or flattish above, slightly convex beneath, 1'-1½' wide, usually shorter than the scape; bracts of the umbel 2 or 3, white, broadly ovate, acuminate; flowers usually or often replaced by ovoid bulblets; pedicels, when present, about ½' long; flowers pink or white, the perianth-segments oblong-lanceolate, acute, about as long as the stamens; filaments widened at the base, none of them toothed; capsule valves not crested.

In moist meadows and thickets, Maine to Minnesota, south to Florida, Louisiana and Arkansas. Ascends to 2500 ft. in Virginia. Maj--June.

7. *Allium mutabile* Michx. Wild Onion. (Fig. 998.)


Bulbs ovoid, solitary or several together, 1' high or less, their coats prominently fibrous-reticulated. Scape terete, 1°-2° tall; leaves basal, channeled, 1½'-2½' wide, shorter than the scape; bracts of the umbel 2 or 3, long-acuminate; umbel erect, many-flowered, rarely bulbil-bearing; pedicels filiform, 8½'-12½' long; flowers pink, rose or white, 2½'-4½' long; perianth-segments lanceolate or ovate-lanceolate, acute, acuminate, or obtusish, thin, longer than the stamens; filaments somewhat widened below; capsule rather shorter than the perianth, its valves not crested.

In moist soil. North Carolina to Nebraska, south to Florida and Texas. Aprl-June.

8. *Allium Nuttallii* S. Wats. Nuttall's Wild Onion. (Fig. 999.)


Bulbs usually solitary, ovoid, ½'-1' high, their coats fibrous-reticulated. Culm slender, terete or nearly so, 4½'-8½' tall; leaves basal, ½½'-1½' wide, shorter than the scape or sometimes equalling it; bracts of the umbel 3 or 2, ovate or ovate-lanceolate, acute or acuminate; umbel several-flowered; no bulblets seen; pedicels slender, 4½'-6½' long; flowers rose or white, about 3½' long; perianth-segments ovate, acute or acuminate, firm, becoming rigid in fruit; stamens shorter than the perianth; capsule shorter than the perianth, its valves not crested.

On prairies, Nebraska and Colorado to Texas and Arizona. Aprl-June.
9. Allium reticulatum Don. Fraser's Wild Onion. (Fig. 1000.)

Allium reticulatum Nutt. Fraser's Cat. Name only.
1813.

Similar to the preceding species, the bulb rather larger, its coats prominently fibrous-reticulated. Scape 3'-10' tall, slender; leaves usually less than 1' wide; bracts of the several-flowered umbel mostly 2, acuminate; pedicels slender, 3'-6' long; flowers white or pink, 21/2'-3' long; perianth-segments longer than the stamens, thin; capsule shorter than the perianth, each of its valves bearing 2 short crests just below the summit.

Assiniboia and South Dakota to New Mexico and Arizona. May–July.

4. NOTHOSCORDUM Kunth, Enum. 4: 457. 1843.

Scapose herbs, similar to the onions, but without alliaceous odor, with membranous-coated bulbs, narrowly linear basal leaves and small yellow or yellowish-green flowers in an erect terminal simple 2-bracted umbel. Perianth 6-parted to the base, withering-persistent, its segments 1-nerved. Stamens 6, inserted on the bases of the perianth-segments; filaments filiform or subulate; anther-sacs introrsely dehiscent. Ovary sessile, 3-celled; ovules several in each cavity; style filiform, jointed near the base, but commonly persistent; stigma small, capitate. Capsule 3-lobed, loculicidal. Seeds angled or flattish, black. [Greek, signifying false garlic.]

About 10 species, the following in the southern United States and Mexico, 8 or 9 in tropical and South America, 1 Chinese.

1. Notothyscirodium bivalve (L.) Britton. Yellow False Garlic. (Fig. 1001.)

Allium ornithogaloides Walt. Fl. Car. 121. 1788.
Allium striatum Jacq. Coll. Suppl. 51. 1796.
Notothyscirodium striatum Kunth, Enum. 4: 459. 1843.

Bulb globose, less than 1' in diameter, its coats membranous. Leaves 11/2'-21/2' wide, flat, blunt or acutish, shorter than the scape or equaling it; bracts of the umbel lanceolate, acuminate, membranous, persistent; umbel 6-12-flowered; pedicels filiform, usually unequal, becoming rather rigid and 1'-2' long in fruit; flowers 5'-6' long; perianth-segments thin, oblong-lanceolate, acute, longer than the stamens; capsule obvoid or somewhat depressed, obtusely 3-lobed, 2'-3' high, the style as long or slightly longer.

In sandy soil, Virginia to Tennessee and Nebraska, south to Florida, Texas and Mexico. Ascends to 1500 ft. in Georgia. March–July.


Scapose herbs from a small membranous-coated corm. Leaves basal, narrowly linear. Flowers rather large, blue, in a terminal erect several-bracted umbel. Perianth funnelform, withering-persistent, the tube about as long as the 6 oblong lobes. Stamens 6, inserted on the throat of the perianth; filaments dilated, united to the middle or above into an erect crown-like tube with toothed lobes alternating with the linear-oblong anthers. Ovary sessile, 3-celled; ovules several in each cavity; style filiform; stigma 3-grooved. Capsule membranous, 3-angled, loculicidal. Seeds few, large, oval, black. [Greek, referring to the crown.]

Two species, natives of the southwestern United States.
1. **Androstephiun coeruleum** (Scheele) Greene. **Androstephiun**. (Fig. 1002.)


*Androstephiun coeruleum* Greene, Pittonia, 2: 57. 1859.

Corm subglobose, less than 1' in diameter. Scape 2'-5' tall; simple; leaves 1'/-2' wide, half terete, equalling the scape, or sometimes longer; bracts of the umbel 2-4, scariosus, lanceolate, acuminate, persistent, shorter than the pedicels; umbel 2-7-flowered; pedicels rather stout, ⅓'-⅔' long; perianth 10'-14' long, the lobes about as long as the tube; filament-tube about 5' long, its lobes exceeding the anthers; style about as long as the filament-tube; capsule 4'-6' high; seeds nearly 5' long, very thin, narrowly winged.


Tall bulbous herbs, with simple leafy stems, and large erect or drooping showy flowers. Perianth funnelform or campanulate, deciduous, of 6 separate spreading or recurved segments, each with a nectar-bearing groove at its base within. Stamens 6, mostly shorter than the perianth, hypogynous, slightly attached to the segments; filaments filiform or subulate; anthers linear, versatile, their sacs longitudinally dehiscent. Ovary 3-celled; ovules numerous; style long, somewhat club-shaped above; stigma 3-lobed. Capsule oblong or obovoid, loculicidally dehiscent. Seeds numerous, flat, horizontal, packed in 2 rows in each cavity. [Latin, from the Greek name of the Lily, said to be from the Celtic *li*, white.]

About 45 species, natives of the north temperate zone. Besides the following, some 8 others occur in western North America.

Flower of flowers erect; perianth-segments narrowed into long claws.

1. **L. Philadelphicum.**

Perianth-segments moderately acute.

Leaves lanceolate, nearly all verticillate.

Leaves narrowly linear, nearly all alternate.

Perianth-segments long-acuminate; leaves all alternate, appressed.

Flowers drooping or spreading; perianth-segments not clawed.

Leaves or most of them verticillate, their axils not bulbiferous; native species.

Leaves finely roughened on the veins beneath.

Perianth-segments recurved or spreading.

Perianth-segments not recurved; mountain species.

Leaves perfectly smooth; perianth-segments recurved.

Leaves lanceolate; stem 3'-10' tall; flowers 1-40.

Leaves oblanceolate; stem 2'-3' tall; flowers 1-3.

Leaves all alternate, crowded, the upper axils bulb-bearing; escaped from gardens.

**1. Lilium Philadelphicum** L. **Red Lily. Wood Lily. Philadelphia Lily.** (Fig. 1003.)


Bulb 1' in diameter or less, composed of narrow jointed fleshy scales. Stem 1'-3' tall, with a few distant scales below, leafy above; leaves lanceolate, acute at both ends or the lower sometimes obtuse, 1'-4' long, 3'-7' wide, all verticillate in 3's-8's, or a few of them alternate, thin, the margins finely roughened; flowers 1-5, erect, 2½'-4' high; perianth reddish orange, its segments spatulate, somewhat spreading, acute or obtuse, the blade ½'-1' wide, rather gradually narrowed into the claw, purple spotted below; capsule obovoid-oval, 1½'-2' high; seeds 3'-4' long, narrowly winged.

In dry woods and thickets. Maine to Ontario, south to North Carolina and West Virginia. Ascend to 4000 ft. in Virginia. June-July.
2. *Lilium umbellatum* Pursh. Western Red Lily. (Fig. 1004.)


*Bulb* similar to that of the preceding species, the stem usually more slender, 1°-2° tall. Leaves linear, blunt or the upper acute, ascending, or sometimes appressed, 1'-'3' long, 1''-2½'' wide, all alternate or the uppermost verticillate, their margins finely roughened; flowers 1-3, erect, 2'-'3' high; perianth-segments red, orange or yellow, narrowed into the claw, acute, spotted below, the claw shorter than the blade; capsule oblong, 3'-'4' long, about 8" thick; seeds like those of *L. Philadelphicum.*

In dry soil, Ohio to Minnesota and the Northwest Territory, south to Missouri, Arkansas and Colorado. Ascends to 4000 ft. in the Black Hills. June-July.

3. *Lilium Catesbaei* Walt. Southern Red Lily. (Fig. 1005.)

*Bulb* yi'-z.' high, composed of narrow leaf-bearing scales, their leaves narrowly linear, 2^-4' long, often falling away before the plant flowers. Stem slender, 1°-2° high; stem leaves all alternate, narrowly linear or linear-lanceolate, acute or acuminate, erect or appressed, 1'-'3' long, 1''-3'' wide; flower (always?) solitary, erect; perianth-segments scarlet with a yellow purple-spotted base and a slender claw, spreading or somewhat recurved, 3'-'5' long, ½'-1' wide, long-acuminate, wavy-margined; capsule 1' high or less; seeds 2'-'3' long.


4. *Lilium Canadense* L. Wild Yellow Lily. Canada Lily. (Fig. 1006.)


*Bulbs* subglobose, 1'-'2' in diameter, borne on a stout rootstock, composed of numerous thick white scales. Stem 2°-5° tall, slender or stout; leaves lanceolate or oblong-lanceolate, verticillate in 4's-to's or some of them alternate, acuminate, 2'-'6' long, 3''-15'' wide, finely roughened on the margins and on the veins beneath; flowers 1-16, nodding on long peduncles; peduncles sometimes bearing a small leaf-like bract; perianth-segments 2'-'3' long, yellow or red, usually thickly spotted below, recurved or spreading, not clawed; capsule oblong, erect, 1½'-2' long.

In swamps, meadows and fields, Nova Scotia to Ontario and Minnesota, south to Georgia, Alabama and Missouri. Ascends to 6000 ft. in North Carolina. Red-flowered forms with slightly spreading perianth-segments resemble the following species, and forms with strongly recurved segments, *L. superbum.* June-July.
LILIACEAE.

5. Lilium Gràyi S. Wats. Asa Gray's Lily. (Fig. 1007.)


Rootstock bearing small subglobose bulbs with thick ovate scales. Stem slender, 2°-3° high; leaves oblong-lanceolate, acute or acuminate at the apex, narrowed at the base, 2'-4' long, ½'-1' wide, verticillate in 3's-8's or the lowest commonly smaller and scattered, all finely roughened on the veins beneath; flowers 1-3, long-peduncled, spreading or slightly drooping, 2'-3' long, red or tinged with yellow at the base; perianth-segments oblong-spatulate, not clawed, acute, spotted; capsule fig-shaped, about 1½' high.

Peaks of Otter, Virginia, and on the higher mountain summits in North Carolina. July-Aug.

6. Lilium supérbum L. Turk's-cap Lily. (Fig. 1008.)


Bulbs globose, 1'-2' in diameter, borne on short rootstocks, their scales white, thick, ovate. Stem stout or slender, 3°-8° high; leaves lanceolate or linear-lanceolate, smooth on both sides, acuminating at both ends, 2'-6' long, ½'-1½' wide, verticillate in 3's-8's or the upper alternate, the veinlets not prominently anastomosing; flowers orange, orange-yellow or rarely red, 3-40, or rarely solitary, nodding, long-peduncled, forming, when numerous, a large panicule; perianth-segments 2½'-4' long, lanceolate, acuminate, purple-spotted, at length usually strongly recurved from below the middle; capsule obovoid, 1½'-2' high.

In meadows and marshes, Maine to Ontario and Minnesota, south to North Carolina and Tennessee. Ascends to 5000 ft. in Virginia. July-Aug.

7. Lilium Carolinianum Michx. Carolina Lily. (Fig. 1009.)


Bulbs borne on short rootstocks, globose, 1'-2' in diameter, composed of numerous fleshy scales. Stem 2°-3° high, slender; leaves oblanceolate or obovate, smooth, verticillate or the upper and lower alternate, acute, obtuse or short-acuminated at the apex, narrowed at the base, the veinlets prominently anastomosing; flowers 1-3, orange-red, 3'-4' long, long-peduncled, nodding; perianth-segments lanceolate, acuminate, purple-spotted below, strongly arched backward with their tips sometimes connivent.

In dry woods, Virginia to Florida and Louisiana. Ascends to 3500 ft. in Virginia. Aug.
8. *Lilium tigrinum* Andr. Tiger Lily. (Fig. 1010.)


Bulb solitary, globose, about 1 1/2" in diameter, composed of numerous oblong-lanceolate, appressed scales. Stem stout, purple or nearly black, white-pubescent above, 2°-5° tall, leafy nearly to the base; leaves lanceolate, all alternate, glabrous or slightly pubescent, 4'-6' long, 5''-10'' wide, the upper blackish bulblets, of 3 or 4 scales, in their axis, which sometimes emit roots while attached to the plant; flowers 5-25, orange-red, nodding, 3^-4 1/2' long; perianth-segments lanceolate, papillose, recurved, purple-spotted.

Escaped from gardens, Maine and Massachusetts. Native of China and Japan. Summer.


Bulbous herbs with simple leafy stems, and rather large nodding solitary or racemed leafy-bracted flowers. Perianth mostly campanulate, deciduous, of 6 separate and nearly equal oblong or ovate segments, each with a nectar-pit or spot at the base. Stamens 6, hypogynous; filaments filiform or somewhat flattened; anthers linear or oblong. Ovary nearly or quite sessile, 3-celled; ovules numerous in each cavity; style slender or filiform, 3-lobed or 3-cleft, the lobes stigmatic along the inner side. Capsule obovoid or globose, 6-angled, loculicidally dehiscent. Seeds numerous, flat, obovate or suborbicular, margined or winged. [Latin, from *fritillus*, a dice-box or chess-board, in allusion to the form or to the checkered markings of the perianth in some species.]

About 50 species, natives of the north temperate zone. Besides the following, about 12 others occur in western North America.

1. *Fritillaria atropurpurea* Nutt. Purple Fritillaria. (Fig. 1011.)


Bulb 1/2' in diameter or less. Stem 6'-15' high, slender, leafless below; leaves linear, alternate, sessile, 1 1/2'-3 1/2' long, 1 1/2''-2'' wide or less; flowers 1-6, purple or purplish green and mottled; perianth-segments narrowly oblong, obtusish, 6''-10'' long; peduncles 1/2'-1' long; stamine one-half to two-thirds as long as the perianth; style 3-cleft to about the middle, the lobes linear; capsule erect, acutely angled, 5''-6'' high.

North Dakota to Nebraska, Wyoming and California. June-July.


Low herbs, from deep membranous-coated corms, sometimes propagated by offshoots, the stem simple, bearing a pair of broad or narrow unequal leaves, usually below the middle, the leaves thus appearing basal. Flowers large, nodding, bractless, solitary, or several in some western species. Many plants are flowerless and 1-leaved, these leaves often wider and longer petiolate than those of the stem. Perianth-segments separate, lanceolate, oblong or oblanceolate, deciduous, with nectariferous groove, and sometimes 2 short processes at the
LILIACEAE.

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Erythronium

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Stamens 6, hypogynous, shorter than the perianth; anthers linear oblong, not versus-
tile. Ovary sessile, 3-celled; ovules numerous or several in each cavity; style filiform or
thickened above, 3-lobed or 3-cleft. Capsule obovoid or oblong, somewhat 3-angled, locul-
ecidal. Seeds compressed, or somewhat angled and swollen. [Greek, in allusion to the red
flowers of some species.]

About 12 species, all but one North American. The species are erroneously called Dog's-tooth
Violet.

Stem with no offshoot; flowers 10'-2' long.

Offshoots produced at the base of the corn; perianth-segments recurved. 1. E. Americanum.

Flowers yellow; stigmas very short.

Flowers white, blue or purple; stigmas 1''-1½'' long, recurved. 2. E. albidum.

No offshoots, propagating by basal corms; perianth-segments not recurved.

Stem with a fleshy offshoot below the leaves; flowers rose, about ½' long. 3. E. mesackoreum.

4. E. propulinus.

1. Erythronium Americánum Ker. Yellow Adder's-tongue. (Fig. 1012.)

Erythronium Americanum Ker, Bot. Mag. pl. 1113. 1 Je. 1808.


Corm ovoid, 6'-10'' high, producing off-
shoots from its base. Stem ½'-1' long;

leaves oblong or oblong-lanceolate, 3'-8'

long, ½'-2' wide, acute or short-acuminate

at the apex, flat, usually mottled with

brown, but sometimes green all over, nar-

rowed into clasping petioles; peduncle

about as long as the leaves, rarely bearing a

bract; flower yellow, or rarely purplish
tinged; perianth-segments oblong, 10'-2'

long, 3'-4' wide, recurved, dotted within,

the 3 inner auricled at the base; style club-

shaped, with 3 very short stigmatic ridges;
capsule obovoid, contracted into a short stipe, 6'-10'' high; seeds curved, rounded on
the back, about ½'' long, pointed at both ends.

In moist woods and thickets, Nova Scotia to

Ontario and Minnesota, south to Florida, Missouri

and Arkansas. Ascends to 500 ft. in Virginia. March-May.

2. Erythronium albidum Nutt. White Adder's-tongue. (Fig. 1013.)


Similar to the preceding species, the plant

propagating by offshoots from the base of the
corn, the leaves mottled or green all over,
sometimes rather narrower. Flower white,
blue or purple; perianth-segments oblong,
recurved, none of them auricled at the base;
style somewhat thickened upward; stigmas
linear, finally recurving, 1''-1½'' long;
capsule obovoid or oblong, 5''-9'' high.

In moist woods and thickets, Ontario to Min-
nesota, south to Georgia, Tennessee and Texas.
Not common eastward. March-May.


3. **Erythronium mesachoreum**

*Knerr. Midland Adder's-tongue.* (Fig. 1014.)

*Erythronium mesachoreum Knerr, Midland College Monthly, 2: 5. 1891.*

Corm ovoid, 10" high or less, not developing offshoots, the new corms formed at or within the base of the old one. Leaves narrowly oblong or linear-oblong, not mottled, 4'-10' long, ½' -1' wide, somewhat folded; flower lavender tinted, 1'-2' long; perianth-segments not recurved, sometimes a little spreading; style slender; stigmas recurved; capsule obvoid, larger than that of *E. albiflorum*, ½'-1½' high.

On prairies, Iowa to Missouri, Nebraska and Kansas. Blooms before *E. albiflorum* when the two grow in proximity. The flowering plants are said to appear before the 1-leaved flowerless ones.

4. **Erythronium propullans**

*Gray. Minnesota Adder's-tongue.* (Fig. 1015.)

*Erythronium propullans A. Gray, Am. Nat. 28: pl. 74. 1871.*

Corm ovoid, 10" high or less, not developing offshoots. Stem ascending, 6'-8' long, bearing a fleshy curved offshoot 1'-2' long from a slit near the base of the petiole-sheath; leaves oblong, acute, 2'-4' long, slightly mottled or green; flower rose or pink, about ½' long, borne on a filiform peduncle shorter than the leaves, perianth-segments with a yellow base, apparently not recurved, none of them auricled; stigmas mere ridges.

In rich woods, Minnesota. Also in southern Ontario (according to Macoun). May.


Branched or simple herbs, with coated corms, narrowly linear leaves and large showy peduncled flowers, erect in the following species. Perianth segments separate, spreading or connivent, yellow, blue, purple, white or variegated; the 3 outer sepal-like, narrow; the 3 inner petaloid, gland-bearing, and barbed or spotted within, sometimes with a nectar-pit near the base. Stamens 6, hypogynous; filaments short, subulate; anthers erect, linear or oblong. Ovary 3-celled; ovules numerous; style very short or none; stigmas 3, recurved. Capsule oblong or linear, 3-angled, mostly septicidal, the valves sometimes 2-cleft. Seeds flat. [Greek, signifying beautiful herb.]

About 35 species, natives of western North America and Mexico.

Anthers obtuse; gland of inner perianth-segments orbicular or oval.

Anthers acute; gland transverse, curved or reniform.

1. *C. Nuttallii.*

2. *C. Gunnisonii.*
1. Calochortus Nuttallii T. & G.  
Nuttall's Mariposa Lily. (Fig. 1016.)


Corm ovoid-oblong, 6'-10' high. Stem slender, few-leaved, branched or sometimes simple, 3'-15' tall; leaves 1'-3' long, 1'/2-2'/2' wide, the lowest commonly bearing a bulb in its axil; peduncles 2'-6' long; outer perianth-segments lanceolate or ovate-lanceolate, green with lighter margins, acute or acuminate, shorter than the inner, sometimes with a dark or hairy spot within; inner perianth-segments broadly obovate-cuneate, 1'/2-1'/2' long, 10'/2-12' wide, white, lilac or yellowish, with a yellow base and a purple or purplish spot, the gland orbicular or oval and more or less pubescent; filaments 3'/4-4' long, about equaling the oblong obtuse sagittate anthers; capsule about 1'/2' long, 3'/4-4' thick, acuminate, the valves obliquely cross-lined.

South Dakota to Nebraska and California. June-Jul.

2. *Calochortus Gunnisoni* S. Wats.  
Gunnison's Mariposa Lily.  
(Fig. 1017.)


Stem slender, often simple, 6'-15' high. Leaves usually less than 1' wide, involute, at least when dry, none of the axils bulb-bearing in any specimen seen; peduncles 1'-4' long; outer perianth-segments lanceolate or oblong-lanceolate, scarious-margined, acuminate; inner perianth-segments similar to those of the preceding species, lilac, yellowish below the middle, purple-lined and banded, the gland transverse, oblong, curved or reniform, pubescent; anthers acute; capsule narrowly oblong, narrowed at both ends, about 1'/2' long.

South Dakota and Nebraska to Arizona and New Mexico. June-July.


Scapose herbs, with membranous-coated edible bulbs, linear basal leaves, and rather large, blue, purple or white bracted flowers in a terminal raceme. Perianth of 6 separate equal spreading persistent 3-7-nerved segments. Pedicels jointed at the base of the flower. Stamens inserted at the bases of the perianth-segments; filaments filiform; anthers oblong or linear-oblong, versatile, introrse. Ovary 3-celled, sessile; ovules numerous in each cavity; style filiform, its base persistent; stigma 3-lobed. Capsule oval, 3-angled, loculicidal. Seeds black, shining. [From quamash, the Indian name.]

About 4 species, natives of North America.
I. Quamasia hyacinthina (Raf.) Britton. Wild Hyacinth. (Fig. 1018.)

*Scilla Fraseri* A. Gray, Man. Ed. 2. 469. 1856.

Bulb ovoid, 1'-1½' long, its outer coat usually nearly black. Scapes slender, 1°-2° tall, sometimes bearing 1 or 2 short linear scarious leaves; basal leaves narrowly linear, acuminate, shorter than the scape, 1½'-4' wide; raceme open, 3'-8' long in flower, longer in fruit; flowers several or many; pedicels filiform, 6"-io" long, about as long as the bracts and the perianth-segments; bracts long-acuminate; perianth-segments narrowly oblong, 3-5-nerved, blue or nearly white, longer than the stamens; capsule about 4" high, 5'-6" thick, the valves transversely veined.

In meadows and along streams, Pennsylvania to Minnesota, Alabama and Texas. Ascends to 2100 ft. in Virginia. April-May.


Scapose herbs, with coated bulbs, narrow basal fleshy leaves, and large white or yellow flowers in a terminal bracted corymb or raceme. Perianth-segments equal or nearly so, separate, white, or sometimes green without, persistent, faintly several-nerved. Stamens hypogynous; filaments flattened, often broad; anthers versatile, introrse. Ovary 3-celled, sessile; ovules several or numerous in each cavity; style short or columnar, 3-sided; stigma capitate, 3-lobed or 3-ridged. Capsule subglobose, 3-sided or 3-lobed, loculicidal. Seeds black. [Greek, signifying bird's milk, said to be in allusion to the egg-white color of the flowers in some species.]

About 75 species, natives of Europe, Asia and Africa.

Flowers corymbose, erect; pedicels long, slender.
Flowers racemose, drooping; pedicels very short, stout.

1. O. umbellatum. 2. O. nutans.

1. Ornithogalum umbellatum L.
Star-of-Bethlehem. (Fig. 1019.)


Tufted, bulbs ovoid, ½'-1½' long, the coats membranous. Scape slender, 4'-12' high; leaves narrowly linear, 1'-2½' wide, dark green with a light midvein, blunt, equaling or longer than the scapes; flowers corymbose, opening in sunshine; bracts membranous, linear-lanceolate, mostly shorter than the pedicels; pedicels erect or ascending, the lower 1'-3' long; perianth-segments oblong-lanceolate, acute, white above, green with white margins beneath, 6'-io" long, about twice as long as the stamens; filaments somewhat flattened, not toothed.

2. Ornithogalum nutans L. Drooping Star-of-Bethlehem. (Fig. 1020.)

Ornithogalum nutans L. Sp. Pl. 308. 1753.

Bulb ovoid, 1'-2' long. Scape stout, 1°-2° high; leaves usually equaling the scape or longer, blunt, 2'-4' wide; flowers several or numerous, racemose, nodding; raceme 3'-8' long, loose; pedicels stout, 2'-6' long; bracts lanceolate, long-acuminate, much longer than the pedicels, often as long as the flowers; perianth-segments thin, oblong-lanceolate, about 1' long and 4' wide, nearly twice as long as the stamens; filaments broad, flat, 2-toothed at the apex.

Escaped from gardens in eastern and southern Pennsylvania. Native of Europe. April-May.

The bulbs of this and other species have for centuries past been a portion of the food of Italy, the Levant, and other parts of the Old World.


Low bulbous scapose herbs, with basal linear fleshy leaves, and nodding bracted racemose flowers, deep blue (rarely white) in the following species. Bulbs membranous-coated. Perianth globose, urn-shaped, or oblong, with 6 teeth or short lobes, tardily deciduous. Stamens 6, inserted on the perianth-tube, included; anthers ovate, versatile, intorse. Ovary 3-celled, sessile; ovules 2 in each cavity; style short; stigma 3-lobed. Ovary 3-sided or 3-winged, usually 6-seeded, loculicidal. Seeds black, angled. [From the musk-like odor of the flowers of some species.]

About 40 species, natives of Europe, Asia and Africa.

Perianth globose, 1'-1½' in diameter; leaves erect.
Perianth oblong, urn-shaped, 2'-3' long; leaves recurved.

1. Muscari botryoides (L.) Mill. Grape-Hyacinth. (Fig. 1021.)


Bulb 1' high or less. Scape 4'-10' high; leaves about as long as the scape, erect or nearly so, 1'-4' wide, channeled, blunt or acutish; raceme oblong-cylindric, 1'-1½' long, dense, or becoming longer and looser in fruit; pedicels shorter than the faintly odorous flowers; bracts very short; perianth globose, 1½'-1⅓' in diameter, 6-toothed, the teeth white, recurved; valve of the capsule obovate.

In meadows and thickets and along roadsides, escaped from gardens, Massachusetts to Ohio and Virginia. Naturalized or adventive from southern Europe. Native also of Asia. April-June.
2. *Muscari racemosum* (L.) Mill.  
Starch Grape-Hyacinth.  
(Fig. 1022.)


Similar to the preceding species. Leaves 1½"-2½" wide, recurved or spreading, channelled above; raceme oblong or ovoid, many-flowered, dense, 1½"-2½" long; pedicels shorter than the starchy-scented flowers or sometimes equaling them, slender, much longer than the bracts; perianth oblong, urn-shaped, constricted at the throat, 2½'-3½" long, with 6 deltoid recurved white teeth; capsule-valves suborbicular, retuse.

Escaped from gardens, southern New York to Pennsylvania and Maryland. Native of southern Europe. April-May.


Scapose perennial bitter fibrous-rooted herbs, with basal spreading lanceolate leaves, and small white or yellow bracted perfect flowers in a terminal spike-like raceme. Perianth oblong or campanulate, roughened without, 6-lobed, its lower part adnate to the ovary. Stamens 6, inserted on the perianth at the bases of the lobes, included; filaments short; anthers introrse. Ovary 3-celled; ovules numerous, anatropous; style subulate, or short, 3-cleft above; stigmas minutely 2-lobed. Capsule ovoid, enclosed by the persistent perianth, 3-celled, many-seeded, loculicidal. Seeds oblong, ribbed. Embryo small. Endosperm fleshy. [Greek, signifying to grind corn, apparently in allusion to the rough, mealy flowers.]

About 8 species, natives of eastern North America and eastern Asia.

1. *A. farinosa*.  
Perianth white, oblong.  
Perianth yellow, bell-shaped.

1. *A. farinosa* L.  

Roots numerous, tough, scape 1½'-3' tall, slender, terete, striate, bearing several or numerous small distant bract-like leaves. Basal leaves several, lanceolate or linear-lanceolate, acuminate at the apex, narrowed to the base, spreading, pale yellowish green, 2'-6' long, 3½'-10½" wide; raceme 4'-12' long in flower, or longer in fruit, dense, erect, pedicels 1½" long or less; bracts subulate, longer than the pedicels sometimes 2 to each flower; perianth tubular-oblong, white, or the oblong lobes yellowish, 3½'-4½" long, about 1½" thick; style subulate; capsule ovoid, about 2½" long, loculicidal above, each of its 3 valves tipped with a subulate portion of the style.

In dry, mostly sandy soil, Maine to Ontario and Minnesota, south to Florida and Tennessee. Ascends to 3500 ft. in Virginia. Yellow flowered forms of this or a distinct species occur in the Southern States. May-July.

LARGE PLANTS, with a short sometimes subterranean caudex, or tall woody and leafy stem, or bracted scape, the leaves linear or lanceolate, usually rigid and sharp-pointed, bearing long marginal thread-like fibres in our species. Flowers large, bracted, nodding in a terminal raceme or panicle. Perianth campanulate, or nearly globular, white in our species, of 6 ovate, or ovate-lanceolate separate or slightly united segments. Stamens hypogynous, shorter than the perianth; filaments thickened above, often papillose; anthers small, versatile. Ovary sessile, 3-celled; or imperfectly 6-celled; ovules numerous; style columnar, short, with 3 stigmatic lobes. Fruit a loculicidal or septicidal capsule, or fleshy, or spongy and indehiscent. Seeds numerous, flattened, horizontal. [The Haytien name.]

About 16 species, natives of North and Central America.

Fruit fleshy, indehiscent, drooping.
Fruit an erect capsule.

Leaves 2"-5" wide; scape short, bearing a long raceme.
Leaves 10"-2" wide; scape 2"-10" high, bearing a large panicle.

1. Yucca baccáta Torr. Spanish Bayonet. (Fig. 1025.)


Caudex very short, or sometimes 2"-5" tall, covered with the reflexed dead leaves. Leaves 1½"-3" long, 1'-2' wide with a much wider base, acuminate, with a stout brown point, concave, the marginal fibres 2'-5' long; panicle peduncled; pedicels stout, 8'-20' long; flowers 4'-5' broad; perianth-segments 2½'-3½' long, 8'-12' wide; style slender, as long as the ovary, or shorter; fruit oval, dark purple, fleshy, indehiscent, edible, drooping 2'-3' long, 1½'-2' in diameter, with a 6-grooved beak of one-half its length or less; seeds 3'-8' long, 1'/-1½' thick.

Western Kansas (?) southern Colorado to Texas, California and Mexico. April-June. Fruit ripe Sept.-Oct.
2. **Yucca glauca** Nutt. Bear-grass.

(Fig. 1026.)

_Yucca glauca_ Nutt. Fraser's Cat. 1813.


Caudex very short, the leaves all basal, narrowly linear, smooth, very stiff, sharp-pointed, 1°-3° long, 2"-5" wide, with a broader base, concave, at least when dry, the marginal fibres filiform, usually numerous; scape short; flowers 1½'-3' broad, racemose or in a little-branched panicle 1°-4° long; perianth-segments ovate, 1½'-1½' long; style short; stigmas shorter than the ovary; pedicels stout, erect and 1½'-1½' long in fruit; capsule oblong, 2½'-3½' long, about 1° thick, 6-sided; seeds very flat, about ½' broad.

In dry soil, Iowa and South Dakota to Wyoming, south to Missouri, Texas and Arizona. May-June.

3. **Yucca filamentosa** L. Adam's Needle.

(Fig. 1027.)


Caudex very short, or sometimes 1° high. Leaves lanceolate, narrowed above the broad base, acuminate and sharp-pointed, flat, roughish, 1-2½° long, 9'-2' wide; scape 2°-10° high; panicle large, its branches divergent or ascending, the lower often 1° long or more; flowers numerous; perianth-segments 1½'-2½' long, ovate; stigmas slender, but shorter than the ovary; pedicels rarely more than ½' long; capsule oblong, 1½'-2½' long, about 1° thick.

In sandy soil, Maryland to Florida, Tennessee and Louisiana. Much cultivated for ornament. Escaped from gardens in southern Pennsylvania. May-July.


**LILY OF THE VALLEY FAMILY.**

Scaposse or leafy-stemmed herbs, with simple or branched rootstocks, never with bulbs or corms. Flowers solitary, racemose, panicked or umbelled, regular and perfect. Leaves broad, parallel-veined and sometimes with cross-veinlets, alternate, verticillate or basal, or in *Asparagus* and its allies reduced to scales bearing filiform or flattened branchlets in their axils. Perianth inferior 4-6-parted with separate segments, or oblong, cylindric or urn-shaped and 6-lobed or 6-toothed. Stamens 6, hypogynous or borne on the perianth; anthers introrse, extrorse or laterally dehiscent. Ovary 2-3-celled, superior; ovules anatropous or amphitropous; style slender or short; stigma mostly 3-lobed. Fruit a fleshy berry. Seeds few or numerous. Embryo small. Endosperm copious.

About 23 genera and 215 species, widely distributed.

Leaves reduced to scales; leaf-like branchlets filiform.

Leaves broad; stems simple or somewhat branched.

Leaves alternate or basal.

Leaves basal; flowers umbelled or solitary.

Leaves alternate (solitary in flowerless plants of no. 4).

Perianth-segments separate.

Flowers racemed, umbelled, panicked or solitary, terminal.

Flowers racemed or panicked.

Perianth-segments 6.

Perianth-segments 4.

Flowers umbelled or solitary.

Flowers solitary or two together, axillary.

Perianth cylindric or oblong, 6-toothed.

Leaves nearly basal; flowers racemed; perianth 6-toothed.

1. **Asparagus**.

2. **Clintonia**.

3. **T'agnera**

4. **Unifolium**

5. **Disporum**.

6. **Streptopus**.

7. **Polygonatum**.

8. **Convallaria**.
Leaves in 1 or 2 whorls below the flower or flowers.
Leaves in 2 whorls; flowers umbelld.
Leaves in 1 whorl; flowers solitary.

1. ASPARAGUS L. Sp. Pl. 313. 1753.
Stem at first simple, fleshy, scaly, at length much branched; the branchlets filiform and mostly clustered in the axils of the scales in the following species, flattened and linear, lanceolate or ovate in some others. Flowers small, solitary, umbelld or racemcd. Perianth-segments alike, separate or slightly united at the base. Stamens inserted at the bases of the perianth-segments; filaments mostly filiform; anthers ovate or oblong, introrse. Ovary sessile, 3-celled; ovules 2 in each cavity; style slender, short; stigmas 3, short, recurved. Berry globose. Seeds few, rounded. [Ancient Greek name.]

About 100 species, natives of the Old World.

(Fig. 1028.)

Rootstock much branched. Young stems succulent, edible, stout, later branching, and becoming 3°-7° tall, the filiform branchlets 3°-9° long, less than ¼" thick, mostly clustered in the axils of minute scales. Flowers mostly solitary at the nodes, green, drooping on filiform jointed peduncles; perianth campanulate, about 3° long, the segments linear, obtuse; stamens shorter than the perianth; berry red, about ¼" in diameter.

Escaped from cultivation and naturalized, especially along salt marshes, New Brunswick to Virginia, and locally in waste places in the interior. Native of Europe. May-June, or flowering also in the autumn.

Somewhat pubescent scapose herbs, with slender rootstocks, erect simple scapes, and few broad petioled sheathing basal leaves, the bractless flowers umbelld at the summit of the scape in our species. Perianth-segments distinct, equal or nearly so, erect-spreading. Stamens 6, inserted at the bases of the perianth-segments; filaments filiform; anthers oblong, laterally dehiscent. Ovary 2-3-celled; ovules 2-several in each cavity; style stout or slender; stigma obscurely 2-3-lobed. Berry globose or oval. [Name in honor of De Witt Clinton, 1769-1828, American naturalist, Governor of the State of New York.]

Six species, the following of eastern North America, 2 of western North America, 2 Asiatic.
Flowers greenish-yellow, drooping, 8°-16° long; berry blue.
Flowers white, not drooping, 4°-5° long; berry black.

1. Clintonia borealis (Ait.) Raf. Yellow Clintonia. (Fig. 1029.)


Clintonia borealis Raf. Atl. Journ. 120. 1832.
Scape 6°-15° high, pubescent above or nearly glabrous. Leaves 2-5, usually 3, oval, oblong or obovate, thin, shorter than the scape, 1½"-3½" wide, ciliate, short-acuminate or cuspidate; umbel 3-6-flowered; flowers drooping, greenish yellow, 8°-10° long; pedicels 3°-15° long, slender, pubescent, erect or ascending in fruit; perianth-segments obtuse or acute; stamens about as long as the perianth; ovary 2-celled; ovules numerous, in 2 rows in each cavity, style slender, somewhat thickened above, about equalling the stamens; berry oval, blue, several-seeded, about 4½" in diameter.

In moist woods and thickets, Newfoundland to Ontario and Minnesota, south to North Carolina and Wisconsin. Ascends to 4500 ft. in Virginia. A flower is occasionally borne on the scape below the umbel, and rarely a small leaf. May-June.
2. Clintonia umbellulata (Michx.) Torr. White Clintonia. (Fig. 1030.)


Scape more or less pubescent, 8’-18’ high, sometimes bearing a small leaf. Leaves 2-5, oblong, oblanceolate or obovate, shorter than the scape or equaling it, acute or cuspidate, ciliate on the margins and sometimes also on the midvein beneath, 1 1/2’-4’ wide; umbel several-many-flowered; pedicels ascending or erect, slender, pubescent, at first short, becoming 1/2’-1 1/2’ long in fruit; flowers white, odorous, often purplish dotted, 4’-5’ long; perianth-segments obtusish; ovary 2-celled; ovules 2 in each cavity; style slender; berry globose, black, about 3” in diameter, few-seeded.

In woods, New York and New Jersey to Georgia and Tennessee. Ascends to 1000 ft. in Virginia. May-June.


Vagnera globosa; glands spreading.

Vagnera globosa Greene, Vagnera

3. VAGNERA Adans. Fam. Pl. 2: 496. 1763.

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Vagnera amplexicaulis (Nutt.) Greene, of western North America, distinguished from this by its clasping leaves and longer style, may occur in western Nebraska.
2. Vagnera stellata (L.) Morong. Star-flowered Solomon’s Seal.
(Fig. 1032.)

3. Vagnera trifolia (L.) Morong.
Three-leaved Solomon’s Seal.
(Fig. 1033.)

Convallaria stellata L. Sp. Pl. 316. 1753.
1807.


Rootstock stout, fleshy. Stem rather stout, erect, glabrous, 8’-20’ tall, straight or somewhat zigzag, leafy. Leaves oblong-lanceolate or lanceolate, sessile and somewhat clasping, minutely pubescent beneath, 2’-5’ long, ½’-1½’ wide, acute, acuminate, or blunt at the apex, flat or somewhat concave; raceme sessile or short-pediculed, 1’-2’ long, several-flowered; pedicels 1’/-4’’ long, usually shorter than the flowers; perianth-segments oblong, obtuse, longer than the stamens; style about as long as the ovary; berry green with 6 black stripes or black, 3’/-5’’ in diameter.

In moist soil, Newfoundland to British Columbia, south to New Jersey, Virginia, Kentucky, Kansas and California. Also in northern Europe. May–June.

Unifolium liliaceum Greene, Pittonia, 1: 280, a related plant with conspicuously folded leaves and longer pedicels, of western North America, from the Black Hills to the Pacific Coast, may be distinct from this species.

3. Vagnera trifolia (L.) Morong.
Three-leaved Solomon’s Seal.
(Fig. 1033.)

Convallaria trifolia L. Sp. Pl. 316. 1753.
1807.


Glabrous, rootstock slender. Stem slender, erect, 2’-15’ high, 2-4-leaved (usually 3-leaved); leaves oval, oblong or oblong-lanceolate, sessile, sheathing, 2’-5’ long, ½’-2’ wide, acute or acuminate at the apex, narrowed at the base; raceme few-flowered, peduncled, 1’/-2’ long; perianth-segments oblong or oblong-lanceolate, obtuse, finally somewhat reflexed, longer than the stamens; style about as long as the ovary; berry dark red, 2½’/-3’’ in diameter.


4. UNIFOLIUM Adans. Fam. Pl. 2: 54. 1763.


Low herbs, with slender rootstocks, erect simple few-leaved stems, petioled or sessile leaves and small white flowers in a terminal raceme, the pedicels commonly 2–3 together. Perianth of 4 separate spreading segments. Stamens 4, inserted at the bases of the segments; filaments filiform; anthers introrse. Ovary sessile, globose, 2-celled; ovules 2 in each cavity; style about as long as the ovary, 2-lobed or 2-cleft. Berry globose, 1-2-seeded. [Many plants bear only a solitary long-petioled leaf, arising from the rootstock, whence the Latin name.]

Two known species, the following of eastern North America, the other of Europe, Asia and northwest America.
LILY-OF-THE-VALLEY FAMILY.


   Two-leaved Solomon's Seal. (Fig. 1034.)


   Glabrous or pubescent. Stem slender, erect, often zigzag, 1-3-leaved (usually 2-leaved), 2'-7' high; leaves ovate or ovate-lanceolate, 1'-3' long, acute, acuminate, or blunt and cupulinate at the apex, cordate at the base with a narrow or closed sinus, sessile, short-petioled, or the lowest sometimes with a petiole ½' long; solitary leaves of the stemless plants on petioles 1'-4' long; raceme rather dense, many-flowered, 1'-2' long; pedicels mostly longer than the flowers; perianth-segments oblong, obtuse, becoming reflexed, about 1" long, rather longer than the stamens; berry pale red, speckled, about 2" in diameter.

   In moist woods and thickets, Newfoundland to the Northwest Territory, south to North Carolina, Iowa and South Dakota. Ascends to 5000 ft. in Virginia. May-July.


   More or less pubescent herbs with slender rootstocks, branching stems, scaly below, leafy above, and alternate somewhat inequilateral sessile or clasping leaves, the flowers terminal, drooping, whitish or greenish yellow, solitary or few in simple umbels. Perianth of 6 narrow equal separate deciduous segments. Stamens 6, hypogynous; filaments filiform or somewhat flattened, longer than the anthers; anthers oblong, or linear, extrorse. Ovary 3-celled; ovules 2 or sometimes several in each cavity; style slender; stigma 3-cleft or entire. Berry ovoid or oval, obtuse. [Greek, referring to the 2 ovules in each cavity of the ovary, in most species.]

   About 15 species, natives of North America and Asia. Besides the following, some 5 others occur in western North America.

   Stamens shorter than the perianth; fruit smooth, 2-6-seeded.
   Stamens as long as the perianth; fruit toughened, 4-18-seeded.

1. Disporum lanuginósæ (Michx.) Nichols. Hairy Disporum. (Fig. 1035.)


   Finely and rather densely pubescent, 1½'-2½' high. Leaves ovate lanceolate, or oblong-lanceolate, 2'-4½' long, 1'-2' wide, long-acuminate at the apex, rounded at the base, 7-15-nerved; flowers solitary or 2-3 together, greenish, 6'/-6' long; pedicels filiform, about 1' long; perianth narrowly campanulate, its segments linear-lanceolate, acuminate, somewhat spreading, glabrous, one-third to one-half longer than the stamens; ovary oblong; style slender, longer than the stamens or equalling them, 3-cleft; berry oval, red, pulpy, 2-6-seeded, 5'/-7' long.

   In woods, Ontario to western New York, Georgia and Tennessee. Ascends to 4000 ft. in Virginia. May-June.
2. Disporum trachycarpum (S. Wats.) B. & H. Rough-fruited Disporum. (Fig. 1036.)


Puberulent, at least when young, 1°–2° high. Leaves ovate, oval or oblong-lanceolate, 1½°–3½° long, 1°–2½° wide, acute or short-acuminate at the apex, rounded or subcordate at the base, 5–11-nerved; flowers solitary or 2–3 together, yellowish-white, 4°–7′ long; pedicels ½–1′ long; perianth narrowly campanulate, its segments narrowly oblong or obovateaculate, acute, little spreading, about equaling the stamens, ovary depressed-globose; style slender, about equaling the stamens, 3-lobed; berry roughened, depressed-globose or somewhat obovoid, 4°–5′ in diameter, apparently leathery rather than pulpy, 4–18-seeded.


Branching herbs, with stout or slender rootstocks, thin sessile or clasping alternate many-nerved leaves, the flowers solitary or 2 together, extra-axillary, slender-peduncled, greenish or purplish, small, nodding. Peduncles bent or twisted at about the middle. Perianth somewhat campanulate, its 6 separate segments recurved or spreading, deciduous, the outer flat, the inner keeled. Stamens 6, hypogynous; filaments short, flattened; anthers sagittate, extrorse. Ovary 3-celled; ovules numerous in 2 rows in each cavity; style slender, 3-cleft, 3-lobed or entire. Berry globose or oval, red, many-seeded. [Greek, twisted-stalk, in reference to the bent or twisted peduncles.]

About 5 species, natives of the north temperate zone. Besides the following, another occurs on the Pacific Coast.

Leaves glaucous beneath, clasping; flowers greenish-white.

Leaves green on both sides, sessile; flowers purple or rose.

1. Streptopus amplexifolius (L.) DC. Clasping-leaved Twisted-stalk. (Fig. 1037.)

Uvularia amplexifolia L. Sp. Pl. 304. 1753.

Rootstock short, stout, horizontal, covered with thick fibrous roots. Plant 1½°–3° high; stem glabrous, usually branching below the middle, leaves 2′–5′ long, 1′–2′ wide, acuminate at the apex, cordate-clasping at the base, glabrous, glaucous beneath; peduncles 1′–2′ long, 1–2-flowered; flowers greenish white, 4′–6′ long; perianth-segments narrowly lanceolate, acuminate; anthers subulate-pointed; stigma simple, obtuse or truncate; berry oval, 5′–8′ long.

In moist woods, Labrador to Alaska, south to North Carolina, Ohio, Michigan and New Mexico. Ascends to 4000 ft. in the Adirondacks. May–July.
2. **Streptopus roseus** Michx. Sessile-leaved Twisted-stalk.

(Fig. 1038.)


Plant 1°–2½° high, from a short stout rootstock covered with fibrous roots. Branches sparingly pubescent; leaves 2”–4½” long, acuminate at the apex, sessile, rounded, or slightly clasping at the base, green on both sides, their margins finely ciliate; peduncles ½”–1’ long, usually pubescent, 1-flowered, rarely 2-flowered; flowers purple or rose, 4’–6’ long; perianth-segments lanceolate, acuminate; anthers 2-horned; style 3-cleft, the spreading branches stigmatic along the inner side; berry globose or oval, 5’–6’ in diameter.

In moist woods, Labrador to Alaska, Georgia, Michigan and Oregon. Ascends to 5000 ft. in Virginia. May–July.

7. **POLYGONATUM** Adans. Fam. Pl. 2: 54. 1763.

Glabrous or pubescent herbs, with thick, horizontal jointed and scarred rootstocks, simple arching or erect stems, scaly below, leafy above, the leaves ovate or lanceolate, sessile and alternate in our species (opposite or verticillate in some exotic ones). Flowers greenish or pinkish, axillary, drooping, peduncled, solitary or 2–10 in an umbel, the pedicels jointed at the base of the flower. Perianth tubular or oblong-cylindric or somewhat expanded above the base, 6-lobed, the short lobes not spreading. Stamens 6, included; filaments adnate to the perianth for half their length or more; anthers sagittate, introrse. Ovary 3-celled; ovules 2–6 in each cavity; style slender; stigma small, capitate or slightly 3-lobed. Berry globular, pulpy, dark blue or nearly black, with a bloom, in our species. [Greek, in allusion to the jointed rootstocks].

About 20 species, natives of the North temperate zone.

Leaves pubescent beneath; filaments filiform, roughened. Plant glabrous throughout; filaments smooth, somewhat flattened.

1. **Polygonatum biflorum** (Walt.) Ell. Hairy Solomon’s Seal. (Fig. 1039.)

*Convallaria biflora* Walt. Fl. Car. 122. 1788.


Stem slender, glabrous, often zigzag above, 8’–3° high. Leaves lanceolate, oval or ovate, 2’–4’ long, ½”–2’ wide, acute or acuminate at the apex, narrowed or sometimes obtuse at the base, pubescent especially on the veins and pale beneath, glabrous above, the upper commonly narrower than the lower; peduncles 1–4-flowered (often 2-flowered), glabrous; perianth 4’–6’ long, about 1½” thick, filaments filiform, adnate to the perianth for about three-fourths its length, papillose-roughened; berry 3’–4’ in diameter.

In woods and thickets, New Brunswick to Ontario and Michigan, south to Florida and West Virginia. April–July.
2. **Polygonatum commutatum** (R. & S.) Dietr. Smooth Solomon's Seal. (Fig. 1040.)

*Convallaria commutata* R. & S. Syst. 7: 1671. 1830.


Glabrous throughout, stem stout or slender, 1°-8° high. Leaves lanceolate, oval or ovate, 1½'-6' long, 3'-4' wide, rather darker green above than beneath, acute, acuminate or blunt at the apex, narrowed or somewhat clasping at the base, the upper often narrower than the lower; peduncles 1-8-flowered, glabrous; perianth 6"-10" long, 1½"-2" thick; filaments somewhat flattened, smooth, adnate to the perianth for half its length or more; berry 4"-6" in diameter.

In moist woods and along streams, rarely in dry soil, Rhode Island to Ontario and Manitoba, south to Georgia, Louisiana, Utah and New Mexico. Variable in size and in leaf-form. May-Jul3'.


A low glabrous herb, with horizontal rootstocks, very numerous fibrous roots, and 2 or sometimes 3 erect broad leaves, narrowed into sheathing petioles, the lower part of the stem bearing several sheathing scales. Flowers white, racemed, fragrant, nodding. Raceme 1-sided. Perianth globose-campanulate, 6-lobed, deciduous, the short lobes recurved. Stamens 6, included; filaments short, adnate to the lower part of the perianth; anthers oblong, introrse. Ovary 3-celled; ovules several in each cavity; style slender, 3-grooved; stigma small, capitate, slightly 3-lobed. Berry globose, pulpy. [Latin from *Convallis*, valley, and the Greek for lily.]

A monotypic genus of Europe, Asia and the higher Alleghenies.

1. **Convallaria majalis** L. Lily-of-the-valley. (Fig. 1041.)


Stem 4'-9' high. Leaves oblong, or oval, appearing nearly basal, acute at both ends, 5'-12' long, 1'-2½' wide; basal scales large, 1'-4' long, one of them subtending an erect angled scape shorter than the leaves; raceme 1'-3½' long, loosely several-flowered; pedicels filiform, recurved, 3½'-6' long, exceeding or sometimes shorter than the lanceolate bracts; perianth 3½'-4' long, its lobes 1" long or less; filaments shorter than the anthers; berry about 3" in diameter.


A slender erect unbranched herb, loosely provided with deciduous wool. Roots thick, white, tuber-like, with somewhat the odor and taste of cucumbers, the slender fibrous roots numerous. Leaves of flowering plants in 2 whorls; lower whorl of 5–9 oblong-lanceolate or obovate leaves; upper whorl of 3–5 ovate or oval leaves, subtending, like an involucre, the sessile umbel of small greenish yellow declined flowers. Perianth of 6 separate equal oblong recurved segments. Stamens 6, hypogynous; filaments slender, smooth, longer than the oblong extrorse anthers, the sacs laterally dehiscent. Ovary 3-celled; ovules several in each cavity; styles 3, recurved, stigmatic along the inner side. Berry globose, pulpy. [Name from Medea, a sorceress, referring to the supposed healing properties.]

A monotypic genus of eastern North America.

1. **Medeola Virginiana** L. Indian Cucumber-root. (Fig. 1042.)


Rootstock fleshy, 1'–3' long. Stem 1²–2½° tall, bearing the lower whorl of leaves above the middle, or in flowerless plants at the summit; leaves of the lower whorl sessile, 2½–5' long, 1'–2' wide, acuminate at the apex, narrowed at the base, 3–5-nerved and reticulate-veined; leaves of the upper whorl 1'–2' long, ½'–1' wide, short-petioled or sessile; umbel 2–9-flowered; pedicels filiform, 1' long or less, declined in flower, erect or ascending in fruit; perianth-segments 3'–5' long, obtuse; berry dark purple, 4''–7'' in diameter.

In moist woods and thickets, Nova Scotia to Ontario and Minnesota, south to Florida and Tennessee. Ascends to 2800 ft. in Virginia. May–June.


Glabrous erect unbranched herbs, with short scarred rootstocks and 3 leaves whorled at the summit of the stem, subtending the sessile or peduncled solitary bractless flower. Solitary long-petioled leaves are sometimes borne on the rootstock. Perianth of 2 distinct series of segments, the outer 3 (sepals) green, persistent, the inner 3 (petals) white, pink, or sometimes greenish, deciduous or withering. Stamens 6, hypogynous; filaments short; anthers linear, mostly introrse. Ovary sessile, 3-6-angled or lobed, 3-celled; ovules several or numerous in each cavity; styles 3, stigmatic along the inner side. Berry globose or ovoid, many-seeded. Seeds horizontal. [Latin, in allusion to the 3-parted flowers and the 3 leaves.]

About 20 species, natives of North America and Asia. Besides the following, some 7 others occur in the southern and western parts of North America. The species are known as Three-leaved Nightshade and Birthroot. Phyllody, i.e., the reversion of petals or sepals to leaves, is occasional in the genus, and the floral parts are sometimes in 4's instead of 3's.

Flower sessile.

| Leaves sessile; sepals not reflexed. | 1. *T. sessile*. |
| Leaves petiolate; sepals reflexed. |
| Flower peduncled. | 2. *T. recurvatum*. |
| Leaves ovate or ovate, obtuse or obtusish, 1'–2' long. | 3. *T. nivale*. |
| Leaves broadly ovate or rhombic, acuminate, 2'–7' long. |
| Leaves sessile, or narrowed at the base and short-petioled. |
| Petals ovate or oblanceolate, 1½'–2½' long. | 4. *T. grandiflorum*. |
| Petals ovate or lanceolate, 5½'–7½' long. |
| Peduncle 1½'–7' long, erect or declined; petals spreading. | 5. *T. erectum*. |
| Peduncle 1½'–7' long or less, recurved beneath the leaves; petals recurved. |
| Leaves distinctly petiolate, obtuse or rounded at the base. | 6. *T. cernuum*. |
| 7. *T. undulatum*. |
CONVALLARIACEAE.

1. Trillium séssile L. Sessile-flowered Wake-robin. (Fig. 1043.)


Stem 4'-12' tall. Leaves ovate, oval or nearly orbicular, sessile, acute or obtuse and cuspidate at the apex, 1½'-6' long, often blotched; flower sessile, erect; sepals lanceolate, acute or obtuse, spreading, ½'-2' long, petals lanceolate, acute or obtuse, somewhat longer than the sepals, erect-spaying, purple or green; anthers 3''-7'' long, longer than filament, the connective prolonged beyond the sacs; berry globose, 6-angled, about ½' in diameter.

In moist woods and thickets, Pennsylvania to Ohio and Minnesota, south to Florida, Mississippi and Arkansas. Flowers pleasantly odorous. April-May.

2. Trillium recurvátum Beck. Prairie Wake-robin. (Fig. 1044.)


Stem 6'-18' tall. Leaves ovate, oval or oblong, 1½'-4' long, acute at the apex, narrowed into petioles 3'-9' long, sometimes blotched; flower sessile, erect; sepals lanceolate, acuminate, 6''-15'' long, reflected between the petioles; petals spatulate or oblong, nearly erect, clawed, acute or acuminate, equaling the sepals or somewhat longer; anthers 4''-7'' long, much longer than the filaments, the connective prolonged beyond the sacs; berry ovoid, 6-winged above, about 9'' long.

In woods and thickets, Ohio to Minnesota, Mississippi and Arkansas. April-June.

3. Trillium nivále Riddell. Early Wake-robin. (Fig. 1045.)

Trillium nivále Riddell, Syn. Fl. W. States, 93. 1835.

Stem 2'-6' high. Leaves ovate, oval or nearly orbicular, ½'-2' long, obtuse at the apex, rounded or narrowed at the base, petioled; petioles, 2'-6'' long; flowers peduncled; peduncle ½'-1' long, erect, bent, or recurved beneath the leaves; sepals narrowly oblong or oblong-lanceolate, obtuse, ½'-1' long; petals white, oblong or oval, obtuse, longer than the sepals, erect-spaying; anthers about as long as the filaments, the connective not prolonged beyond the sacs; berry globose, 3-lobed, about ½' in diameter.

In woods and thickets, Pennsylvania to Ohio and Minnesota, south to Kentucky and Iowa. March-May.
(Fig. 1046.)  
*Trillium grandiflorum* Salish. Par. Lond. 1: pl. i. 1805.  
Stems usually stout, 8'-16' high. Leaves broadly rhombic-ovate or rhombic-oval, 2½'-5' long, acuminate at the apex, narrowed to the scissile or nearly sessile base; peduncle erect or somewhat inclined, 1½'-3' long; sepals lanceolate or oblong-lanceolate, acuminate but sometimes bluntish, 1½'-2' long, spreading; petals erect-spreadings, oblongate; ovate or rarely ovate-oblong, obtuse or cuspidate, strongly veined, white or pink, thin, longer than the sepals; anthers about ½' long, longer than the filaments; styles slender, 3'-4' long, ascending or erect; berry globose, black, slightly 6-lobed, 8'-12' in diameter.  
In woods, Quebec to Ontario and Minnesota, south to Florida and Missouri. Ascends to 5000 ft. in Virginia. May-June.  
A monstrous form, with two long-petioled leaves, was collected by Dr. Pitcher in Michigan.

(Fig. 1047.)  
Stem stout, 8'-16' high. Leaves very broadly rhombic, 3'-7' long, often as wide or wider, sessile, acuminate at the apex, narrowed at the base; peduncle 1½'-4' long, erect, inclined or declined beneath the leaves; sepals lanceolate, acuminate, spreading, ½'-1½' long; petals lanceolate or ovate, acute or acutish, spreading, equaling the sepals or a little longer, dark purple, pink, greenish or white; anthers longer than the filaments; styles short, spreading or recurved; berry ovoid somewhat 6-lobed, reddish, 8'-12' long.  
In woods, Nova Scotia to James Bay and Manitoba, south to North Carolina, Tennessee and Missouri. Ascends to 3000 ft. in Virginia. Also in Japan. Flowers unpleasantly scented. April-June.

(Fig. 1048.)  
Stem usually slender, 8'-20' high. Leaves similar to those of the preceding species, broadly rhombic, acuminate at the apex, narrowed at the base, sessile, or with the petioles 1½'-2' long; peduncle ½'-1½' long, recurved beneath the leaves, the flower drooping; sepals lanceolate or ovate-lanceolate, acuminate, 6'-12' long; petals white or pink, ovate-lanceolate or oblong-lanceolate, rolled backward, wavy-margined, equaling the sepals, or a little longer; anthers about as long as the subulate filaments; styles rather stout, recurved; berry ovoid, red-purple, pendulous, 8'-10' long.  
In rich woods, Nova Scotia to Ontario and Minnesota, south to Georgia and Missouri. Sometimes confounded with forms of the preceding. April-June.
7. *Trillium undulatum* Willd. Painted Wake-robin. (Fig. 1049.)


Stem usually slender, 8'-2° high. Leaves ovate, 3'-8' long, 2'-5' wide, petioled, long-acuminate at the apex, obtuse or rounded at the base; petioles 2'-10'' long; flowers peduncled, erect or somewhat inclined, 1'-2½' long; sepals lanceolate, acuminate, 9'-15'' long, spreading; petals ovate or ovate-lanceolate, acuminate or acute, white with purple veins or stripes, thinner than the sepals, widely spreading, wavy-margined; anthers about equaling the filaments; styles slender; berry ovoid, obtuse, bluntly 3-angled, bright red, shining, 6'-10'' in diameter.

In woods, Nova Scotia to Ontario and Wisconsin, south to Georgia and Missouri. Ascends to 5600 ft. in Virginia. May-June.

Family 21. **SMILÁCEAE** Vent. Tabl. 2: 146. 1799.*

**SMILAX FAMILY.**

Mostly vines, with woody or herbaceous, often prickly stems. Leaves alternate, netted-veined, usually punctate or lineolate, several-nerved, petioled. Petiole sheathing, bearing a pair of slender tendril-like appendages (stipules?), persistent, the blade falling away. Flowers small, mostly green, dioecious, in axillary umbels. Perianth-segments 6. Stamens mostly 6, distinct; filaments ligulate; anthers basifixied, 2-celled, intorse. Ovary 3-celled, the cavities opposite the inner perianth-segments; ovules 1 or 2 in each cavity, orthotropous, suspended; stigma 1-3. Fruit a globose berry containing 1-6 seeds. Seeds brownish; endosperm horny, copious; embryo small, oblong, remote from the hilum.

Genera 3; species about 200, in warm and temperate regions; only the following in North America.


Rootstocks usually very large and tuberous, stems usually twining, and climbing by means of the spirally coiling appendages of the petiole. Lower leaves reduced to scales; upper leaves entire or lobed. Flowers regular. Perianth-segments distinct, deciduous. Pedicels borne on a globose or conic receptacle, inserted in small pits, generally among minute bractlets. Filaments inserted on the bases of the perianth-segments. Staminate flowers without an ovary. Pistillate flowers usually smaller than the staminate, with an ovary and usually with 1-6 abortive stamens. Berry black, red or purple (rarely white), with 3 strengthening bands of tissue running through the outer part of the pulp, connected at the base and apex. Embryo lying under a tubercle at the upper end of the seed. [Ancient Greek name, perhaps not originally applied to these plants.]

About 195 species of wide distribution, most abundant in tropical America and Asia. Besides the following, about 5 others occur in the southern United States, and 1 in California and Oregon. Stem annual, herbaceous, unarmed.

- Petioles tendril-bearing; stems climbing.
- Leaves usually ovate, thin.
- Leaves usually hastate, coriaceous.
- Petioles without tendrils or nearly so; stems erect.
- Stem perennial, woody, usually armed with prickles.
- Berries black or bluish-black.
- Fruit ripening the first year.
- Leaves glaucous.
- Leaves green on both sides.
- Leaves rounded or lanceolate, 5-nerved.
- Leaves ovate, 7-nerved.
- Leaves round-ovate, often narrowed at the middle, 7-9-nerved.
- Leaves deltoid or deltoid-lanceolate, 5-7-nerved, often with 1 or 2 additional nerves on each side.

Fruit ripening the second year; leaves elliptic or lanceolate, evergreen.

Berries red.
- Leaves ovate or ovate-lanceolate, base rounded; berries bright red.
- Leaves lanceolate, acute at the base; berries dull red.

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*Text contributed by the late Rev. Thomas Morong.*
1. Smilax herbacea L. Carrión-flower. (Fig. 1050.)

Smilax herbacea L. Sp. Pl. 1030. 1753.
Coprosmaanthus herbaceus Kunth, Enum. 5: 264. 1850.

Tubers short, thick, scarred, numerous. Stem herbaceous, glabrous, terete or obtusely angled, unarmed, commonly much branched. Petioles 4'-3½' long; tendrils numerous; leaves ovate, rounded or lanceolate, acute, acuminate or cuspidate at the apex, obtuse or cordate at the base, thin, frequently downy beneath, 7-9-nerved, 1½'-5' long, 1'-3½' wide, the margins entire or denticulate; peduncles 4'-9' long, usually 6-10 times as long as the petioles, flattened; umbels 15-80-flowered; pedicels 3'-8' long; flowers carrión-scented when open; stamens sometimes 5 or 7; filaments 2-3 times as long as the anthers; berries bluish black, 2-4-seeded, 3'-4' in diameter.

In woods and thickets, New Brunswick to Ontario and Dakota, south to Florida, Louisiana and Nebraska. April-June.

2. Smilax tamnifolia Michx. Halberd-leaved Smilax. (Fig. 1051.)

Coprosmaanthus tamnifolius Kunth, Enum. 5: 267. 1850.

Glabrous, herbaceous; stem and branches terete or obtusely angled, unarmed. Petioles ½'-1½' long, the sheath tendril-bearing, very short or none; leaves coriaceous, mostly ovate-hastate, with broad obtuse lobes at the base, slightly narrowed at about the middle, acute obtuse or acuminate at the apex, truncate or subcordate at the base, entire, green on both sides, 1½'-3' long, ½'-2' wide, 5-7-nerved; peduncles 1-3 from the same axil, 1'-4' long, usually much longer than the leaves, often flattening in drying; umbels 10-30-flowered; pedicels 2'-3' long; segments of the staminate flowers slightly pubescent; filaments 1-2 times as long as the anthers; berries black, 2'-3' in diameter, 1-3-seeded.

In dry soil, southern New Jersey and Pennsylvania to South Carolina and Tennessee. May-July.

3. Smilax eicirrhata (Engelm.) S. Wats.

Upright Smilax. (Fig. 1052.)

Coprosmaanthus herbaceus var. eicirrhata Engelm.;
Kunth, Enum. 5: 266. 1850.
Smilax eicirrhata S. Wats. in A. Gray, Man. Ed. 6, 520. 1890.

Stem herbaceous, glabrous, simple, erect, 6'-2° tall. Tendrils none, or sometimes present on the uppermost petioles; leaves often whorled at the summit of the stem, ovate, acute, obtuse, cuspidate or acuminate at the apex, rounded or cordate at the base, thin, 5-9-nerved, 2½'-5½' long, 1½'-4' wide, sometimes larger, more or less pubescent beneath and erose-denticulate on the margins; petioles 10'-15' long; peduncles long, often pubescent; staminate flowers commonly not more than 25 in the umbels; pedicels 2'-5' long; anthers shorter than the filaments or equalling them.

In dry soil, Virginia to Minnesota and Florida. May-June.
4. Smilax glauca Walt. Glaucous-leaved Greenbrier. (Fig. 1053.)


Rootstock deep, knotted and tuberous. Stem terete; branches and twigs angled, armed with rather stout numerous or scattered prickles, or sometimes unarmed; pediolos 3'-6' long, tendril-bearing; leaves ovate, acute or cuspidate at the apex, sometimes cordate at the base, entire, glaucous beneath and sometimes also above, mostly 5-nerved, 1 1/2'-6' long, 1/2'-5' wide; peduncles flattened 6'-16' long; umbels 6-12-flowered; pedicels 2'-4' long; berries bluish black, ripening the first year, about 3' in diameter, 2-3-seeded.

In dry sandy soil, eastern Massachusetts to Florida, west to Kansas and Texas. May-June.

5. Smilax rotundifolia L. Greenbrier. Catbrier. Horsebrier. (Fig. 1054.)


Rootstocks long, sparingly tuberous. Stem woody, terete, the branches and young shoots often 4angled, glabrous; prickles scattered, stout, straight or a little curved, sometimes none; pediolos 3'-6' long; leaves thick and shining when mature, thin when young, ovate, nearly orbicular, or lanceolate, acute or acuminate at the apex, obtuse or cordate at the base, entire or the margins erose-denticulate, 5-nerved, 2'-6' long, 10'-6' wide; peduncles flattened 3'-1' long; umbels 6-25-flowered; pedicels 1'-4' long; perianth-segments pubescent at the tip; filaments 2-3 times as long as the anthers; berries black, 1-3-seeded, about 3' in diameter, maturing the first year.

In woods and thickets, Ontario to Minnesota, south to Florida and Texas. April-June.

6. Smilax hispida Muhl. Hispid Greenbrier. (Fig. 1055.)


Glabrous, stem terete below, and commonly thickly hispid with numerous slender straight prickles, the branches more or less angled; pediolos 4'-9' long, tendril-bearing, rarely denticulate; leaves thin, green on both sides, ovate, abruptly acute and cuspidate at the apex, obtuse or subcordate at the base, 7-nerved, or the older ones sometimes with an additional pair of faint nerves, 2'-5' long, 1'-5' wide, the margins usually denticulate; peduncles flattened, 9'-2' long; umbels 10-26-flowered; pedicels slender, 2'-3' long; filaments a little longer than the anthers; berries bluish black, about 3' in diameter, maturing the first year.

In thickets, Ontario to Minnesota and Nebraska, south to Virginia and Texas. May-July.
7. Smilax Pseudo-China L. Long-stalked Greenbrier. (Fig. 1056.)


Glabrous throughout, rootstock often bearing large tubers, stem terete, the branches angled. Lower part of the stem beset with straight needle-shaped prickles, the upper part and the branches mostly unarmed; petioles 3'-12' long; leaves firm, or becoming quite leathery when old, green on both sides or occasionally glaucous beneath, ovate, often narrowed at about the middle or lobed at base; acute or cuspidate at the apex, 7-9-nerved, 2½'-5' long, 1½'-3½' wide, often denticulate on the margins; peduncles flattened, 1'-3' long, umbels 12-40-flowered; pedicels 3'-4' long; stamens 6-10; anthers as long as the filaments or longer; berries black, 8-16 in the umbels, 2'-3' in diameter, 1-3-seeded, maturing the first year.

In dry or sandy thickets, Maryland to Nebraska, south to Florida and Texas. March-Aug.

8. Smilax Bōna-nōx L.

*Smilax Bōna-nōx* L. Sp. Pl. 1030. 1753.


*Smilax tamnoides* A. Gray, Man. 485. 1848. Not L.

Rootstocks bearing large tubers, stem terete or slightly angled, the branches often 4-angled. Prickles scattered or numerous, stout or needle-like, often wanting on the branches; petioles 3'-6' long, often prickly; leaves thick, ovate or commonly deltoid-hastate, sometimes narrowed at the middle, glabrous, green and usually shining on both sides, often spiny on the margins and on the veins beneath, acute or abruptly cuspidate at the apex, obtuse, truncate or cordate at the base, 5-9-nerved, 1½'-4½' long, 8'-3' wide; peduncles slender, flattened, 7'-15' long; umbels 15-45-flowered; pedicels 2'-4' long; stigmas 1-3; berries 8-20 in the umbels, 2'-3' in diameter, mostly 1-seeded, ripening the first year.

In thickets, Massachusetts to Kansas, Florida and Texas. April-July.

9. Smilax laurifolia L.

*Smilax laurifolia* L. Sp. Pl. 1030. 1753.

Rootstocks bearing tubers sometimes 6' thick, stem stout, high-climbing, terete, striate, armed with strong straight prickles, the branches angled, mostly unarmed. Petioles stout, 3'-8' long; leaves leathery, evergreen, elliptic or oblanceolate, acute or abruptly cuspidate at the apex, narrowed at the base, entire, 3-nerved, or sometimes with an additional pair of nerves near the margins, 2'-4½' long, 1½'-2' wide; peduncles stout, angled, 2'-10' long; umbels 6-30-flowered; pedicels 2'-3' long; anthers usually about one-third shorter than the filaments; stigma 1, sometimes 2; berries black, ovoid, 2'-3' thick, not ripening until the second year.

In moist woods and thickets, southern New Jersey to Florida and Texas, north in the Mississippi Valley to Arkansas. March-Sept.
10. Smilax Walteri Pursh. Walter's Greenbrier. (Fig. 1059.)


Glabrous, stem angled, prickly below, the branches commonly unarmed. Petioles 2"-6" long, stout, angled; leaves ovate or ovate-lanceolate, rarely lobed at the base, cordate or subcordate, obtuse or abruptly acute at the apex, entire, 5-7-nerved, 2'-5' long, 10'-3.5' wide; peduncles 2'-5' long, flattened, thickening in age; umbels 6-15-flowered; pedicels very slender, 2''-3' long; berries globose, coral-red (rarely white), 3''-4'' in diameter, 2-3-seeded, ripening the first year.

In wet soil, pine barrens of New Jersey to Florida, Tennessee and Louisiana. April–June.

11. Smilax lanceolata L. Lance-leaved Greenbrier. (Fig. 1060.)

*Smilax lanceolata* L. Sp. Pl. 1031. 1753.

Glabrous, stem terete, usually prickly, the branches slender, long, slightly angled, mostly unarmed. Petioles 1''-2'' long; leaves rather thin, lanceolate, acute or acuminate at the apex, narrowed at the base, entire, shining above, 5-7-nerved, 2''-3.5'' long, 6''-20'' wide; peduncles thick, angled, 3''-8'' long; umbels 8-40-flowered; pedicels 2''-7'' long; filaments longer than the anthers; berries dark red, globose, 2''-3'' in diameter, usually 2-seeded, ripening the first year.

In thickets, Virginia to Arkansas, Florida and Texas. March–Aug.


BLOODWORT FAMILY.

Perennial herbs with erect stems, narrowly linear leaves, and regular or somewhat irregular small perfect flowers in terminal cymose panicles. Perianth 6-parted or 6-lobed, adnate to the ovary, persistent. Stamens 3, opposite the 3 inner perianth-segments. Ovary wholly or partly inferior, 3-celled or rarely 1-celled; ovules usually few in each cavity, half-anatropous; style mostly slender; stigma small, entire or 3-grooved. Fruit a loculicidally 3-valved capsule. Seeds few or rarely numerous; embryo small, in fleshy endosperm.

About 9 genera and 35 species, mostly natives of South Africa and Australia, a few in tropical America; only the following genus in the north temperate zone.


A rather stout herb, with a short rootstock, red fibrous roots and equitant leaves, the basal ones longer than those of the stem. Flowers numerous, yellowish, small, in a dense terminal woolly cymose panicle. Perianth 6-parted to the summit of the ovary, the outer segments smaller than the inner. Filaments filiform, longer than the perianth; anthers linear-oblong, versatile. Ovary 3-celled; ovules few in each cavity, borne on fleshy placentae; style very slender, declined. Capsule enclosed by the withering-persistent perianth, nearly globular, 3-valved. Seeds about 6 in each cavity, flattened, nearly orbicular, peltate. (Greek, referring to the round fruit.)

A monotypic genus of southeastern North America and the West Indies.

**AMARYLLIS FAMILY.**

Perennial herbs (some tropical species woody or even arborescent), with bulbs or rootstocks, scapose or sometimes leafy stems and usually narrow and entire leaves. Flowers perfect, regular or nearly so. Perianth 6-parted or 6-lobed, the segments or lobes distinct, or united below into a tube which is adnate to the surface of the ovary (adnate only to the lower part of the ovary in *Lophiola*). Stamens 6 in our genera, inserted on the bases of the perianth-segments or in the throat of the perianth opposite the lobes. Anthers versatile or basifixed, 2-celled, the sacs usually longitudinally dehiscent. Ovary wholly or partly inferior, usually 3-celled. Style filiform, entire, lobed, or divided into 3 stigmas at the summit. Ovules usually numerous, rarely only 1 or 2 in each cavity of the ovary, anatropous. Fruit capsular, rarely fleshy. Seeds mostly black, the embryo small, enclosed in fleshy endosperm.

About 70 genera and 800 species, principally natives of tropical and warm regions, some in the temperate zones.

Bulbous herbs with flowers on scapes.

Flower solitary; perianth without a crown.

Anthers versatile; tube of the perianth not greatly elongated.

1. *Zephyranthes*.

Anthers erect; tube of the perianth several times the length of its lobes.

2. *Cooperia*.

Flowers clustered; perianth with a membranous crown connecting the lower parts of the filaments.

3. *Hymenocallis*.

Bulbless herbs, with rootstocks or corms.

Perianth adnate to the whole surface of the ovary; leaves mostly basal.

1. *Agave*.

Tall, fleshy-leaved; anthers versatile.

2. *Hypoxis*.

Low, linear-leaved; anthers not versatile.

Perianth adnate only to the lower part of the ovary; stem leafy; flowers woody.

3. *Lophiola*.


Glabrous herbs with coated bulbs, narrow leaves, and erect 1-flowered scapes, the flower large, erect, pink, white or purple. Perianth funnelform, naked in the throat, with 6 membranous equal erect-spreading lobes united below into a tube, subtended by an entire or 2-cleft-bract. Stamens inserted on the throat of the perianth, equal or nearly so; anthers versatile. Ovary 3-celled; style long, filiform, 3-cleft at the summit; ovules numerous, in 2 rows in each cavity of the ovary. Capsule thin-walled, subglobose or depressed, 3-lobed, loculicidally 3-valved. Seeds mostly flattened, black or nearly so. [Greek, signifying wind-flower.]

About 30 species, natives of America. Besides the following, 4 others occur in the southern United States.
1. Zephyranthes Atamásco (L.) Herb. Atamásco Lily. Stagger-grass. (Fig. 1062.)


Bulb ovoid, about 1⁄4 long. Leaves fleshy, somewhat concave, shining, 6'-15' long, about 1 1⁄2'-3' wide, blunt, usually shorter than the scape; scape terete, erect, 2'-3' in diameter; bract membranous, 2-cleft into acuminate lobes, longer than the ovary; flowers 2'-3 1⁄2' high, white with a purplish tinge or sometimes light purple; perianth-segments oblong-lanceolate, acute, shorter than the tube; stamens shorter than the tube; stamens shorter than the perianth; style longer than the stamens; capsule depressed, about 3⁄2' high.

In moist places, southern Pennsylvania (?); eastern Virginia, Florida and Alabama. Perianth rarely 8-lobed. March-June.


Low herbs with coated bulbs, very narrow grass-like leaves and slender 1-flowered scapes, the flower large, long, erect, subtended by a membranous spathe-like bract. Perianth salverform with 6 oval or ovate spreading lobes united into a tube several times their length, the tube cylindric or slightly dilated at the summit. Stamens inserted on the throat of the perianth; filaments short; anthers linear, erect. Ovary 3-celled; style filiform; stigma slightly 3-lobed; ovules numerous, in 2 rows in each cavity of the ovary. Capsule depressed, globose or obovoid, 3-lobed, loculicidally 3-valved. Seeds numerous, horizontal, black. [In honor of Daniel Cooper, 1817-1842, Curator, Botanical Society of London.]

Two known species, natives of the southwestern United States and Mexico.

1. Cooperia Drummóndi Herb. Drummond’s Cooperia. (Fig. 1063.)


Bulb globose, about 1 in diameter. Leaves 6'-12' long, 2'-3' wide, erect; scape slender, hollow, about as long as the leaves; spathe-like bract 1'-2' long, 2-cleft above into acuminate lobes 4'-6' long; flower 3'-5' high, white or pinkish; tube of the perianth very slender, about 1 1⁄2' in diameter, slightly expanded just below the limb; segments oblong, obtuse and cuspidate or acutish, nearly 1' long, 3'-4' wide, ovary sessile; capsule somewhat obovoid, about 3⁄2' in diameter, deeply lobed.

On prairies, Kansas to Louisiana, Texas, Mexico and New Mexico. April-July.


Mostly tall bulbous herbs with usually lanceolate or linear-oblong leaves, and large white sessile or short-pedicilled umbelled flowers on erect solid scapes, each flower subtended by 2 long membranous bracts. Perianth of 6 spreading or recurved narrow equal elongated lobes, united below into a long cylindric tube. Stamens inserted in the top of the perianth-tube, the lower parts of the long filaments connected by a membranous cup-like crown; anthers linear, versatile. Ovary 3-celled; ovules only 1 or 2 in each cavity; style filiform, long-exserted; stigma small, entire or nearly so. Capsule ovoid or globose, rather fleshy. Seeds usually only 1 or 2, large, green, fleshy. [Greek, beautiful membrane, referring to the crown.]

About 30 species, all American. Besides the following, 10 others occur in the southern States.
1. Hymenocallis occidentalis (Le Conte) Kunth. Hymenocallis. (Fig. 1064.)


Bulb large. Leaves linear-oblong, narrowed at each end, fleshy glaucous, 1°-2° long, 9'-2' wide; scape stout, equaling or longer than the leaves; bracts linear-lanceolate, 1½'-2½' long; umbel several-flowered; perianth-tube 1½'-2' in diameter, 3'-5' long, the linear lobes nearly as long; crown funnelform, narrowed below, ½'-1½' long, its margins entire, erose or 2-toothed between the filaments; free part of the filaments about ½' long, white; anthers about ½' long and ½'' wide, yellow; style extending for 2'-3' beyond the crown, green; fruit 6''-9'' in diameter.

In moist soil, Georgia to southern Illinois and Missouri. July-Sept.


Fleshy herbs, some tropical species very tall, with a short crown-like or erect rootstock (caudex) and tall bracted scapes, the leaves large, thick, sometimes spiny-toothed, basal, or clustered at the top of the caudex, and large, bracted flowers in terminal spikes or compound clusters. Perianth tubular or funnelform, withering-persistent, of 6 erect or spreading equal or nearly equal lobes, united below into a tube. Stamens inserted on the perianth at the bases of the lobes, exserted; filaments flattened or filiform; anthers versatile. Ovary 3-celled; style slender, exserted, 3-lobed; ovules numerous, in 2 rows in each cavity of the ovary. Capsule ovoid, subglobose or oblong, 3-lobed, thick-walled, many-seeded. Seeds compressed, somewhat cuneate, black. [Greek, signifying noble.]

About 130 species, all American. Besides the following, some 12 others occur in the southwestern States.

1. Agave Virginica L. False Aloe.

(Fig. 1065.)

Agave Virginica L. Sp. Pl. 323. 1753.

Glabrous throughout, rootstock a short crown with numerous fibrous roots, Scape 2°-6° tall, rather slender, sometimes nearly ½" in diameter at the base, its bracts distant, long-acuminate, the lower 3'-6' long; leaves narrowly oblong, ½°-2° long, ½'-2½' wide, acuminate, their margins entire or denticulate; spike 1°-2° long, loose; flowers greenish yellow, odoriferous, solitary in the axils of short bracts, sessile or the lowest distinctly pedicelled; perianth nearly tubular, slightly expanded above, 8'-12' long, the tube about twice as long as the erect lobes; filaments at length about as long as the perianth; capsule 5'-8' in diameter, slightly longer than thick, abruptly contracted into a short stalk.

In dry soil, Maryland to Indiana and Missouri, south to Florida and Texas.


Low, mostly villous herbs with a caudex or short rootstock, grass-like leaves and slender few-flowered scapes, the flowers rather small. Perianth 6-parted, its segments equal or nearly so, separate to the summit of the ovary, spreading, withering-persistent, the 3 outer ones greenish on the lower side in our species. Stamens inserted on the bases of the perianth-segments; filaments short; anthers erect, sagittate or entire. Ovary 3-celled; style short; stigmas 3, erect; ovules numerous, in 2 rows in each cavity. Capsule subglobose or oblong, thin-walled, not dehiscent by valves. Seeds globose, black, laterally short-beaked by their stalks. [Greek, originally given to some plant with sour leaves.]

About 90 species, widely distributed. Besides the following, 2 others occur in the southern States.
1. **Hypoxis hirsuta** (L.) Coville. Star-grass. (Fig. 1066.)


*Hypoxis erecta* L., Syst. Ed. 10, 2495. 1759.


Corolla ovoid, oblong or globose, ⅔–⅔ in diameter, with numerous fibrous roots. Leaves basal, narrowly linear, ¾–2½″ wide, more or less villous, mostly longer than the scapes; scapes slender, erect, villous above, usually glabrous below, 2′–6′ high; flowers 1–6, umbellate; bracts subulate, shorter than the pedicels; perianth-segments narrowly oblong, spreading, mostly obtuse, bright yellow within, greenish and villous without, ⅜–⅞ long; stamens somewhat unequal; style rather shorter than the stamens, 3-angled, the stigmas decurrent on the angles; capsule about ⅔″ in diameter; seeds angled, black.

In dry soil, Maine and Ontario to Assiniboia, Florida and Texas. Ascends to 3000 ft in Virginia. May–Oct.

### 6. **LOPHIOLA** Ker, Bot. Mag. pl. 1596. 1814.

An erect perennial herb with slender rootstocks, fibrous roots erect sparingly leafy stems, the leaves narrowly linear and mostly basal, and numerous small yellowish flowers in a terminal woolly cymose panicle. Perianth campanulate, persistent, of 5 nearly equal woolly erect-spreading segments, slightly united at the base, and adnate to the lower part of the ovary. Stamens inserted on the bases of the perianth-segments; filaments filiform, short; anthers basifixed. Ovary 3-celled; style subulate, at length 3-cleft; ovules numerous, in 2 rows in each cavity. Capsule ovoid, tipped with the style, finally loculicidally 3-valved at the summit. Seeds oblong, numerous, ribbed. [Greek, referring to the tufts of wool on the perianth.]

A monotypic genus of southeastern North America.

1. **Lophiola Americana** (Pursh) Coville.

*Lophiola.* (Fig. 1067.)


*Lophiola aurea* Ker, Bot. Mag. pl. 1596. 1814.


Stem stiff, erect, terete, glabrous below, white-woolly above, 1°–2° tall. Leaves equitant, glabrous, much shorter than the stem, the upper ones reduced to bracts; panicle densely white-woolly, composed of numerous few–several-flowered cymes; pedicels short, rather stout, erect or ascending; perianth-segments linear-lanceolate, about 2′ long, woolly outside, longer than the stamens and with a tuft of wool at the base within; capsule about as long as the persistent style, shorter than the perianth.


**YAM FAMILY.**

Herbaceous or slightly woody twining vines with fleshy or woody rootstocks, slender stems, petioled, mostly cordate, several-nerved and reticulate-veined leaves, alternate or the lower opposite or verticillate, and small inconspicuous dioecious or monoecious (in some exotic genera perfect) regular flowers in spikes, racemes or panicles. Perianth 6-parted, that of the pistillate flowers persistent. Staminate flowers with 6 or 3 stamens, sometimes with a rudimentary ovary. Pistillate flowers with an inferior 3-celled ovary, 3 styles and 3 terminal stigmas, sometimes also with 3 or 6 staminodia; ovules 2 (rarely 1) in each cavity of the ovary, pendulous, anatropous or amphiropous. Fruit a 3-valved, 3-angled capsule in the following genus. Endosperm of the seed fleshy or cartilaginous, enclosing the small embryo.

About 9 genera and 175 species, mostly natives of America, a few in the Old World.

Characters of the family as defined above. [Name in honor of the Greek naturalist Dioscorides.]

There are about 160 species, most numerous in tropical regions, a few extending into the temperate zones. The large fleshy rootstocks of several tropical species furnish the yams of commerce.

1. *Dioscorea villòsa* L. Wild Yam-root. (Fig. 1068.)


Rootstock knotted, horizontal, woody, ½'-1' thick. Stem 6°-15° long, twining or rarely suberect, glabrous; leaves ovate, entire, slender-petioled, alternate or the lower opposite or in 4's, acuminate at the apex, cordate at the base, 2'-6' long, t'-4' wide, 9-13-nerved, thin, green and glabrous or nearly so above, pale and more or less pubescent beneath; petioles often longer than the blades; flowers greenish yellow, nearly sessile, the staminate 1°'-1½' broad in drooping panicles 3'-6' long, the pistillate about 3' long in drooping spicate racemes; capsules membranous, yellowish green, 7°'-12' long, strongly 3-winged, containing 2 or sometimes only 1 flat thin-winged seed in each cavity.

In moist thickets, Rhode Island to Ontario and Minnesota, south to Florida and Texas. Ascends to 4000 ft. in Virginia. June-July. Fruit ripe Sept., persistent on the vines into the winter.


**IRIS FAMILY.**

Perennial herbs with narrow equitant 2-ranked leaves and perfect regular or irregular mostly clustered flowers subtended by bracts. Perianth of 6 segments or 6-lobed, its tube adnate to the ovary, the segments or lobes in two series, convolute in the bud, withering-persistent. Stamens 3, inserted on the perianth opposite its outer series of segments or lobes; filaments filiform, distinct or united; anthers 2-celled, extrorse. Ovary inferior, mostly 3-celled; ovules mostly numerous in each cell, anatropous; style 3-cleft, its branches sometimes divided. Capsule 3-celled, loculicidally dehiscent, 3-angled or 3-lobed (sometimes 6-lobed), many-seeded. Endosperm of the seed fleshy or horny; embryo straight, small.

About 57 genera and 1000 species, of wide distribution.

Style-branches opposite the anthers, very broad, petal-like.

Style-branches alternate with the anthers, slender or filiform.

Style-branches 2-cleft; plants bulbous. Filaments all distinct; seeds fleshy. Filaments united; seeds dry.

1. *Iris.*

2. *Nemastylis.*

3. *Gemmingia.*

4. *Styriunichium.*


Herbs with creeping or horizontal, often woody and sometimes tuber-bearing rootstocks, erect stems, erect or ascending equitant leaves, and large regular terminal sometimes panicled flowers. Perianth of 6 clawed segments united below into a tube, the 3 outer dilated, spreading or reflexed, the 3 inner narrower, smaller, usually erect, or in some species about as large as the outer. Stamens inserted at the base of the outer perianth-segments; anthers linear or oblong. Ovary 3-celled; divisions of the style petal-like, arching over the stamens, bearing the stigmas immediately under their mostly 2-lobed tips; style-base adnate to the perianth-tube. Capsule oblong or oval, 3-6-angled or lobed, mostly coriaceous. Seeds numerous, vertically compressed in 1 or 2 rows in each cell. [Greek, rainbow, referring to the variegated flowers.]

About 100 species, mostly in the north temperate zone. Besides the following, some 8 others occur in the southern and western parts of North America. The names *Flower-de-luce* and *Fleur-de-lis* are applied to the species.
IRIDACEAE.

Stems tall, usually several-flowered, leafy; outer perianth-segments larger than the inner. Flowers blue, variegated with yellow, white or green (rarely all white).

None of the perianth-segments crested; native species.

Leaves $\frac{1}{2}'$–1' wide.

Leaves somewhat glaucous.
Leaves bright green, not glaucous.

Outer perianth-segments $3'-4'$ long; flowers sessile.
Outer perianth-segments $2\frac{1}{2}'-3'$ long; flowers pedicelled.

Leaves much narrower, $\frac{3}{4}'$–1' wide.

Capsule obtusely angled, 3-6-lobed
Capsule 3-lobed; northern.
Capsule 6-lobed; western.
Capsule sharply 3-angled.

Outer perianth-segments strongly crested; introduced.
Flowers reddish or red-brown.
Flowers bright yellow; introduced species.

Stems low, seldom over 6' tall, 1-3-flowered; outer and inner perianth-segments nearly equal.
Outer perianth-segments crested; leaves lanceolate.
Perianth-tube very slender, exceeding the bracts.
Perianth-tube expanded above, not exceeding the bracts.
Outer perianth-segments crested, claws slightly pubescent; leaves linear.

1. Iris versicolor L. Larger Blue Flag. (Fig. 1069.)


Rootstock horizontal, thick, fleshy, covered with the fibrous roots. Stems terete or nearly so, straight or flexuous, 2°–3° tall, often branched above, leafy; leaves erect, shorter than the stem, somewhat glaucous, 6'–12' wide; bracts commonly longer than the pedicels, the lower one sometimes foliaceous; flowers several, violet-blue, variegated with yellow, green and white; perianth-segments glabrous, crestless, the outer ones spatulate, 2'–3' long, longer and wider than the inner; perianth-tube dilated upward, shorter than the ovary; capsule oblong, obscurely 3-lobed, about 1½' long and 8' in diameter; seeds 2’–3’ broad, in 2 rows in each cell.

In marshes, thickets, and wet meadows, Newfoundland to Manitoba, south to Florida and Arkansas. May–July.

2. Iris hexagona Walt. Southern Blue Flag. (Fig. 1070.)

*Iris hexagona* Walt. Fl. Car. 66. 1788.

Rootstock stout, thick. Stems terete, usually simple, straight or flexuous, leafy, 1°–3° tall; leaves $\frac{3}{4}'$–1½' wide, green, not glaucous, the lower often 2°–3° long; flowers solitary in the upper axils, sessile, similar to those of *I. versicolor*, but larger, the broader outer crestless perianth segments often 4’ long and over 1’ wide, much wider than the erect inner ones; perianth-tube rather longer than the ovary, a little dilated upward; capsule oblong cylindric, 6-angled, about 2’ long; seeds in 2 rows in each cavity.

In swamps, South Carolina and Florida to Kentucky, Missouri and Texas. April–May.
3. Iris Caroliniâna S. Wats. Carolina Blue Flag. (Fig. 1071.)

*Iris Caroliniâna* S. Wats. in A. Gray, Man. Ed. 6, 514. 1890.

Rootstock stout, fleshy. Stem rather stout, simple or branched 2°-3° tall, equalled or exceeded by the bright green leaves which are 8°-14° wide; flowers solitary or 2 or 3 together, lilac, variegated with yellow, purple and brown, pedicelled; pedicels somewhat shorter than the bracts; outer perianth-segments broadly spatulate, 2½'-3' long, with narrow claws, the inner narrower and nearly erect; perianth-tube about ½' long above the ovary; capsule oblong, obtusely 3-angled, 1½'-2' long; seeds in 1 row in each cavity, 4'-5' broad.

In swamps, southern Virginia and eastern North Carolina. May-June.

4. Iris Hóokeri Penny. Hooker's Blue Flag. (Fig. 1072.)


Rootstock rather slender. Stems slender, simple or branched, terete, 10'-20' tall. Leaves mostly basal, narrowly linear, bright green, shorter than or equalling the stem, 2''-4'' wide; flowers solitary or 2 together, pedicelled, the pedicels shorter than the bracts; perianth-segments glabrous, crestless, the inner ones oblanceolate, much shorter and smaller than the outer; capsule short-oblong, 1'-1½' long, 7''-10'' in diameter, thin-walled, transversely veined, obtusely 3-lobed; seeds in 2 rows in each cavity, about 1½'' broad.

On river shores, Newfoundland to Quebec and Maine. Summer.

5. Iris Missouriénsis Nutt. Western Blue Flag. (Fig. 1073.)


Rootstock stout. Stem rather slender, usually simple, terete, 6'-2° tall, 1-2-flowered; leaves mostly basal, green, sometimes purplish below, shorter than or about equaling the stem, 2''-4'' wide; flowers pale blue and variegated, pedicelled; pedicels slender, ½'-2' long, usually shorter than the scarious bracts; perianth-segments glabrous, crestless, the outer ones 2'-2½' long, the inner somewhat shorter, the tube 3'-4'' long above the ovary; capsule oblong, 1'-1½' long, about ½' in diameter, obtusely 6-angled, faintly veined.

In wet soil, South Dakota to Montana and Nevada, south to Colorado and Arizona. May-July.
6. Iris prismatica Pursh. Slender Blue Flag. (Fig. 1074.)

Iris Virginica Muhl. Cat. 4. 1813. Not L. 1753.

Rootstock rather slender, tuberous-thickened. Stems slender, often flexuous, 1°-3° tall, usually simple, bearing 2 or 3 leaves; leaves almost grass-like, 1½'-'2½' wide, mostly shorter than the stem; flowers solitary or 2 together, blue veined with yellow, slender-pedicelled; pedicels commonly longer than the bracts; outer perianth-segments 1½'-'2' long, glabrous and crestless, the inner smaller and narrower, the tube 2''-'3'' long above the ovary; capsule narrowly oblong, acute at each end, sharply 3-angled, 1½'-'1½' long, 3½'-'4'' thick; seeds about 1'' broad, thick, borne in 1 row in each cavity.

In wet grounds. New Brunswick to Pennsylvania and North Carolina, mainly near the coast. May-June.

7. Iris Germanica L. Fleur-de-lis.
(Fig. 1075.)

Iris Germanica L. Sp. Pl. 38. 1753.

Rootstock thick. Stems stout, usually branched and several-flowered, 2°-3° tall, bearing several leaves. Leaves glaucous, 8½'-'2' wide, the basal ones mostly shorter than the stem; bracts scarious; flowers nearly sessile in the bracts, large and very showy, deep violet-blue veined with yellow and brown or sometimes white; outer perianth-segments broadly obovate, 3½'-4' long, their claws strongly crested; inner perianth-segments narrower, arching.

Escaped from gardens to roadsides in Virginia. Native of Europe. May-June.

Iris Duerinckii Buckley, Am. Journ. Sci. 45: 176, described from specimens collected at St. Louis, Mo., but doubtless cultivated, appears to be I. aphylla L., a native of central Europe.

8. Iris fulva Ker. Red-brown Flag.
(Fig. 1076.)

Iris fulva Ker, Bot. Mag. pl. 1496. 1812.

Rootstock stout, fleshy. Stems rather slender, 2°-3° tall, simple or branched, several-flowered and bearing 2-4 leaves; leaves pale green and somewhat glaucous, shorter than or equalling the stem, 5½'-'8'' wide; pedicels ½'-'1' long, shorter than the bracts; flowers reddish brown, variegated with blue and green; perianth-segments glabrous, crestless, the outer ones 1½'-'2' long, the inner smaller, spreading; style-branches 2½'-'3'' wide.

In swamps, southern Illinois to Georgia and Louisiana, west to Missouri, Arkansas and Texas. May-June.
9. Iris Pseudácorus L. Yellow Flag.  
(Fig. 1077.)


Rootstock thick. Stems 1½"-3" high, usually several-flowered; leaves pale green and glaucous, stiff, 4"-8" wide, the lower equalling or longer than the stem; flowers bright yellow, short-pedicelled; perianth-segments glabrous and crestless, the outer broadly obovate, 2½-3½" long, the inner oblong, nearly erect, scarcely longer than the claws of the outer ones; capsule oblong, 2½-3½" long.

In marshes, Massachusetts to New York (Ohio?) and New Jersey. Naturalized or adventive from Europe. May-July.

10. Iris cristata Ait. Crested Dwarf Iris.  (Fig. 1078.)


Rootstock slender, branched, creeping, tuberous-thickened. Stems only 1½'-3½' high, 1-2-flowered; leaves lanceolate, bright green, 4'-9' long, 3½'-6½' wide, much exceeding the stems; scape flattened, flowers blue, pedicelled; perianth-segments obovate, 1½'-1½½' long, the outer crested, little longer than the naked inner ones, the tube very slender, 1½'-2½½' long above the ovary, longer than the bracts; capsule oval, sharply triangular, narrowed at each end, 6½'-9½' high, 4½'-5½' thick.

On hillsides and along streams, Maryland to southern Ohio and Indiana, south to Georgia, Tennessee and Missouri. April-May.

11. Iris lacústris Nutt. Dwarf Lake Iris.  (Fig. 1079.)


Similar to the preceding species in size and foliage, or the leaves rather narrower, sometimes wavy-marginined. Flowers blue; perianth-tube only ½'-1½' long, shorter than the bracts and the sometimes yellowish perianth-segments, somewhat expanded upward; capsule ovoid, about 8½' high, borne on a pedicel of about its own length.

Shores of Lakes Huron and Superior. Local. Reported from the following localities: Presque Isle, Mackinac City, Bois Blanc Island and Drummond’s Island, Mich.; Bruce Peninsula and Southampton, Ont. May.
12. Iris verna L. Dwarf Iris. (Fig. 1080.)


Rootstock slender. Stems 1'-3' high, usually 1-flowered. Leaves narrowly linear, 3'-8' high, 2''-5'' wide; flowers violet-blue or rarely white, pedicelled; perianth-segments crenated, the outer about 1 1/2'' long, obovate, narrowed into slightly pubescent slender yellow claws, the inner somewhat smaller, glabrous; capsule obtusely triangular, short.

On shaded hillsides and in woods, southern Pennsylvania to Virginia, Kentucky and Georgia. Rootstock described as "pungently spicy." April-May.


Bulbous herbs with erect slender terete usually branched stems and elongated linear folded leaves. Flowers rather large, in our species blue or purple, solitary or several together, fugacious, subtended by 2 herbaceous bracts. Perianth of 6 spreading nearly equal obovate segments, distinct nearly or quite to the summit of the ovary. Filaments more or less united; anthers short; style short, its branches alternate with the anthers, each slenderly 2-parted; stigmas small, terminal. Capsule oblong, ovoid or obovoid, loculicidally dehiscent at the summit. [Greek, referring to the thread-like style-branches.]

About 10 species, natives of America. Besides the following, some 3 others occur in the southern United States.

1. Nemastylis acuta (Bart.) Herb. Northern Nemastylis. (Fig. 1081.)

*Ivia acuta* Bart. Fl. N. A. 2: 89. pl. 66. 1822.


Bulb dark colored, ovoid, scaly, 1' or less long. Stem 1'-2' tall, bearing 3 or 4 leaves, 3'-10' long, 1 1/2''-2 1/2'' wide; bracts lanceolate, each pair subtending 1 or 2 flowers; flowers light blue or purple, 1'-2' broad, slender-pedicelled; pedicels rather shorter than the bracts; perianth-segments obovate, obtuse; style-branches exserted between the free parts of the filaments, their filiform divisions 2''-3' long; capsule obovoid, 5''-6' high, 3'-4' in diameter.

On prairies, Tennessee to Kansas and Arkansas, south to Louisiana and Texas. April-June.


[BELAMCANDA Adans. Fam. Pl. 2: 60. 1763.]


An erect perennial herb, with short stout rootstocks and *Iris*-like leaves. Flowers in terminal bracted clusters, rather large, orange and purple-mottled. Perianth of 6 oblong spreading nearly equal withering-persistent segments, distinct very nearly to the summit of the ovary. Stamens inserted on the bases of the segments; filaments distinct; anthers linear-oblong. Style very slender, enlarged above, the 3 slender undivided branches alternate with the anthers. Capsule fig-shaped, obovoid, thin-walled, loculicidally 3-valved, the valves recurving, finally falling away, exposing the mass of black fleshy seeds, which are borne on a central axis.

A monotypic genus of eastern Asia.

Perennial tufted slender herbs, with short rootstocks, simple or branched 2-edged or 2-winged stems, linear grass-like leaves, and rather small mostly blue terminal flowers umbellate from a pair of erect green bracts. Perianth-tube short or none, the 6 spreading segments oblong or obovate, equal, mostly aristulate. Filaments united to above the middle in our species. Ovary 3-celled, each cavity several ovuled. Style-branches filiform, undivided, alternate with the anthers. Capsule globose, oval or obovoid, loculicidally 3-valved. Seeds subglobose or ovoid, smooth or pitted, dry.

About 70 species, all American. Besides the following, some 7 others occur in the Western States. Those here described have all been referred to *S. Bernadiana* L., by American authors.

The two bracts equal or nearly so; stems usually branched above.

Leaves 1½–3½" wide; capsule subglobose, 2½–3½" in diameter when mature.

Leaves ¾–1½" wide; capsule oval, 1½–2½" in diameter when mature.

The lower of the bracts longer than the upper; stems mostly simple.

1. **Sisyrischium graminoides** Bicknell. Stout Blue-eyed Grass. (Fig. 1083.)

*Sisyrischium aniceps* S. Wats. in A. Gray, Man. Ed. 6, 315. 1890. Not Cav.


Rather light green, somewhat glaucous; stem broadly 2-winged, stout, erect, or reclining, 8′–18′ tall, usually terminating in two unequal branches subtended by a conspicuous grassy leaf. Basal leaves equaling or shorter than the stem, 1½–3½" wide; often lax and grass-like; edges of stems and leaves usually perceptibly rough-serrulate; bracts ½ long or less, green, nearly or quite equal but the outer one occasionally prolonged; umbels 2–4-flowered; pedicels filiform, 8′–12′ long, exceeding the bracts, finally often spreading or recurved; flowers 6′–9′ broad; petals sparsely pubescent on outer surface; capsule subglobose, 2½–3½" in diameter when mature; seeds black, nearly globular, about ½–¾" in diameter, pitted.

In grassy places, in moist or dryish soil, sometimes in woods, Massachusetts to Florida and Louisiana. Plant dark in drying. April–June.
2. *Sisyrinchium Atlánticum* Bicknell. **Eastern Blue-eyed Grass,**
(Fig. 1084.)


Similar to the preceding, but paler, glaucous green, often more tufted, the stem more slender and weaker, rather narrowly 2-winged, very smooth-edged, sometimes 2'' long and reclining, terminating in two or three mostly subequal branches, often also with one or two lateral ones; branches slender and wiry, often recurved and forming a distinct angle with the floral bracts. Leaves narrower, rarely over 1'' wide, the basal ones usually much shorter than the stem; bracts nearly or quite equal, narrow, mostly somewhat scarious, often purplish; flowers slightly smaller; outer surface of perianth and young capsule minutely downy; capsules 2-7, usually 5, on generally erect pedicels, 7''-10'' long; ovary, 1''-2'' long and ¾''-1½'' in diameter; seeds oval, subglobose, ½''-¾'' in diameter, dark, faintly pitted or nearly smooth.

In moist fields, meadows and brackish marshes, often in sandy soil, Newfoundland to Florida, mainly near the coast. May-June.

3. *Sisyrinchium angustifolium* Mill. **Pointed Blue-eyed Grass.** (Fig. 1085.)

*Sisyrinchium anceps* Cav. 6: 345. Fl. Mex. f. 2. 1788.

Pale glaucous green, stems 2-edged, scarcely 2-winged, slender, rigid, erect, 3'-14' tall, simple, or very rarely forking into 2 branches above. Leaves commonly all basal, rigid and often almost setaceous, the edges rough or smooth, ¾''-1¾'' wide, shorter than the stem; bracts very unequal, sometimes purplish, the lower one usually about twice as long as the upper; flowers 6''-8'' broad; pedicels erect, about 8'' long, shorter than the lower bract; capsule subglobose, 2½''-3½'' in diameter; seeds large, ½''-¾'' long, somewhat obovoid, faintly pitted or nearly smooth, brown.

In fields and meadows, Newfoundland to British Columbia, Virginia, Kansas and Colorado. May-Aug.


**ARROWROOT FAMILY.**

Tall herbs, perennial by rootstocks or tubers, or sometimes annual, with scapose or leafy stems, mostly large entire long-petioled sheathing leaves, often swollen at the base of the blade, the veins pinnate, parallel. Flowers perfect or sometimes polygamous, irregular, in racemes, racemes or spikes. Perianth superior, its segments distinct to the summit of the ovary or united into a tube, normally in 2 series of 3, the outer (sepals) usually different from the inner (petals). Perfect stamen 1; anthers 1-2-celled. Staminodia mostly 5, often petal-like, separate or united by their bases, very irregular. Ovary 1-3-celled, inferior; ovule 1 in each cavity, anatropous; style slender, curved, terminal; stigma simple. Fruit capsular or berry-like, 1-3-celled. Seed solitary in each cavity. Embryo central, in copious endosperm.

About 12 genera and 160 species, mostly in the tropics, a few in warm-temperate regions.
1. Thalia dealbata Roscoe. Powdery Thalia. (Fig. 1086.)


Plant finely white-powdery nearly all over. Scapes rather stout, terete, 3°-6° tall; petioles 1°-2½° long, terete; leaves ovate-lanceolate, acute or acuminate at the apex, rounded, narrowed or subcordate at the base, ½°-1° long, 3°-5° wide; panicle 8°-18° long, its spikes numerous, usually erect or ascending; bracts of the panicle narrow, deciduous, not longer than the spikes; bractlets ovate, unequal, coriaceous, about ½° long; flowers purple, longer than the bractlets; capsule ovoid, about 4° in diameter.

In ponds and swamps, South Carolina to Louisiana, Missouri and Texas.


Burmannia Family.

Low annual herbs, with filiform stems and fibrous roots. Leaves basal or reduced to cauline scales or bracts. Flowers regular, perfect, the perianth with 6 small thick lobes, its tube adnate to the ovary. Stamens 3 or 6, included, inserted on the tube of the perianth; anthers 2-celled, the sacs transversely dehiscent. Style slender; stigmas 3, dilated; ovary inferior, with 3 central or parietal placentae. Ovules numerous. Capsule many-seeded. Seeds minute, oblong; endosperm none.

Ten genera and about 60 species, widely distributed in tropical regions. The family is represented in North America by the following genus and Apteria of the Gulf States.


Erect herbs, with simple stems and several alternate scale-like or bract-like leaves. Tube of the perianth strongly 3-angled or 3-winged, the 3 outer lobes longer than the inner. Stamens 3, opposite the inner perianth-lobes. Filaments very short; connective of the anthers prolonged beyond the sacs into a 2-cleft crest. Ovary 3-celled, with 3 thick 2-lobed central placentae; stigmas glbose or 2-lobed. Capsule crowned by the persistent perianth, opening by irregular lateral ruptures. [In honor of Johann Burmann, Dutch botanist of the eighteenth century.]

About 20 species, natives of warm regions. Besides the following another occurs in the southeastern States.

* Text contributed by the late Rev. Thomas Morong.

ORCHID FAMILY.

Perennial herbs, with corms, bulbs or tuberous roots, sheathing entire leaves, sometimes reduced to scales, the flowers perfect, irregular, bracted, solitary, spiked or racemed. Perianth superior, of 6 segments, the 3 outer (sepal) similar or nearly so, 2 of the inner ones (petals) lateral, alike; the third inner one (lip) dissimilar, often markedly so, usually larger, often spurred, sometimes inferior by torsion of the ovary or pedicel. Stamens variously united with the style into an unsymmetrical column; anther 1 or in Cypripedium 2, 2-celled; pollen in 2–8 pear-shaped usually stalked masses (pollinia), united by elastic threads, the masses waxy or powdery, attached at the base to a viscid disk (gland). Style often terminating in a beak (rostellum) at the base of the anther or between its sacs. Stigma a viscid surface, facing the lip beneath the rostellum, or in a cavity between the anther-sacs (clainandrium). Ovary inferior, usually long and twisted, 3-angled, 1-celled; ovules numerous, anatropous, on 3 parietal placentae. Capsule 3-valved. Seeds very numerous, minute, mostly spindle shaped, the loose coat hyaline, reticulated; endospore none; embryo fleshy.

About 410 genera and 5,000 species, of wide distribution, most abundant in the tropics, many of those of warm regions epiphytes.

Anthers 2; lip a large inflated sac.

1. Cypripedium.

Anther-sacs divergent; pollinia with a caudicle which is attached at base to a viscid disk or gland.

Glands enclosed in a pouch.

Glands not enclosed in a pouch.

Anther-sacs parallel; pollinia not produced into a caudicle (except apparently in no. 14).

Pollinia granulose or powdery.

Flowers solitary or few; anther incumbent on a column 4” long or less.

Lip crested with straight, somewhat fleshy hairs.

Column clavate; lip free.

Column linear, dilated above, the lip adherent to its base.

Lip bearded with long club-shaped hairs.

Flowers numerous, in spikes or racemes; anther erect, jointed to a column not over 2” long.

Anther operculate; leaves broad, alternate.

Anther not operculate.

Leaves green, borne on the stem.

Leaves alternate; spike mostly twisted.

Leaves 2, opposite; spike not twisted.

Leaves white-reticulated, basal.

Pollinia smooth and waxy.

Plants with corms or solid bulbs; leaves basal or caudine.

Leaves unfolding before or with the flowers.

Leaf caudine; lip ovate, or auricled at the base.

Leaf or leaves basal.

Leaves 2; lip flat; flowers racemed.

Leaf 1; lip saccate; flower solitary.

1. Cypripedium.

2. Orchis.

3. Habenaria.

4. Pogonia.

5. Arethusa.


7. Gyrostachys.

8. Listera.


10. Aenroanthus.

11. Leptochis.

12. Calypso.

*Text contributed by the late Rev. Thomas Morong.
Leaf 1, basal, unfolding after the flowering time.
Flowers long-spurred; lip 3-lobed.
Flowers not spurred; lip 3-ridged.
Plants with coralliform roots, bulbless, the leaves reduced to scales.
Pollinia 4, in 2 pairs; flowers gibbos or spurred.
Pollinia 8, united; flowers not gibbos nor spurred.


Glandular-pubescent herbs, with leafy stems and scapes and tufted roots of thick fibres.
Leaves large, broad, many-nerved. Flowers solitary or several, drooping, large, showy.
Sepals spreading, separate, or 2 of them united under the lip. Lip a large inflated sac.
Column declined, bearing a sessile or stalked anther on each side and a dilated petaloid
sterile stamen above, which covers the summit of the style. Pollinia granular, without a
caudicle or glands. Stigma terminal, broad, obscurely 3-lobed. [Name Greek, Venus' sock
or buskin.]

About 40 species, natives of temperate and tropical regions. Besides the following, some 4
others occur in western North America.
Sepals separate; stem leafy, 1-flowered.
Lateral sepals more or less united.
Plant 2-leaved; scape 1-flowered.
Stem leafy to the top, 1-several-flowered.
Sepals and petals not longer than the lip.
Sepals and petals longer than the lip.
Sterile stamen lanceolate; lip white.
Sterile stamen triangular; lip yellow.
Lip 1⅜-2 long, pale yellow.
Lip 7½-15 long, bright yellow.

1. Cypripedium arietinum R. Br.
Ram's-head Ladies' Slipper.
(Fig. 1088.)


Stem 8'-12' high, 1-flowered. Leaves 3 or 4, el-
lepict or lanceolate, 2'-4' long, ½'-3' wide; sepals
separate, lanceolate, 8'-10' long, longer than the
lip; petals linear, greenish brown, about as long as
the sepals; lip 7'-8' long, red and white, veiny,
prolonged at the apex into a long blunt spur, some-
what distorted at the upper end which resembles a
ram's head, whence the specific name.

In cold and damp woods, Quebec to Ontario, New

2. Cypripedium acaule Ait. Moccasin
Flower. Noah's Ark. Stemless
Ladies' Slipper. (Fig. 1089.)


Scape 6'-12' high, 1-flowered. Leaves 2, basa,
eliptic, 6'-8' long, 2'-3' wide, thick; occa-
sionally a smaller leaf is borne on the scape;
sepals greenish purple, spreading, 1½'-2' long;
lanceolate, the 2 lateral ones united; petals nar-
rower and somewhat longer than the sepals;
lip often over 2' long, somewhat obovoid, folded
inwardly above, pink with darker veins or some-
times white, the upper part of its interior
surface crested with long white hairs; sterile
stamen triangular, acuminate, keeled inside.

In sandy or rocky woods, Newfoundland to On-
tario, south to North Carolina, Kentucky and Min-
nnesota. Ascends to 4500 ft. in Virginia. The hairs
on the lower part of the bract and on the base of the
ovary are often tipped with scarlet glands. Flower
fragrant. May-June.
3. *Cypripedium reginae* Walt. Showy Ladies' Slipper. (Fig. 1090.)

*Cypripedium reginae* Walt. Fl. Car. 222. 1788.


*Cypripedium specabile* Salisb. Trans. Linn. Soc. 1: 78. 1791.

Stem stout, 1°-2° high, leafy to the top. Leaves elliptic, acute, 3'-7' long, 1'-4' wide. Flowers 1-3; sepals round-ovate, white, not longer than the lip, the lateral ones united for their whole length; petals somewhat narrower than the sepals, white; lip much inflated, over 1' long, variegated with purple and white stripes; stamen cordate-ovate.

In swamps and woods, Nova Scotia to Ontario and Minnesota, south to Georgia. June-Sept.

4. *Cypripedium candidum* Willd. Small White Ladies' Slipper. (Fig. 1091.)


Stem 6'-12' high, leafy. Leaves 3 or 4, elliptic or lanceolate, acute or acuminate, 3'-5' long, 8'/-16' wide, with several obtuse sheathing scales below them; bracts 1'-2' long, lanceolate; flower solitary; sepals lanceolate, longer than the lip, greenish, purple spotted; petals somewhat longer and narrower than the sepals, wavy-twisted, greenish; lip white, striped with purple inside, about 10' long; sterile stamen lanceolate.

In bogs and meadows, New York and New Jersey to Minnesota and Missouri. May-July.

5. *Cypripedium hirsutum* Mill. Large Yellow Ladies' Slipper. (Fig. 1092.)


Stems leafy, 1°-2° high. Leaves oval or elliptic, 3'-5' long, 1½'-3' wide, acute or acuminate; sepals ovate-lanceolate, usually longer than the lip, yellowish or greenish, striped with purple; petals narrower, usually twisted; lip much inflated, 1'-2' long, pale yellow with purple lines; its interior with a tuft of white jointed hairs at the top; sterile stamen triangular; stigma thick, somewhat triangular, incurved.

In woods and thickets, Nova Scotia to Ontario and Minnesota, south to Alabama and Nebraska. Ascends to 4000 ft. in Virginia. Petals often elongated. May-July.
6. Cypripedium parviflorum Salisb.
Small Yellow Ladies' Slipper.
(Fig. 1093.)

*Cypripedium parviflorum* Salisb. Trans. Linn. Soc. i: 77. 1791.

Stems 1'-2' high, slender, leafy. Leaves oval, elliptic or lanceolate, 2'-6' long, 1'-2'/4 wide; sepals and petals longer than the lip; petals usually twisted; lip 7'/4'-15' long, bright yellow, more or less marked with purple stripes, spots or blotches; sterile stamen triangular, yellow and purple spotted like the lip.

In woods and thickets. Newfoundland to British Columbia and Washington, south along the mountains to Georgia, and to Missouri. Ascends to 4000 ft. in Virginia. Similar to the preceding species, with which it appears to intergrade, or of which it may be but a form, but usually distinguished by the smaller size and brighter yellow color of the lip. Sepals and petals sometimes purple. May-July.


Roots of numerous fleshy fibres, stems in our species scape-like, 1-2-leaved at the base. Flowers in short terminal spikes. Sepals separate, subequal, spreading or convivert. Petals similar to the sepals. Lip connate with the base of the column, produced below into a spur. Column short, scarcely extending beyond the base of the lip. Anther 2-celled, the sacs contiguous and slightly divergent; pollinia granulose, 1 large mass in each sac, produced into a slender caudicle, the end of which is attached to a small gland. Stigma a hollowed surface between the anther-sacs, the rostellum a knob-like projection under the anther. Glands enclosed in a pouch. Capsule oblong, erect, without a beak. [Name ancient.]

About 80 species, natives of the north temperate zone. Only the following are known in North America.

Plant 2-leaved at the base.
Plant 1-leaved at the base.

1. *Orchis spectabilis* L. Showy Orchis. (Fig. 1094.)


Stems 4'-12' high, thick, fleshy, 5-angled. Leaves 2, near the base of the stem, with 1 or 2 scales below them, obovate, sometimes 8' long and 4' wide, but usually smaller, clanny to the touch; spike 3-6-flowered; flowers about 1' long, violet-purple mixed with lighter purple and white; bracts foliaceous, sheathing the ovaries; sepals united in an arching galea; petals connivent under the sepals, more or less attached to them; lip whitish, divergent, entire, about as long as the petals; spur obtuse, about 8' long; column violet on the back; capsule about 1' long, strongly angled.

In rich woods, New Brunswick to Ontario and Minnesota, south to Georgia, Kentucky and Nebraska. Ascends to 4000 ft. in Virginia. April-June.
2. **Orchis rotundifolia** Pursh. Small Round-leaved Orchis. (Fig. 1095.)


Stem slender, 8'–10' high, 1-leaved near the base. Leaf varying from nearly orbicular to oval, 1½'–3' long, 1'–2' wide, with 1 or 2 sheathing scales below it; spike 2–6-flowered; flowers 6'–8' long; subtended by small bracts; lateral sepals spreading, sometimes longer than the petals; sepals and petals oval, rose-color; lip white, purple spotted, longer than the petals, 3-lobed, the middle lobe larger, dilated, 2-lobed or notched at the apex; spur slender, shorter than the lip.


Herbs, with thick fibrous or tuberous roots, our species with leafy stems. Flowers greenish, white, purple or yellow, mostly in spikes or racemes. Sepals equal or nearly so, separate, or coherent at the base, the lateral ones usually spreading. Petals mostly smaller than the sepals; lip spreading, or drooping, with a spur at its base, entire, or 3–5-cleft, or lacerate. Column very short. Anther-sacs elevated, more or less divergent. Pollinia coarsely granular; caudicles short; glands naked. [Latin; a rein or strap.]

About 400 species, widely distributed. Besides the following, some 20 others occur in the southern and western parts of North America.

Leaves only 2, basal.
Scape bracted.
Scape naked.
Leaf solitary.
Leaves several or numerous.
Lip not 3-parted.
Lip entire.

Lip with or without twisted.  
1. **H. orbiculata.**
2. **H. Hookeriiana.**
3. **H. obtusata.**

Lip lanceolate; flowers greenish yellow.
Lip rhombic; dilated at the base; flowers white.
Lip crenulate or erose-dentate; flowers orange-yellow.
Lip 2–3-toothed.
Lip toothed at the apex.
Spur sac-like, shorter than the ovary.
Spur slender, longer than the ovary.
Lip with an obtuse tooth on each side at the base, and a central tubercle.

Lip pectinately fringed.
Spur half as long as the ovary; flowers yellow.
Spur longer than the ovary.
Flowers bright yellow.
Flowers white.

Lip 3-parted.

Segments of the lip deeply fringed.
Segments narrow; fringe of a few threads.
Segments broadly fan-shaped; fringe copious.
Segments fringed to the middle; flowers white.
Segments fringed to about one-third or less; flowers lilac.
       Raceme 2½–2½' thick; lip ½–1' broad.
Segments of the lip cut-toothed; flowers violet-purple.

14. **H. lacera.**
15. **H. lenophaea.**
16. **H. grandiflora.**
17. **H. psycodes.**
18. **H. peramoena.**
1. Habenaria orbiculata (Pursh) Torr. Large Round-leaved Orchis. (Fig. 1096.)

_Habenaria orbiculata_ Torr. Comp. 318. 1826.

Scape stout, bracted, 1°-2° high, occasionally bearing a small leaf. Basal leaves 2, orbicular, spreading flat on the ground, shining above, silvery beneath, 4’-7’ in diameter; raceme loosely many-flowered; pedicels nearly ½’ long, the fruiting ones erect; flowers greenish white; upper sepal short, rounded; lateral sepals spreading, falcate-ovate, obtuse 4’’-5’’ long; petals smaller; lip oblong-linear, entire, obtuse, white, about 6’’ long; spur much longer than the ovary, often 1½’ long; anther-sacs prominent, converging above; glands small, orbicular, nearly ¾’ apart, their faces turned toward the axis.

In rich woods, Newfoundland to British Columbia, south to North Carolina and Minnesota. Ascends to 4500 ft. in Virginia. July-Aug.

2. Habenaria Hookeriiana A. Gray. Hooker’s Orchis. (Fig. 1097.)

_Habenaria Hookeri_ var. _orbiculata_ Paine, Cat. Pl. Oneida. 83. 1865.

Scape 8’-15’ high, not bracted. Leaves 2, basal, fleshy, shining, spreading or ascending, oval, orbicular or obovate, 3’-5½’ long; raceme rather loosely many-flowered, 4’-8’ long; bracts acute, about as long as the yellowish green flowers; lateral sepals greenish, lanceolate, acute, spreading, about 4’ long; petals narrowly linear or awl-shaped; lip linear-lanceolate, acute, 4’’-5’’ long; anther-sacs widely diverging below; glands small, their faces turned inward; spur slender, acute, 8’’ long or more, as long as the ovary or considerably longer.


3. Habenaria obtusata (Pursh) Richards. Small Northern Bog Orchis. (Fig. 1098.)


Scape slender, naked, 4’-10’ high, 4-angled. Leaf solitary, basal, obovate, 2’-5’ long, 5’’-12’ wide; spike 1’-2½’ long, loose flowers greenish yellow, about 3’ long; upper sepal erect, round-ovate, green with whitish margins; lateral sepals spreading, oblong, obtuse; petals shorter, dilated or obtusely 2-lobed at the base, connate with the base of the column; lip entire, lanceolate, obtuse, deflexed, about 3’ long; spur about as long as the lip, slender, nearly straight, blunt; anther-sacs widely divergent below, glands small, rather thick.

4. Habenaria nivea (Nutt.) Spreng.
Southern Small White Orchis.
(Fig. 1099.)

Habenaria nivea Spreng. Syst. 3: 689. 1826.

Stem slender, angled, 12'-15' high. Leaves linear-lanceolate, acuminate, 4'-8' long, the upper much shorter and passing into the bracts of the spike; spike 2'-4' long, loosely many-flowered; flowers small, white; lateral sepals broadly oblong, dilated or slightly eared at the base, spreading, about 3'' long; petals and upper sepal smaller; spur capillary, as long as the ovary or longer; stigma appended by 2 small horns affixed to the back of the anther; ovary straight.

In pine barren bogs, Delaware to Florida and Alabama. Aug.

5. Habenaria hyperborea (L.) R. Br.
Tall Leafy Green Orchis. (Fig. 1100.)

Orchis hyperborea L. Mant. 121. 1767.

Stem rather stout, 8'-9' high. Leaves lanceolate, mostly acute, 2'-12' long, 6'-18'' wide; spike narrow, 3'-8' long; flowers small, greenish or greenish yellow; sepals and petals ovate, obtuse, 2''-3'' long; upper sepal slightly crenulate at the apex; lip lanceolate, entire, obtuse, about 3'' long; spur about equaling the lip, shorter than the ovary, blunt, slightly incurved, sometimes clavate; anther-sacs parallel, diverging at the base; glands small; ovary more or less twisted.

In bogs and wet woods, Nova Scotia to Alaska, south to New Jersey, Colorado and Oregon. Ascends to 4000 ft. in Vermont. May-Aug.

Tall White Bog Orchis. (Fig. 1101.)

Habenaria dilatata Hook. Exot. Fl. 2: pi. 95. 1825.

Stem slender, leafy, 10'-20'' high. Leaves lanceolate, 3'-12' long, 3'-10'' wide, obtuse or acute; spike 2'-10' long; bracts acute, the lower longer than the ovary, the upper shorter; flowers small, white; sepals ovate, obtuse, nearly 3'' long; lip entire, dilated or obtusely 3-lobed at the base, obtuse at the apex, about as long as the blunt incurved spur; anther-sacs nearly parallel; glands close together, strap-shaped, nearly as long as the pollinia and caudicle; stigma with a trowel-shaped beak between the bases of the anther-sacs; ovary more or less twisted.

7. **Habenaria integra** (Nutt.) Spreng.  
Small Southern Yellow Orchis.  
(Fig. 1102.)

*Orchis integra* Nutt. Gen. 2: 188. 1818.  
*Habenaria integra* Spreng. Syst. 3: 689. 1826.

Stem 1°-2° high, angled, with 1-3 linear-lanceolate leaves below, and numerous bract-like ones above. Lower leaves 2'-8' long, acute; spike 1'-3' long, densely flowered; flowers orange-yellow; upper sepals and petals connivent; lateral sepals longer, oval or obovate, spreading; lip oblong, mostly crenulate or erose, sometimes entire; spur straight, longer than the lip, shorter than the ovary; stigma with 2 lateral fleshy appendages and a narrow beak.

In wet pine barrens, New Jersey to Florida and Louisiana. The upper surface of the leaves is often reticulated with hexagonal cells. July.

8. **Habenaria bracteata** (Willd.) R. Br.  
Long-bracted Orchis.  
(Fig. 1103.)

*Orchis bracteata* Willd. Sp. Pl. 4: 34. 1805.  

Stem slender or stout, leafy, 6'-2° high. Leaves lanceolate, ovate or oval, or the lowest sometimes obovate, obtuse or acute, 2'-5' long, the upper much smaller; bracts longer than the ovaries, the lower ones 2 or 3 times as long; spike 3'-5' long, loosely flowered; flowers green or greenish; sepals ovate-lanceolate, spreading, dilated or somewhat gibbous at the base, about 3" long; petals very narrow, sometimes thread-like; lip 3"-4" long, oblong-spatulate, 2-3-toothed or lobed at the apex, more than twice as long as the white sac-like spur; anther-sacs divergent at the base.

In woods and meadows, New Brunswick to British Columbia, south to North Carolina and Nebraska. Also in Europe. Ascends to 3600 ft. in Virginia. May-Sept.

9. **Habenaria clavellata** (Michx.) Spreng.  
Small Green Wood Orchis.  
(Fig. 1104.)

*Habenaria clavellata* Spreng. Syst. 3: 689. 1826.

Stem 8'-18' high, angled, 1-leaved near the base, often with several small bract-like leaves above, or one of these larger. Basal leaf oblanceolate, 2'-6' long; bracts shorter than the ovaries; spikes ½'-2' long, loosely flowered; flowers small, greenish or whitish; sepals and petals ovate, lip dilated and 3-toothed at the apex, the teeth often small and inconspicuous; spur longer than the ovary, incurved, clavate; stigma with 3 club-shaped appendages; anther-sacs nearly parallel; capsule ovoid, 3"'-4" long, nearly erect.

1 In wet or moist woods, Newfoundland to Minnesota, south to Florida and Louisiana. Ascends to 6000 ft. in North Carolina. July-Aug.
10. Habenaria flava (L.) A. Gray. Tubercled Orchis. Small Pale-green Orchis. (Fig. 1105.)

Orchis flava L. Sp. Pl. 942. 1753.
Habenaria virescens Spreng. Syst. 3: 688. 1826.

Stem rather stout, 1°-2° high, leafy. Leaves lanceolate or elliptic, acute or obtuse, 4'-12' long, 8''-3' wide; spike 2'-6' long; bracts acuminate, longer than the ovaries; petals greenish; sepals and petals ovate or roundish, about 3'' long; sepals greenish yellow, lip a little longer than the petals, entire or crenulate, with an obtuse tooth on each side and a central tubercle at the middle of the base; anther-sacs parallel, the sides forming a rounded cavity, in which lie the orbicular incurved glands; capsule about 4'' long.

In moist soil, Ontario to Minnesota, south to Florida and Louisiana and Missouri. June-July.

11. Habenaria cristata (Michx.) R. Br. Crested Yellow Orchis. (Fig. 1106.)


Stem slender, angled, 8'-2° high. Leaves narrowly lanceolate, 2'-8' long, 3''-8'' wide, the upper much smaller, similar to the bracts; bracts as long as the flowers; spike 2'-4' long, dense; flowers orange; sepals roundish-ovate, about 1 1/2'' long, the lateral ones spreading; petals narrower, pectinate-fringed; lip slightly longer than the sepals, not 3-parted, but deeply fringed to the middle or beyond; spur 2''-3'' long, about half as long as the ovary; anther-sacs divergent at the base, widely separated.

In bogs, New Jersey to Florida and Louisiana. July-Aug.

12. Habenaria ciliaris (L.) R. Br. Yellow Fringed Orchis. (Fig. 1107.)


Stem slender, 1°-2 1/2° high. Leaves lanceolate, acute, 4'-8' long, 6''-18'' wide, the upper smaller; spike closely many-flowered, 3'-6' long, sometimes nearly 3' thick; flowers orange or yellow, large, showy; sepals orbicular or broadly ovate, oblique at the base, 2''-4'' long; the lateral ones mostly reflexed; petals much smaller, oblong or cuneate, usually toothed; lip oblong, 5''-7'' long, copiously fringed more than halfway to the middle; spur 1'-1 1/2' long, very slender; anther-sacs large, divergent at the base, bearing a small white tubercle on the outer side.

In meadows, Vermont (?) and Ontario to Michigan, south to Florida and Texas. July-Aug.
13. Habenaria blephariglottis (Willd.) Torr. White Fringed Orich. (Fig. 1108.)

Habenaria blephariglottis Torr. Comp. 317. 1826.

Stems and leaves similar to those of the preceding species. Spikes densely or rather loosely many-flowered; flowers pure white, usually a little smaller than those of H. ciliaris; lip narrower, oblong; petals toothed or somewhat fringed at the apex; fringe of the lip copious or sparse.

In bogs and swamps, Newfoundland to Minnesota and New Jersey. Intermediate forms between this and the preceding species, with light yellow flowers, are probably hybrids. Blooms a few days earlier than ciliaris where the two grow together. July–Aug.

Habenaria blephariglottis holopetala (Lindl.) A. Gray, Man. Ed. 5, 502. 1897.

One or both of the petals entire; lip often sparingly fringed. With the type, probably a mere form.

14. Habenaria laceræ (Michx.) R. Br. Ragged Orich. (Fig. 1109.)


Stem rather slender, 1°–2° high. Leaves firm, lanceolate, 5’–8’ long, 10’/18’ wide, the upper gradually smaller; spike 2’–6’ long, loose; flowers greenish yellow; sepals ovate, obtuse, about 3’ long, the upper one a little broader than the others, petals linear, entire, obtuse, about as long as the sepals; lip 3-parted, the segments narrow, deeply fringed, the fringe of a few threads, about ½’ long; spur 7’/”–8’ long, curved, shorter than the ovary, clavate at the apex; anther-sacs divergent at the base, their bases beaked and projecting upward; glands oblong-linear, hyaline, as long as the caudicle.

In swamps and wet woods, Nova Scotia to Minnesota, south to Georgia and Missouri. June–July.

15. Habenaria leucophaea (Nutt.) A. Gray. Prairie White-fringed Orich. (Fig. 1110.)


Stem stout, angled, 1½°–2½° high. Leaves lanceolate, 4’–8’ long; spike 3’–5’ long, very thick, loosely flowered; flowers large, white, fragrant, sometimes tinged with green; sepals broadly ovate; petals obovate, minutely cut toothed, about 3’ long; lip 3-parted, 6’–7’ long, the segments broadly wedge-shaped and copiously fringed. Spur 1’–1½’ long, longer than the ovary; anther-sacs widely diverging at the base; caudicles long and slender; glands transversely oval; ovary often recurved.

16. Habenaria grandiflora (Bigel.) Torr. Large Purple-fringed Orich. (Fig. 1111.)

Habenaria grandiflora Torr. Comp. 419. 1826.
Habenaria fimbriata A. Gray, Man. Ed. 5, 593. 1867.

Not R. Br. 1814.
Stem 1°-5° high. Leaves oval or lanceolate, 4'-10' long, 10''-3' wide, obtuse, or the upper smaller and acute; raceme 3'-15' long, sometimes 2½' thick, densely flowered; flowers lilac or purplish, sometimes white or nearly so, fragrant; upper sepal and petals erect, connivent; petals oblong or oblanceolate, more or less toothed, ½' long; lip 3-parted, ½'-1' broad, about ½' long, the segments broadly fan-shaped, copiously fringed to about the middle, anther-sacs divergent at the base; glands orbicular, turned inward; spur filiform, clavate, 1½'-1½' long.

In rich woods and meadows, New Brunswick to Ontario and Michigan, south to North Carolina. June-Aug.

17. Habenaria psycodes (L.) A. Gray. Smaller Purple-fringed Orich. (Fig. 1112.)


Stem rather slender, 1°-3° high. Leaves oval, elliptic or lanceolate, 2'-10' long, 8'-3' wide, the upper smaller; raceme 2'-6' long, 1'-1½' thick, loosely or densely several-many-flowered; flowers lilac, rarely white, fragrant; lower sepals ovate, obtuse, about 4'' long, the upper one a little narrower; petals oblong or oblanceolate, toothed on the upper margin; lip 3-parted, 4''-6'' broad, the segments fan-shaped and copiously fringed, the fringe of the middle segment shorter than that of the lateral ones; spur somewhat clavate at the apex, about 8'' long, longer than the ovary.

In meadows, swamps and wet woods, Newfoundland to Minnesota, south to North Carolina and Indiana. Ascends to 6000 ft. in North Carolina. July-Aug.

18. Habenaria peramoena A. Gray. Fringeless Purple Orich. (Fig. 1113.)


Stem 1½'-2½' high. Leaves elliptic or lanceolate, 4'-8' long, ½'-1½' wide, the upper gradually smaller; spike 2'-7' long, 1½'-2½' thick, densely or rather loosely many-flowered; flowers large, showy, violet-purple; lateral sepals round-ovate, 3½'-4½' long, the upper one smaller; petals smaller, round-ovate, clawed, entire, or slightly erose; lip 7½'-10' long, 3-parted, the segments fan-shaped, cut-toothed, not fringed, the middle one 2-lobed; spur about as long as the ovary, curved, clavate; anther-sacs widely divergent, little separated; glands orbicular, oblique.


Mostly low herbs, the flowers terminal, solitary or in racemes, the leaves usually alternate or verticillate. Sepals and petals separate, erect or ascending. Lip erect from the base of the column, spurred. Column elongated, club-shaped at the summit. Anther terminal, stalked, attached to the back of the column, its sacs parallel; pollinia 2, 1 in each sac, powdery-granular, without a caudicle. Stigma a flattened disk below the anther. Capsule oblong or ovoid, erect or drooping. [Greek, bearded, from the bearded lip of some species.]

About 30 species, widely distributed. Only the following are known in North America.

Sepals and petals nearly equal and alike.

Lip crested.
Lip not crested.

Sepals longer and narrower than the petals.
Stem bearing a single leaf near the middle.
Lip crested along a narrow line down the face; peduncle as long as the capsule or longer.
Lip crested over the whole face and lobes; peduncle shorter than the capsule.

1. *Pogonia ophioglossoides* (L.) Ker. Rose Pogonia. Snake-mouth. (Fig. 1114.)


Stem 5'-15' high, 1-3-leaved, not rarely with a long-petioled basal leaf. Stem leaf or leaves ½'-3' long, lanceolate or ovate, erect, bluntly acute; flowers fragrant, pale rose-color, slightly nodding, large, solitary or occasionally in pairs, subtended by a foliaceous bract; sepals and petals about equal, elliptic or oval, 6''-10'' long; lip spatulate, free or somewhat appressed to the column below, crested and fringed; column much shorter than the petals, thick, club-shaped.

In meadows and swamps, Newfoundland to Ontario, Florida and Kansas. Also in Japan. Roots fibrous. June-July.

2. *Pogonia trianthophora* (Sw.) B.S.P. Nodding Pogonia. (Fig. 1115.)


*Pogonia trianthophora* B.S.P. Prel. Cat. N. Y. 52. 1888.

Stem glabrous, 5'-8' high, from a tuberous root, often clustered. Leaves 2-8, alternate, ovate, 3''-9'' long, clasping; flowers 1-7, on axillary peduncles, pale purple, at first nearly erect, soon drooping; perianth 6''-8'' long; sepals and petals about equal, connivent, elliptic, obtuse; lip clawed, somewhat 3-lobed, roughish or crisped above, not crested, about as long as the petals; capsule oval, drooping, about 6'' long.

3. **Pogonia divaricata** (L.) R. Br. Spreading Pogonia. (Fig. 1116.)


Stem 1°-2° high, bearing a leaf near the middle, and a foliaceous bract near the flower. Leaf lanceolate, or narrowly elliptic, obtuse, clasping, 2'-4' long; flower terminal, solitary, about 1' long; sepals linear, longer and narrower than the petals, diverging dark colored; petals flesh-color, lanceolate, narrowed at the apex, lip as long as the petals, 3-lobed, crenulate or wavy-margined, greenish, veined with purple, crested, but not bearded, the upper lobe long.

In swamps, southern New Jersey to Florida and Alabama. Ascends to 4000 ft. in North Carolina. Reported from Wisconsin. July.

4. **Pogonia verticillata** (Willd.) Nutt. Whorled Pogonia. (Fig. 1117.)


Stem 10'-12' high, from long fleshy roots, bearing a whorl of 5 leaves at the summit. Leaves obovate, abruptly pointed at the apex, sessile, 1'-3' long; flower solitary, erect or declined; peduncle 6'-8' long, in fruit usually equalling or exceeding the capsule; sepals linear, 1½'-2' long, about 1'' wide, spreading, dark purple; petals linear, erect, obtuse, greenish yellow, about 10'' long; lip 3-lobed, crested along a narrow band, the upper part expanded, undulate; capsule erect, 1' or more long.

In moist woods, Ontario to Wisconsin, Indiana and Florida. Ascends to 4500 in Virginia. May-June.

5. **Pogonia affinis** Austin. Smaller Whorled Pogonia. (Fig. 1118.)

*Pogonia affinis* Austin; A. Gray, Man. Ed. 5, 507. 1867.

Smaller than the preceding species, stem 8'-10' high. Leaves in a whorl of 5 at the summit, 1'-2' long; flowers 2 or solitary, greenish yellow; peduncle 2'-4' long, much shorter than the ovary and capsule; sepals equalling the petals, or but little longer, somewhat narrowed at the base; lip crested over nearly the whole face and lobes; capsule erect, 1' long or less.

In moist woods, Connecticut to southern New York and New Jersey. Rare and local. The species is imperfectly known. Our figure is taken from Mr. Austin's original sketches. June.

Low herbs, with small bulbs and mostly solitary flowers on bracted scapes, the solitary leaf linear, hidden at first in the upper bract, protruding after flowering. Sepals and petals about equal, connivent and hooded above, coherent below. Lip dilated and recurved-spreading at the apex, crested on the face with straight somewhat fleshy hairs, slightly gibbous at the base. Column adherent to the lip below, linear, narrowly winged and dilated at the summit. Anther operculate, of 2 approximately sacs incumbent upon the column; pollinia 4, 2 in each sac, powderly-granular. Capsule erect, ellipsoid, strongly angled. [Dedicated to the nymph Arethusa.]

Two known species, the following occurring in North America, the other in Japan.

1. Arethusa bulbosa L. Arethusa.  
(Fig. 1 1 1 9.)


Scape glabrous, 5'-10' high, bearing 1-3 loose sheathing bracts. Leaf linear, many-nerved, becoming 4'-6' long; flower solitary (rarely 2), arising from between a pair of small unequal scales, rose-purple, 1'-2' high; sepals and petals linear to elliptic, obtuse, arched over the column; lip usually drooping beneath the sepals and petals, the apex broad, rounded, often fringed or toothed, variegated with purplish blotches, bearded, crested down the face in three white hairy ridges; capsule about 1' long, ellipsoid, strongly 6-ribbed, rarely maturing.

In bogs, Newfoundland to Ontario and Minnesota, south to North Carolina and Indiana. May-June.


Tall stout herbs with fibrous roots and simple leafy stems. Leaves ovate or lanceolate, plicate, clasping. Flowers leafy-bracted, in terminal racemes. Sepals and petals all separate. Spur none. Lip free, sessile, broad, concave below, constricted near the middle, the upper portion dilated and petal-like. Column short, erect. Anther operculate, borne on the margin of the clinandrium, erect, ovate or semiglobose, its sacs contiguous. Pollinia 2-parted, granulose, becoming attached to the glandular beak of the stigma. Capsule oblong, beakless. [Greek name for Helleborine.]

About 10 species, widely distributed. Besides the following, another occurs in the western United States.

1. Epipactis viridiflora (Hoffm.) Reichb.  
Helleborine. (Fig. 1 1 2 0.)

Epipactis latifolia var. viridiflora Irmin. Linnaea, 10: 451. 1842.  
Epipactis viridiflora Reichb. Fl. Exc. 134. 1830.  
Epipactis Helleborine A. Gray, Man. Ed. 6, 594. 1890.  
Not Crantz. 1769.

Stem 1°-2° high, glabrous below, pubescent above. Leaves ovate or lanceolate, obtuse or acute, 1½'-3' long, 9'-1½' wide; flowers greenish yellow to purple; pedicels 2'-3' long; sepals 4'-5' long, lanceolate; petals narrower; lip expanded into a slightly undulate apex, tapering to a point; bracts lanceolate, longer than the flowers.

Near Toronto, Ontario; Syracuse and Buffalo, 'New York; the only American stations known. Widely distributed in Europe. Sometimes confounded with the European E. latifolia, but differs in having the lip free from callosities, its apex acute, the sepals and petals longer and more tapering. July-Aug.

Erect herbs, with fleshy-fibrous or tuberous roots and slender stems or scapes, leaf-bearing below or at the base. Flowers small, sparsely, spiked, 1-3-rowed, the spikes more or less twisted. Sepals free, or more or less coherent at the top, or united with petals into a galea. Lip sessile or clawed, concave, erect, embracing the column and often adherent to it, spreading and crisp, or rarely lobed or toothed at the apex, bearing minute callosities at the base. Column arched below, obliquely attached to the top of the ovary. Anther without a lid, borne on the back of the column, erect. Stigma ovate, prolonged into an acuminate beak, at length bifid, covering the anther and stigmatic only underneath. Pollinia 2, in each sac, powdery. Capsule ovoid or oblong, erect, [Greek, referring to the twisted spikes].

About 80 species, widely distributed in tropical and temperate regions. Besides the following, another occurs in the Southern States and one in California. The flowers are often fragrant.

Flowers 3-ranked; stems not twisted, or but slightly so.

Sepals and petals more or less connivent into a hood.

Lateral sepals separate, free.

Spike short, about 4' long, 4'-5' thick; callosities none, or mere thickening of the basal margins of the lip.
Spike 4'-6' long, 6'-10' thick; callosities nipple-shaped.
Spike 6'-7' thick; callosities hairy, straight.
Spike 8'-9' thick; callosities glabrous, incurved.

Flowers merely alternate, appearing second from the spiral twisting of the stem.

Stem leafy; lower leaves elongated, mostly persistent through the flowering season.

Stem a bracted scape; leaves basal, mostly withering before the flowering season.

Root a single tuber; spike about 1' long.

Root a cluster of tubers; spike 1'-3' long.

1. G. Romanzoffiana.  
2. G. plantaginea.
3. G. cornua.
4. G. odorata.
5. G. braccis.
6. G. simplex.
7. G. gracilis.

1. Gyrostachys Romanzoffiana (Cham.) MacM. Hooded Ladies’ Tresses. (Fig. 1121.)

Spiranthes Romanzoffiana Cham. Limnæa, 3: 32. 1828.  
Gyrostachys Romanzoffiana MacM. Met. Minn. 171. 1892.

Stem 6'-15' high, glabrous, leafy below, bracted above, the inflorescence rarely puberulent. Lower leaves 3'-5' long, linear or linear-ob lanceolate; spike 2'-3' long, 4'-6' thick; bracts shorter than the flowers; flowers in 3 rows, white or greenish, ringent, 3'-4' long, spreading horizontally, very fragrant; sepals and petals broad at the base, all more or less connivent into a hood; lip oblong, broad at the base, contracted below the dilated crisp apex, thin, transparent, veined; callosities mere thickenings of the basal margins of the lip, or none.


2. Gyrostachys plantaginea (Raf.) Britton. Wide-leaved Ladies’ Tresses. (Fig. 1122.)

Spiranthes cornua var.? latifolia Torr. Comp. 320. 1826.  

Stem 4'-2' high, glabrous or pubescent, bracted above, bearing 4 or 5 lanceolate or oblanceolate leaves below. Leaves 1'-5' long; spike 1'-2' long, 4'-5' thick, dense; floral bracts mostly much shorter than the flowers; flowers spreading, about 3'-5' long; petals and sepals white; lateral sepals free, narrowly lanceolate, the upper somewhat united with the petals; lip pale yellow on the face, oblong, not contracted in the middle, the wavy apex rounded, crisped or fringed, the base short-clawed; callosities none, or mere thickenings of the lip margins.

Nodding Ladies' Tresses. (Fig. 1123.)

*Ophrys cernua* L. Sp. Pl. 496. 1753.

Stem 6''-25'' high (rarely taller), usually pubescent above, mostly bearing 2-6 acuminate bracts. Leaves nearly basal, linear-oblong or linear, 3''-14'' long, the blade narrow, the petiole 2''-10'' long; spike 4'-5'' long, 6''-7'' thick; flowers white or yellowish, fragrant, nodding or spreading, about 5'' long, in 3 rows; lateral sepals free, the upper arching and connivent with the petals; lip oblong, or sometimes ovate, the broad apex rounded, crenulate or crisped; callosities nipple-shaped, straight, hairy.

In wet meadows and swamps, Nova Scotia to Ontario and Minnesota, south to Florida and Louisiana. Aug.-Oct.

Fragrant Ladies' Tresses. (Fig. 1124.)


Stem stout, 1'-2' high, strongly pubescent above. Lower and basal leaves 8'-15' long, 7'-2' wide, tapering into sheathing petioles, the upper reduced to bracts; spike 5'-6' long, 8'-10'' thick, floral bracts often exceeding the flowers, long-acuminate; flowers yellowish white, fragrant, 5'' long; lateral sepals free; lip as long as the petals, oblong, broad at the base, contracted above the middle, the dilated apex crisped or toothed; callosities nipple-shaped, incurved, glabrous.


5. Gyrostachys praecox (Walt.) Kuntze.
Grass-leaved Ladies' Tresses. (Fig. 1125.)

*Spiranthes graminea* var. *Walteri* A. Gray, Man. Ed. 5, 305. 1867.
*Spiranthes praecox* S. Wats. in A. Gray, Man. Ed. 6, 505. 1890.

Stem slender, 10'-30' high, glandular-pubescent above, leafy. Leaves linear, 4'-12' long, with narrow grass-like blades and long sheathing petioles, mostly persistent through the flowering season, the upper smaller; spike usually much twisted, 2'-8' long, 4'-6' thick; bracts about as long as the ovaries; flowers white or yellowish, about 4'' long, spreading; lateral sepals free, the upper somewhat connivent with the petals; lip about 3'' long, short-clawed, oblong, contracted above, the dilated apex obtuse, crenulate, often dark-striped in the middle; rostellum very acute; callosities small, glabrous.

In grassy places, southern New York to Florida and Louisiana. July-Aug.
6. *Gyrostachys simplex* (A. Gray) Kuntze. Little Ladies' Tresses. (Fig. 1126.)

*Spiranthes simplex* A. Gray, Man. Ed. 5, 396. 1867.


Stems very slender, 5'-9' high, with small deciduous bracts above. Leaves basal, ovate or oblong, short, abruptly narrowed into a petiole, mostly disappearing at or before the flowering time; spike slender, about 1' long and 3'' thick, glabrous, little twisted; flowers white, 1''-1 1/2'' long; lip thin, striped, obovate-oblong, crisped at the summit, short-clawed; callosities nipple-shaped, slender; root a solitary spindle-shaped tuber.

In dry sandy soil, Massachusetts to Maryland. Aug.-Sept.

7. *Gyrostachys grácilis* (Bigel.) Kuntze. Slender Ladies' Tresses. (Fig. 1127.)


*Spiranthes gracilis* Beck, Bot. 313. 1833.


Stem slender, 8'-2' high, from a cluster of spindle-shaped tuberous roots, glabrous, or rarely pubescent above, bearing small deciduous bracts. Leaves basal, obovate, or ovate-lanceolate, petiolated, the blades 3/2'-2' long, 4''-10'' wide, mostly perishing before the flowering season; spike 1'-3' long, 4''-6'' thick, loose, usually much twisted; flowers white, fragrant, 2''-2 1/2'' long; sepals a little longer than the lip, the lateral ones free; lip about 2'' long, oblone, dilated and crenulate or wavy-crisped at the apex, usually thick and green in the middle, white and hyaline on the margins, slightly clawed at the base; callosities small, nipple-shaped.


Small herbs, with fibrous or sometimes rather fleshy-fibrous roots, bearing a pair of opposite green leaves near the middle, and 1 or 2 small scales at the base of the stem. Flowers in terminal racemes, spurless. Sepals and petals nearly alike, spreading or reflexed, free. Anther without a lid, erect, jointed to the column. Pollinia 2, powdery, united to a minute gland. Capsule ovoid or obovoid. [Name in honor of Martin Lister, 1638 (?)–1712, a correspondent of Ray.]

About to species, natives of the north temperate and arctic zones. Besides the following, another occurs in northwestern North America.

Lip broadly wedge-shaped, 2-lobed at the apex.
Lip narrowly linear or setaceous.
Lip 2-cleft, twice as long as the petals.
Lip 2-parted, 4-8 times as long as the petals.

1. *L. convallarioides*.
2. *L. cordaia*.
3. *L. australis*. 
1. **Listera convallarioides** (Sw.) Torr.  
(Broad-lipped Twayblade.  
(Fig. 1128.)

*Listera convallarioides* Torr. Comp. 320. 1826.

Stem 4'-10' high, glandular-pubescent above the leaves. Leaves smooth, round-oval or ovate, obtuse or cuspidate at the apex, sometimes slightly cordate or reniform at the base, 3-9-nerved. Raceme 1½'-3' long, loosely 3-12-flowered; flowers greenish yellow, pedicels filiform, bracted, 3/4'-1'' long; petals and sepals linear-lanceolate, much shorter than the lip; lip broadly wedge shaped, with 2 obtuse lobes at the dilated apex, generally with a tooth on each side at base; column elongated, but shorter than the lip, a little incurved, with 2 short projecting wings above the anther; capsule obovoid, about 3'' long.

In woods, Nova Scotia to Alaska and California, south to Vermont, along the mountains to North Carolina. Ascends to 4500 ft. in North Carolina. June-Aug.

2. **Listera cordata** (L.,) R. Br.  
(Heart-leaved Twayblade.  
(Fig. 1129.)

*Ophrys cordata* L. Sp. Pl. 946. 1753.  

Stem very slender, glabrous or nearly so, 3'-10' high. Leaves sessile, cordate, ovate, mucronate, ½'-1' long; racemes rather loose, ½'-2' long, 4-20-flowered; flowers purplish, minute; pedicels bracted, about 1'' long; sepals and petals oblong-linear, scarcely 1'' long; lip narrow, often with a subulate tooth on each side at the base, twice as long as the petals, 2-cleft, the segments setaceous and ciliolate; column very small, the clinandrium just appearing above the anther; capsule obovoid, 2' long.


3. **Listera australis** Lindl.  
(Southern Twayblade.  
(Fig. 1130.)


Stem slender, 4'-10' high, more or less pubescent above. Leaves ovate, acutish, mucronate, glabrous, shining, 8'-10'' long, 3-7-nerved; raceme 2'-3'' long, loosely 8-15-flowered; flowers yellowish green with purplish stripes; sepals and petals minute; lip ½'-½' long, 2-parted, split nearly to the base, 4-8 times as long as the petals, its segments linear-setaceous; column very small; capsule ovoid.

In bogs, New York and New Jersey to Florida and Alabama and Louisiana. A third leaf is rarely borne below the flowers.
9. PERA\n\n1812.
\nHerbs with bracted erect scapes, the leaves basal, tufted, often blotched with white, the roots thick fleshy fibres. Flowers in bracted spikes. Lateral sepals free, the upper one united with the petals into a galea. Lip sessile, entire, roundish ovate, concave or saccate; without callusities, its apex reflexed. Anther without a lid, erect or incumbent, attached to the column by a short stalk; pollinia one in each sac, attached to a small disk which coheres with the top of the stigma, composed of angular grains.

About 25 species, widely distributed in temperate and tropical regions.
Spike one-sided.
Scape not one-sided.

Flowers 2'–3' long; galea ovate, its short tip usually not recurved.
Flowers 3'–4' long; galea ovate-lanceolate, its long tip recurved.

1. Peramium repens (L.) Salisb. Lesser Rattlesnake Plantain. (Fig. 1131.)

Satyrium repens L. Sp. Pl. 945. 1753.


Scape 5'–10' high, glandular-pubescent, bearing several small scales. Leaves ovate, the blade 6'–15' long, 4'–8' wide, somewhat reticulated or blotched with white, tapering into a sheathing petiole spike short, 1-sided; flowers greenish white, 2'–3' long; galea concave, ovate, with a short spreading or slightly recurved tip; lip saccate, with a narrow recurved or spreading apex; column very short; anther 2-celled; pollinia not prolonged into a caudicle.


2. Peramium pubescens (Willd.) MacM. Downy Rattlesnake Plantain. (Fig. 1132.)


Peramium pubescens MacM. Met. Minn. 172. 1892.

Usually larger than the preceding species, scape 6'–20' high, densely glandular-pubescent, bearing 5–10 lanceolate scales. Leaves 1'–2' long, 8'–1' wide, strongly white-reticulated, oval or ovate; spike not 1-sided; flowers 2'–3' high, greenish white; lateral sepals ovate; galea ovate, its short tip usually not recurved; lip strongly saccate with a short broad obtuse recurved or spreading tip.

In dry woods, Newfoundland to Ontario and Minnesota, south to Florida and Tennessee. Ascends to 4000 ft. in North Carolina. July–Aug.
3. Peramium Menziessii (Lindl.) Morong. Menzies' Rattlesnake Plantain. (Fig. 1133.)

Spiranthes decipiens Hook. Fl. Bor. Am. 2: 203. 1839?

Scape stout, 8'-15' high, glandular-pubescent. Leaves ovate-lanceolate, $\frac{1}{2}'-2\frac{1}{2}'$ long, $\frac{1}{2}'-1\frac{1}{2}'$ wide, the blade acute at both ends, often without white blotches or reticulations; spike not 1-sided; flowers 3'-4' long; galea concave, ovate-lanceolate, the tip long, usually recurved, lip swollen at the base, with a long narrow recurved or spreading apex; anther ovate, pointed, on the base of the column, which is prolonged above the stigma into a gland-bearing awl-shaped beak.


[Microstylis Nutt. Gen. 2: 196. 1818.]

Low herbs, from a solid bulb, our species 1-leaved, and with 1-several scales at the base of the stem. Flowers small, white or green, in a terminal raceme. Sepals spreading, separate, the lateral ones equal at the base. Petals filiform or linear, spreading. Lip cordate or eared at the base, embracing the column. Anther erect between the auricles, 2-celled; pollinia 4, smooth and waxy, 2 in each sac, the pairs cohering at the summit, without caudicles or glands. Capsule oval, sometimes nearly globose, beakless. [Greek, in allusion to the green flowers?]

About 40 species, widely distributed. Besides the following, about 4 others occur in the southern and western parts of North America.

Leaf sheathing the base of the stem.
Leaf clasping the stem near the middle.

1. Achroanthes monophylla (L.) Greene. White Adder's-mouth. (Fig. 1134.)

Achroanthes monophylla Greene, Pittonia, 2: 183. 1891.

Stem slender, 4'-6' high, smooth, glabrous, striate. Leaf sheathing the stem at its base, the blade 1'-2' long, $\frac{1}{2}'-1\frac{1}{2}'$ wide; raceme 1'-3' long, narrow, 3'-5' thick; flowers whitish, about 1' long; pedicels nearly erect, bracted, 1'-2' long; sepals acute; lip triangular or ovate, acuminate, the lateral lobes obtuse; capsule oval, about 3' long.

In woods, Quebec to Minnesota, Pennsylvania and Nebraska. July.
2. **Achroanthes unifolia** (Michx.) Raf. Green Adder’s-mouth.  
(Fig. 1135.)


Stem glabrous, striate, 4’-10’ high. Leaf clasping the stem near the middle, oval or nearly orbicular, 1’-2 1/2’ long, 10’-1 1/2’ wide; raceme 1’-3’ long, sometimes 1’ thick; flowers greenish, about 1’ long, the pedicels very slender, spreading, 3”-5” long; sepals oblong; lip broad, 3-toothed at the apex; capsule oval or subglobose.

In woods and thickets, Newfoundland to Ontario and Minnesota, south to Florida, Alabama and Missouri. Ascends to 4000 ft. in North Carolina. July.


Low herbs, with solid bulbs, the base of the stem sheathed by several scales and 2 broad shining leaves. Flowers in terminal racemes. Sepals and petals nearly equal, linear, spreading; petals usually very narrow. Column elongated, incurved, thickened and margined above. Pollinia 2 in each sac of the anther smooth and waxy, the pairs slightly united, without stalk, threads or glands. Lip nearly flat, often bearing 2 tubercles above the base.

[Greek, signifying a slender orchid.]

About 100 species, widely distributed in temperate and tropical regions; only the following known to occur in North America.

Raceme many-flowered; lip as long as the petals.
Raceme few-flowered; lip shorter than the petals.

1. **Leptorchis liliifolia** (L.) Kuntze. Large Twayblade.  
(Fig. 1136.)


Scape 4’-10’ high, 5-10-striate. Leaves ovate or oval, 2’-5’ long, 1 1/2’-2 1/2’ wide, obtuse, keeled below, the sheaths large and loose. Raceme sometimes 6’ long; flowers numerous, showy; sepals and petals somewhat reflexed; petals very narrow or thread-like; lip erect, large, 5’-6’ long, about as long as the petals, wedge-obovate; column 1 1/2’ long, incurved, dilated at the summit; pedicels slender, ascending or spreading, 4”-8” long; capsule somewhat club-shaped, about 6” long, the pedicel thickened in fruit.

In moist woods and thickets, Maine to Minnesota, Georgia and Missouri. Ascends to 3000 ft. in Virginia. May-July.
2. Leptorchis Loeselii (L.) MacM. Fen Orchis. Loesel’s Twayblade. (Fig. 1137.)


Leptorchis Loeselii MacM. Met. Minn. 173. 1892.

Scape 2'-8' high, strongly 5-7-ribbed. Leaves elliptic or elliptic-lanceolate, 2'-6' long, 1'/2-2' wide, obtuse; raceme few-flowered; flowers greenish, smaller than those of the preceding species, 2'-3' long; sepals narrowly lanceolate, spreading; petals linear, somewhat reflexed; lip obovate, pointed, rather shorter than the petals and sepalps, its tip incurved; column half as long as the lip or less; capsule about 5' long, wing-angled, on a thickened pedicel.

In wet thickets and on springy banks, Nova Scotia to the Northwest Territory, south to Maryland and Missouri. Also in Europe. May-July.

12. CALYPSO Salisb. Par. Lond. pl. 89. 1807.

Bog herb, with a solid bulb and coralloid roots, the low 1-flowered scape sheathed by 2 or 3 loose scales and a solitary petioled leaf at the base. Flower large, showy terminal, bracted. Sepals and petals similar, nearly equal. Lip large, saccate or swollen, 2-parted below. Column dilated, petal-like, bearing the lid-like anther just below the summit. Pollinia 2, waxy, each 2-parted, without caudicles, sessile on a thick gland, the stigma at the base. [Dedicated to the goddess Calypso.]

A monotypic species of the cooler portions of the north temperate zone.

1. Calypso bulbosa (L.) Oakes. Calypso. (Fig. 1138.)

Calypso borealis Salisb. Par. Lond. pl. 89. 1807.
Calypso bulbosa Oakes, Cat. Vermont Pl. 28. 1842.

Bulb 5' in diameter or less. Scape 3'-6' high; leaf round-ovate, 1'-1'/2' long, nearly as wide, obtusely pointed at the apex, rounded or subcordate at the base, the petiole 1'-2' long; flowers variegated, purple, pink and yellow, the peduncle jointed; petals and sepalps linear, erect or spreading, 5'/2'-7' long, with 3 longitudinal purple lines; lip large, saccate, 2-divided below, spreading or drooping, with a patch of yellow woolly hairs near the point of division; column erect, broadly ovate, shorter than the petals; capsule about 3'/2' long, many-nerved.

Labrador to Alaska, south to Maine, Michigan, California, and in the Rocky Mountains to Arizona. Also in Europe. Flower somewhat resembling that of a small Cypripedium. May-June.


Scape herbs, saprophytes or root-parasites, with large masses of coralloid branching roots, the leaves all reduced to sheathing scales. Flowers in terminal racemes. Sepals nearly equal, the lateral ones united at the base with the foot of the column, forming a short spur or gibbous protuberance, the other one free, the spur adnate to the summit of the ovary. Petals about as long as the sepalps, 1-3-nerved. Lip 1-3-ridged. Column nearly free, slightly incurved, somewhat 2-winged. Anther terminal, operculate. Pollinia 4, in 2 pairs, oblique, free, soft-waxy. [Greek, from the coral-like roots.]

About 15 species, widely distributed in the north temperate zone. Besides the following, some 4 others occur in the southern and western parts of North America.

Spur small or sac-like, adnate to the top of the ovary.

Lip not deeply 3-lobed.

Lip 2-toothed or 2-lobed above the base.

Lip entire, or merely dentilicate.

Flowers about 3'-4' long; lip not notched; column narrowly winged. 2. C. odontorhiza.

Flowers 7' long; lip notched; column manifestly winged.

Lip deeply 3-lobed; flowers 6'-9' long. 3. C. wisteriana.

No spur or sac.

1. C. Corallorrhiza.

2. C. odontorhiza.

3. C. Wisteriana.

4. C. multiflora.

5. C. siria.
1. Corallorhiza Corallorhiza (L.) Karst. Early Coral-root. (Fig. 1139.)

Corallorhiza Corallorhiza L. Sp. Pl. 945. 1753.


Scape glabrous, 4'-12' high, clothed with 2-5 closely sheathing scales. Raceme 1'-3' long, 3-12-flowered; flowers dull purple, about ½' long, on very short minutely bracted pedicels; sepals and petals narrow, about 3' long; lip shorter than the petals, oblong, whitish, 2-toothed or 2-lobed above the base; spur, a sac or small protuberance adnate to the summit of the ovary; capsule 4'-6' long, oblong or somewhat obovoid.

In woods, Nova Scotia to Alaska, south to New Jersey, in the mountains to Georgia, and to Michigan and Washington. Ascends to 3000 ft. in Vermont. Also in Europe, May-June.

2. Corallorhiza odontorhiza (Willd.) Nutt. Small-flowered Coral-root. (Fig. 1140.)


Scape slender, purplish, 6'-15' high. Raceme 2'-4' long, 6-20-flowered; flowers 3'-4' long, purplish, sepals and petals lanceolate, 2'/ long or less, marked with purple lines; lip as long as the petals, broadly oval or obovate, entire or denticulate, narrowed at the base, not notched, whitish; spur, a small sac adnate to the top of the ovary; wings of the column very narrow.

In woods, Massachusetts to Michigan, Florida and Missouri. Ascends to 3000 ft. in North Carolina. July-Sept.

3. Corallorhiza Wisteriana Conrad. Wister's Coral-root. (Fig. 1141.)


Stem slender, but usually stouter than that of the preceding species, 8'-16' high, bearing several sheathing scales. Raceme 2'-5' long, loose, 6-15-flowered; flowers about 7' long, slender-pedicelled, ascending or erect; lip broadly oval or obovate, 4'-5' long, 4'-5' wide; abruptly clawed, white with crimson spots, crenulate, notched at the apex; lamellae, 2 short prominent ridges; spur, a somewhat conspicuous protuberance adnate to the top of the ovary; column strongly 2-winged toward the base; capsule elliptic-oblong or oblong-obovoid, about 5' long, drooping when ripe.

In woods, Massachusetts to Ohio, Florida and Texas. Feb.-May.
4. **Corallorhiza multiflora** Nutt. Large Coral-root. (Fig. 1142.)


Scape 8'-20' high, purplish, clothed with several appressed scales. Raceme 2'-8' long, 10-30-flowered; flowers 6'-9' high, brownish purple, short-pedicelled; sepals and petals somewhat connivent at the base, linear-lanceolate, about 3' long; lip white, spotted and lined with purple, oval or ovate in outline, deeply 3-lobed, crenulate, the middle lobe broader than the lateral ones, its apex curved; spur manifest, yellowish; capsule ovoid or oblong, 5'-8' long, drooping.

In woods, Nova Scotia to British Columbia, south to Florida, Missouri and California. A form with yellow scapes and flowers occurs in Nebraska (according to Williams). July-Sept.

5. **Corallorhiza striata** Lindl. Striped Coral-root. (Fig. 1143.)


*Corallorhiza Macraei* A. Gray, Man. Ed. 2, 453. 1856.

Scape stout, purplish, 8'-20' high. Raceme 2'-6' long, 10-25-flowered. Flowers dark purple; sepals and petals narrowly elliptic, striped with deeper purple lines, 6'-7' long, spreading; lip oval or ob-ovate, entire or a little undulate, somewhat narrowed at the base, about as long as the petals; spur none, but the perianth has a gibsous saccate base; capsule ellipsoid, reflexed, 8'-10' long.


Slender scapose herbs, with solid bulbs, several generations connected by offsets, the flowers in a long loose terminal raceme. Leaf solitary, basal, unfolding long after the flowering season (in autumn), usually after the scape has perished. Scape with several thin sheathing scales at the base. Flowers green, nodding, bractless. Sepals and petals similar, spreading. Lip 3-lobed, produced backwardly into a very long spur. Column erect, wingless or very narrowly winged. Anther terminal, oproculcate, 2-eelled. Pollinia 4, ovoid, waxy, 2 in each anther-sac, separate, affixed to a short stipe, which is glandular at the base. [Latin, similar to *Tipula*, a genus of insects, in allusion to the form of the flower.]

Two known species, the following of eastern North America, the other Himalayan.
1. Tipularia unifolia (Muhl.) B.S.P. Crae-fly Orchis. (Fig. 1144.)

Limodorum unifolium Muhl. Cat. 81. 1813.

Scape glabrous, 15'-20' high, from a hard, often irregular solid bulb or corm. Leaf arising in autumn from a fresh lateral corru, ovate, 2'-3' long, dark green, frequently surviving through the winter, 1'-2' wide. Raceme 5'-10' long, very loose; flowers green, tinged with purple; pedicels filiform, bractless; 4'-6' long; sepals and petals 3'/-4' long, narrow; lip shorter than the petals or equalizing them, 3-lobed, the middle lobe narrow, prolonged, dilated at the apex, the lateral lobes short, triangular; spur very slender, straight or curved, often twice as long as the flower; column narrow, erect, shorter than the petals, the beak minutely pubescent; capsule ellipsoid, 6-ribbed, about 6' long.

In woods, Vermont to Michigan, south to Florida and Louisiana. Local and rare. July-Aug.


Scapose herbs, with round solid bulbs which arise from the bulb of the previous year, a leaf appearing the first season, succeeded in the following year by the scape. Flowers several in a loose terminal spike or raceme. Sepals and petals nearly alike, separate, spreading. Column elongated, 2-winged above. Autther terminal, operculate, sessile; pollinia solitary, 1 in each sac, loosely granular. Lip spreading, raised on a narrow stalk, dilated at the apex, bearded on the upper side with long club-shaped hairs. [Greek, a meadow-gift.]

1. Limodorum tuberous L. Grass-pink. Calopogon. (Fig. 1145.)


Scape slender, naked, 1'-1.5' high. Leaf linear-lanceolate, 8'-12' long, 3'/-10' wide, sheathing, with several scales below it; spike 4'-15' long, 3-15-flowered; flowers about 1' long, purplish pink, subtended by small acute bracts; sepals obliquely ovate-lanceolate, acute, about 10' long; petals similar; column incurved; anther-sacs parallel, attached by a slender thread to the back of the column; lip as long as the column, broadly triangular at the apex, crested along the face with yellow, orange and rose-colored hairs; capsule oblong, nearly erect.

In bogs and meadows, Newfoundland to Ontario and Minnesota, south to Florida and Missouri. June-July.


Scapose herbs, from thick scaly rootstocks and fleshy coralloid roots, the leaves reduced to purplish scales, sheathing the scape. Flowers bracted in a loose terminal raceme. Perianth not gibbous or spurred at the base, the petals and sepals similar, nerved, spreading. Lip obovate, with several crested ridges down the middle, somewhat 3-lobed, the middle lobe a little concave. Column free, thick, slightly incurved. Pollinia 8, united in a cluster. Capsule ellipsoid, the fruiting pedicels thick. [Greek, signifying six crests.]

A monotypic genus of the southeastern United States and Mexico.
1. *Hexalectris aphyllus* (Nutt.) Raf. Crested Coral-root. (Fig. 1146.)


Scape stout, 8'-20' high, its upper scales lanceolate, the lower sheathing and truncate or acute. Raceme 4'-7' long, 8-12-flowered; flowers large, brownish purple, 1' high or more; pedicels short, stout; sepals and petals narrowly elliptic, obtuse or acutish, spreading, striped with purple veins, 6''-9'' long, longer than the broad lip; middle lobe of the lip rounded or crenulate, the lateral ones shorter, rounded; column slightly spreading at the summit, shorter than the lip; capsule ellipsoid, nearly 1' long, the fruiting pedicels 4''-5'' long.

In rich woods, North Carolina to Kentucky and Missouri, south to Florida and northern Mexico. Aug.


Scapose herbs, from a corm, produced from the one of the previous season by an offset, the scape clothed with several sheathing scales. Leaf solitary, basal; developed in autumn or late summer, broad, petioled. Flowers in terminal racemes, the pedicels subtended by small bracts. Petals and sepals similar, narrow. Lip clawed, somewhat 3-ridged, spur none. Column free, the anther borne a little below its summit. Pollinia 4, lens-shaped, oblique. [Greek, meaning without a spur.)

A monotypic North American genus.

1. *Aplectrum spicatum* (Walt.) B.S.P. Adam-and-Eve. Putty-root. (Fig. 1147.)


*Aplectrum spicatum* B.S.P. Prel. Cat. N. Y. 57. 1888.

Scape glabrous, 1º-2º high, bearing about 3 scales. Leaf arising from the corm, at the side of the scape, elliptic or ovate, 4'-6' long, 1½'-3' wide, usually lasting over winter; raceme 2'-4' long, loosely several-flowered; flowers dull yellowish brown mixed with purple, about 1' long, short-pedicelled; sepals and petals linear-lanceolate, about ½' long; lip shorter than the petals, obtuse, somewhat 3-lobed and undulate; column slightly curved, shorter than the lip; capsule oblong-ovoid, angled, about 10'' long.

In woods and swamps, Ontario to the Northwest Territory and Oregon, south to Georgia, Missouri and California. Several old corms usually remain attached to the latest one. May-June.
Sub-class 2. **Dicotylédones.**

Embryo of the seed with two cotyledons (in a few genera one only, as in *Cyclamen, Pinguicula* and some species of *Capnoides*), the first leaves of the germinating plantlet opposite. Stem exogenous, of pith, wood and bark (endogenous in structure in Nymphaeaceae), the wood in one or more layers surrounding the pith, traversed by medullary rays and covered by the bark. Leaves usually pinnately or palmately veined, the veinlets forming a network. Parts of the flower rarely in 3's or 6's.

Dicotyledonous plants are first definitely known in Cretaceous time. They constitute between two-thirds and three-fourths of the living angiospermous flora.

**Series 1. Choripétalae.**

Petals separate and distinct from each other, or wanting.

The series is also known as Archichlamidæ, and comprises most of the families formerly grouped under Apetalæ (without petals) and Polypetalæ (with separate petals). Exceptions to the typical feature of separate petals are found in the Leguminosasæ, in which the two lower petals are more or less united; in the Fumariaceæ, where the two inner petals or all four of them are sometimes coherent; the Polygalææ, in which the three petals are united with each other, and with the stamens; *Oxalis* in Geraniaceæ; and Ilicææ, whose five petals are sometimes joined at the base.


*Lizard's Tail Family.*

Perennial herbs with broad entire alternate petiolate leaves, and small perfect incomplete bracteolate flowers, in peduncled spikes. Perianth none. Stamens 6–8, or sometimes fewer, hypogynous; anthers 2-celled, the sacs longitudinally dehiscent. Ovary 3–4-carpellate, the carpels distinct or united, 1–2-ovuled; ovules orthotropous. Fruit capsular or berry-like, composed of 3–4 mostly indehiscent carpels. Seeds globose or ovoid, the testa membranaceous. Endosperm copious, mealy. Embryo minute, cordate, borne in a small sac near the end of the endosperm.

Three genera and 4 species, natives of North America and Asia. The family differs from the Piperaceae in having more than one carpel to the ovary. It is represented in North America by the following and by *Acanthopitys*, occurring in California and Arizona.


Marsh herbs, with slender rootstocks, jointed stems and cordate leaves, their petioles sheathing the stem at the nodes, and small white flowers, in 1 or 2 dense elongated spikes opposite the leaves. Bractlets adnate to the flowers or to their minute pedicels. Stamens 6–8. Filaments filiform, distinct. Carpels united at the base. Styles as many as the carpels, recurved, stigmatic along the inner side. Fruit rugose, depressed-globose, separating into 3 or 4 one-seeded carpels. [Name Greek, meaning the tail of a lizard, in allusion to the long slender spike.]

Two species, the following of eastern North America, the other of eastern Asia.

1. Saururus cérnuus L. Lizard's-tail. (Fig. 1148.)


Somewhat pubescent when young, becoming glabrous, stem rather slender, erect, sparingly branched, 2°–5° high. Leaves ovate, thin, palmately 5-7-ribbed and with a pair of strong ribs above, which run nearly to the apex, dark green, entire, deeply cordate at the base, acuminate, 3°–6° long, 2°–3½° wide; petioles stout, shorter than the blades, striate; spikes few, very dense, longer than their peduncles, 4°–6° long, the apex drooping in flower; flowers fragrant; stamens white, spreading, about 2° long; fruit slightly fleshy, 1½' in diameter, strongly wrinkled when dry.

In swamps and shallow water, Connecticut to Florida, west to southern Ontario, Minnesota and Texas. June-Aug.

**WALNUT FAMILY.**

Trees with alternate pinnately compound leaves, and monoecious bracteolate flowers, the staminate in long drooping aments; the pistillate solitary or several together. Staminate flowers consisting of 3–numerous stamens with or without an irregularly lobed perianth adnate to the bractlet, very rarely with a rudimentary ovary. Anthers erect, 2-celled, the sacs longitudinally dehiscent; filaments short. Pistillate flowers bracted and usually 2-bracteolate, with a 3–5-lobed (normally 4-lobed) calyx or with both calyx and petals, and an inferior 1-celled or incompletely 2–4-celled ovary. Ovule solitary, erect, orthotropous; styles 2, stigmatic on the inner surface. Fruit in our genera a drupe with indehiscent or dehiscent, fibrous or woody exocarp (husk; ripened calyx; also regarded as an involucre), enclosing the bony endocarp or nut which is incompletely 2–4-celled. Seed large, 2–4-lobed. Endosperm none. Cotyledons corrugated, very oily. Radicle minute, superior.

Six genera and about 35 species, mostly of the warmer parts of the north temperate zone. extending in America south along the Andes to Bolivia. The young leaves in the bud are stipulate in at least two species of *Hicoria*.

Husk indehiscent; nut rugose.
Husk at length splitting into segments; nut smooth or angled.


Trees, with spreading branches, superposed buds, fragrant bark, and odd-pinnate leaves, with nearly or quite sessile leaflets, the terminal one sometimes early perishing. Staminate flowers in drooping cylindric aments, borne on the twigs of the previous year; perianth 3–6-lobed; stamens 8–40 in 2 or more series. Pistillate flowers solitary or several together on a terminal peduncle at the end of shoots of the season, the calyx 4-lobed, with 4 small petals adnate to the ovary at the sinuses; styles fimbriate, very short. Drupe large, globose or ovoid, the exocarp somewhat fleshy, fibrous, indehiscent, the endocarp bony, rugose or sculptured, 2–4-celled at the base, indehiscent, or in decay separating into 2 valves. [Name a contraction of the Latin *Jovis glans*, the nut of Jupiter.]

About 8 species, natives of the north temperate zone, one in the West Indies, 1 or 2 in the Andes of South America. Besides the following 1 or 2 others occur in the southwestern United States.

Fruit globose, obtuse, not viscid; petioles puberulent.
Fruit oblong, pointed, viscid; petioles pubescent.

1. **Juglans nigra** L. Black Walnut. (Fig. 1149.)


A large forest tree with rough brown bark, maximum height about 150 ft, trunk diameter 8 ft, the twigs of the season and petioles puberulent, the older twigs glabrous or very nearly so. Leaflets 13–23, ovate-lanceolate, more or less inequilateral, acuminate at the apex, rounded or subcordate at the base, serrate with low teeth, glabrous or very nearly so above, pubescent beneath, 3½'–5' long, 1½'–2' wide; stamine aments solitary in the axils of leaf-scars of the preceding season, 3½'–5' long; drupes usually solitary or 2 together, globose or a little longer than thick, 1½'–3' in diameter, glabrous but papillose, not viscid; nut corrugated, slightly compressed, 4 celled at the base.

In rich woods, Massachusetts to southern Ontario and Minnesota, south to Florida, Kansas and Texas. Wood strong, hard, rich brown; weight per cubic foot 38 lbs. April–May. Fruit ripe Oct.–Nov.
2. Juglans cinerea L. Butternut. White Walnut. Oil-nut. (Fig. 1150.)


A forest tree, resembling the Black Walnut, but smaller, rarely over 100° high and 3° in trunk diameter, the bark gray, smoother, the twigs, petioles and leaflets viscid-pubescent, at least when young. Leaflets 11-19, oblong-lanceolate, acuminate at the apex, scarcely inequilateral, obtuse, rounded or truncate at the base, serrate with lower teeth; drupes racemose, oblong, densely viscid-pubescent, 2'-3' long and about one-half as thick, pointed; nut 4-ribbed, deeply sculptured, and with sharp longitudinal ridges, firmly adherent to the husk, 2-celled at the base.

In rich or rocky woods. New Brunswick and Ontario to North Dakota, south to Delaware, in the Alleghenies to Georgia, to Mississipi and Arkansas. Ascends to 2500 ft. in Virginia. Wood soft, rather weak, light brown; weight per cubic foot 25 lbs. April-May. Fruit ripe Oct.-Nov.


[CARYA Nutt. Gen. 2: 221. 1818.]

Trees, with close or shaggy bark, odd-pinnate leaves and serrate or serrulate leaflets. Stamine flowers in slender drooping aments, borne in 3's on a common peduncle at the base of the shoots of the season, or clustered and sessile or nearly so in the axis of leaf-scars at the summit of twigs of the preceding year; calyx adulate to the bract, 2-3-lobed or 2-3-cleft; stamens 3-10; filaments short. Pistillate flowers 2-6, together on a terminal peduncle; bract fugacious or none; calyx 4-toothed; petals none; styles 2 or 4, papillose or fimbriate, short. Fruit subglobose, oblong or obovoid, the husk separating more or less completely into 4 valves; nut bony, smooth or angled, incompletely 2-4-celled; seed sweet and delicious or very bitter and astrigent. [From the aboriginal name Hicori.]

About 10 species, natives of eastern North America, one in Mexico.

Bud-scales valvate; lateral leaflets lanceolate or oblong-lanceolate, falcate.

Nut not compressed or angled; seed sweet.

Nut somewhat compressed or angled; seed intensely bitter.

1. H. Pecan.

2. H. minima.

3. H. aquatica.

Bud-scales imbricate; lateral leaflets not falcate.

Husk of the fruit freely splitting to the base; middle lobe of the staminate calyx at least twice as long as the lateral ones.

Bark shaggy, separating in long plates; foliage glabrous or puberulent.

Leaflets 5 (rarely 7); nut rounded at the base, 6'-10' long.

Leaflets 7-9; nut usually pointed at both ends, 1'-1½' long.

Bark close, rough; foliage very pubescent and fragrant.

Husk of fruit thin, not freely splitting to the base; lobes of the staminate calyx nearly equal.

Lateral leaflets ovate-lanceolate, not falcate; fruit rounded or scarcely ridged.

Fruit nearly globular; nut thin-shelled; bark shaggy.

4. H. ovala.

5. H. laciniosa.

6. H. alba.

7. H. microcarpa.

8. H. glabra.


(Fig. 1151.)

Juglans Pecan Marsh. Arb. Am. 69. 1783.

Carya ovata forma Britton. Gen. 2: 221. 1818.


A large slender tree, with somewhat roughened bark, maximum height of 170° and trunk diameter 6°. Young twigs and leaves pubescent; mature foliage nearly glabrous; bud-scales few, small, valvate; leaflets 11-15, falcate, oblong-lanceolate, short-stalked, inequilateral, acuminate, 4'-7' long; staminate aments sessile or nearly so in the axis of leaf-scars near the end of twigs of the preceding season or sometimes on the young shoots, 5'-6' long; middle lobe of the staminate calyx linear, much longer than the broadly oblong lateral ones; fruit oblong-cylindric, 1½'-2½' long; husk thin, 4-valved; nut smooth, oblong, thin-shelled, pointed, 2-celled at base, dissepiements thin, very astrigent; seed delicious.

In moist soil, especially along streams. Indiana to Iowa and Missouri, south to Kentucky and Texas. Wood hard, brittle, light brown; weight 45 lbs. April-May. Fruit ripe Sept.-Oct.
2. **Hicoria minima** (Marsh.) Britton. Bitter-nut. Swamp Hickory. (Fig. 1152.)

*Carya amara* Nutt. Gen. 2: 222. 1816.


A slender tree, sometimes 100° high, with trunk 3° in diameter, the bark close and rough. Bud-scales 6-8, small, valvate, caducous, young foliage puberulent, becoming nearly glabrous; leaflets 7-9, sessile, long-acuminate, lanceolate or oblong-lanceolate, 5'-6' long, 3'-1½' wide, the lateral ones falcate; staminate amouts slightly pubescent, peduncled in 3's at the bases of shoots of the season or somewhat on twigs of the previous year; lobes of the staminate calyx about equal, the middle one narrower; fruit subglobose, narrowly 6 ridged 1'-1½' in diameter; husk thin, tardily and irregularly 4-valved; nut little compressed, not angled, short-pointed, 9'-12' long, thin-shelled; seed very bitter.

In moist woods and swamps, Quebec to southern Ontario and Minnesota, Florida and Texas. Ascends to 3500 ft. in Virginia. Wood hard and strong, dark brown; weight per cubic foot 47 lbs. May-June. Fruit ripe Sept.-Oct.

3. **Hicoria aquatica** (Michx. f.) Britton. Water Hickory. (Fig. 1153.)

*Carya aquatica* Nutt. Gen. 2: 222. 1818.


A swamp tree, attaining a maximum height of about 100° and a trunk diameter of 3°, the bark close, the young foliage pubescent, becoming nearly glabrous when mature. Leaflets 9-13, lanceolate, or the terminal one oblong, long-acuminate at the apex, narrowed at the base, 5'-5' long, ½'-1½' wide, the lateral strongly falcate; staminate amouts and calyx as in the preceding species; fruit oblong, ridged, 1'-1½' long, pointed; husk thin, tardily splitting; nut oblong, thin-shelled, angular; seed better.

In wet woods and swamps, Virginia to Florida, west to Illinois, Arkansas and Texas. Wood soft, strong, dense, dark brown; weight per cubic foot 46 lbs. March-April. Fruit ripe Sept.-Oct.

4. **Hicoria ovata** (Mill.) Britton. Shag-bark. Shell-bark Hickory. (Fig. 1154.)

*Carya alba* Nutt. Gen. 2: 221. 1818. Not *Juglans alba* L.


A large tree, sometimes 120° high, with a trunk diameter of 4°; bark shaggy in narrow plates; young twigs and leaves puberulent, becoming glabrous. Leaflets 5, or sometimes 7, oblong, oblong-lanceolate or the upper obovate, acuminate at the apex, narrowed to the sessile base, 4'-6' long, those of young plants much larger, bud-scales 8-10, imbricated, the inner becoming very large and tardily deciduous; staminate amouts in 3's, on slender peduncles at the bases of shoots of the season; middle lobe of the staminate calyx linear, longer than the lateral ones; fruit subglobose, 1½'-2½' long; husk thick, soon splitting into 4 valves; nut white, somewhat compressed, 4-celled at the base, 2-celled (rarely 3-celled) above, pointed, slightly angled, thin-shelled; seed sweet.

In rich soil, Quebec to southern Ontario and Minnesota, south to Florida, Kansas and Texas. Wood strong and tough, light brown; weight per cubic foot 52 lbs. Sometimes called White Walnut. May. Fruit ripe Sept.-Nov.
5. Hicoria laciniosa (Michx. f.) Sarg. Big Shag-bark. King-nut. (Fig. 1155.)


A large tree, reaching about the size of the preceding species, the bark separating in long narrow plates, the young foliage densely puberulent, the mature leaves somewhat so beneath. Leaflets 7-9, (rarely 5) acute or acuminate, oblong-lanceolate or the upper obovate, sometimes 5' long by 5' wide; staminate aments penduncled in 3's at the base of shoots of the season; middle lobe of the staminate calyx linear, twice as long as the lateral ones; fruit oblong, 2'-3' long; husk thick, soon splitting to the base; nut oblong, somewhat compressed, thick-shelled, pointed at both ends, yellowish-white; seed sweet.

In rich soil, New York and Pennsylvania to Indiana, Iowa, Tennessee, Kansas and the Indian Territory. Wood strong and tough, darker than the preceding; weight 50 lbs. per cubic foot. May. Fruit ripe Sept.-Oct.

6. Hicoria alba (L.) Britton. White-heart Hickory. Mocker-nut. (Fig. 1156.)

Juglans tomentosa Lam. Encycl. 4: 504. 1797.
Carya tomentosa Nutt. Gen. 2: 221. 1818.

A large tree, maximum height 100', and trunk diameter 3'/2', the foliage and twigs persistently tomentose-pubescent, fragrant when crushed, the bark rough and close; bud-scales very large, imbricated; leaflets 7-9, obloug-lanceolate or the upper oblauceolate or obovate, sessile, long-acuminate, narrowed or rounded and somewhat inequilateral at the base; staminate aments peduncled in 3's, tomentose; middle lobe of the staminate calyx linear, much longer than the lateral ones; fruit globose or oblong-globose, 1'/2-3'/2' long; husk thick, freely splitting to the base; nut grayish-white, angled, pointed at the summit, little compressed, thick-shelled, 4-celled at the base; seed sweet.

In rich soil, eastern Massachusetts to southern Ontario, Illinois and Nebraska, south to Florida and Texas. Ascends to 3500 ft. in Virginia. Wood very hard and tough, dark brown; weight per cubic foot 51 lbs. Called also Fragrant Hickory. May-June. Fruit ripe Oct.-Nov.

7. Hicoria microcarpa (Nutt.) Britton. Small-fruited Hickory. (Fig. 1157.)

Juglans alba odorata Marsh. Arb. Am. 68. 1785?
Carya microcarpa Nutt. Gen. 2: 221. 1818.

A forest tree, reaching a maximum height of about 90', and a trunk diameter of 3'/2', the bark close, when older separating in narrow plates, the foliage glabrous throughout. Bud-scales 6-8, imbricated, the inner ones somewhat enlarging; leaflets 5-7, obloug, or ovate-lanceolate, acuminate at the apex, narrowed or sometimes rounded at the base, 3'/2-5' long; staminate aments glabrous, peduncled in 3's at the base of shoots of the season; middle lobe of the staminate calyx equaling or somewhat longer than the lateral ones; fruit globose or globose-oblong, less than 1' long, the husk thin, tardily and incompletely splitting to the base; nut subglobose, nearly white, slightly compressed, not angled, thin-shelled, pointed; seed sweet.

8. Hicoria glabra (Mill.) Britton. Pig-nut Hickory. (Fig. 1158.)

Carvus peregrina Nutt. Gen. 2. 1822. 1818.

A tree, sometimes 120° high and with a trunk diameter of 5°, dark close, rough; foliage glabrous, or sometimes pubescent. Bud-scales 8–10, imbricated, the inner ones enlarging; leaflets 3–7, rarely 9, oblong, oblong-lanceolate or the upper obovate, sessile, acuminate at the apex, mostly narrowed at the base, 3′-6′ long, in young plants much larger; staminate aments glabrous, peduncled in 3′s; lobes of the stamineate calyx about equal in length, the middle one narrower; fruit obvoid or obovoid-oblong, 1½–2′ long; husk thin, the valves very tardily dehiscent; nut brown, angled, pointed, very thick-skulled; seed astringent and bitter, not edible.

In dry or moist woods, Maine to southern Ontario and Minnesota, south to Florida, Kansas and Texas. Wood hard, strong, tough, rather dark brown; weight per cubic foot 51 lbs. May–June. Fruit ripe Oct.–Nov.


BAYBERRY FAMILY.

Shrubs or trees with alternate, mostly coriaceous and aromatic simple leaves and small monoeccious or dioecious flowers, in linear, oblong or globular bracteate aments. Flowers solitary in the axils of the bracts. Perianth none. Staminate flower with 2–16 (usually 4–8) stamens inserted on the receptacle; filaments short, distinct or somewhat united; anthers ovate, 2-celled, the sacs longitudinally dehiscent. Pistillate flowers with a solitary 1-celled ovary, subtended by 2–8 bractlets; ovule solitary, orthotropous; style very short; stigmas 2, linear. Fruit a small oblong or globose drupe or nut, the exocarp often waxy. Seed erect. Endosperm none. Cotyledons plano-convex. Radicle very short.

Two genera and 35 species of wide geographic distribution.

Ovary subtended by 2–4 bractlets; leaves serrate or entire, exstipulate.

Ovary subtended by 8 linear persistent bractlets; leaves pinnatifid, stipulate.

1. MYRICA L. Sp. Pl. 1024. 1753.

Shrubs or small trees with entire, dentate or lobed, mostly resinous dotted leaves, our species usually dioecious. Staminate aments oblong or narrowly cylindrical, expanding before or with the leaves. Stamens 4–8. Pistillate aments ovoid or subglobose; ovary subtended by 2–4, mostly short, deciduous or persistent bractlets. Drupe globose or ovoid, its exocarp waxy. [Ancient Greek name of the Tamarisk.]

Besides the following species, another occurs in the Southern States and 2 on the Pacific coast. Bractlets of pistillate aments persistent, clasping the drupes; low bog shrub. 1. M. Gale. Bractlets of pistillate aments deciduous, the ripe drupes separated.

Slender tree; leaves mostly acute, narrow; drupe less than 1′ in diameter. 2. M. cerifera.

Shrub; leaves mostly obtuse, broader; drupe 1′–1½′ in diameter. 3. M. Carolinensis.

1. Myrica Gale L. Sweet Gale. (Fig. 1159.)

Myrica Gale L. Sp. Pl. 1024. 1753.

A shrub, usually strictly dioecious, the twigs dark brown. Leaves oblongate, obtuse and dentate at the apex, narrowed to a cuneate entire base, short-petioled, dark green and glabrous above, pale and puberulent or glabrous beneath, 1′–2½′ long, 5′–10′ wide, unfolding after the aments; staminate aments linear-oblong, 6′–10′ long, crowded; pistillate aments ovoid-oblong, obtuse, about 4′ long and 2′ in diameter in fruit, their bracts imbricated; drupe resinous-waxy, not longer than the 2 ovate persistent bractlets, which clasp it on each side and are adnate to its base.

In swamps and along ponds and streams, Newfoundland to Alaska, southern New York, Virginia, Michigan and Washington. Also in Europe and Asia. Ascends to 3000 ft. in the Adirondacks. April–May.
2. Myrica cerifera L. Wax-myrtle. (Fig. 1160.)

Myrica cerifera L. Sp. Pl. 1024. 1753.

A slender dioecious tree, maximum height about 40\(^\circ\), trunk diameter 1\(\frac{1}{2}\)\(^\circ\), the bark gray, nearly smooth. Leaves narrow, oblong or oblong-obovate, mostly acute at the apex, entire or sparingly dentate, narrowed or somewhat cuneate at the base, fragrant when crushed, short-petioled, dark green above, paler and sometimes pubescent beneath; golden-resinous, 1\(\frac{3}{4}\)–3\(\frac{1}{2}\) long, 3\(\frac{1}{2}\)–9\(\frac{1}{2}\) wide, unfolding with or before the aments; stamine aments cylindrical; pistillate aments short, oblong; ripe drupes separated, globose, bluish-white, waxy, less than 1\(\frac{1}{2}\) in diameter, tipped with the minute base of the style, long persistent, the bracts and bractlets deciduous.

In sandy swamps or wet woods, Maryland to Florida and Texas, north to Arkansas. March–April. Leaves mostly persistent through the winter. Wood light, brown; weight per cubic foot 35 lbs.

3. Myrica Carolinensis Mill. Waxberry. Bayberry. (Fig. 1161.)

Myrica Carolinensis Mill. Gard. Dict. Ed. 8, no. 3. 1768.

A shrub, 2\(\circ\)–8\(\circ\) high, with smooth gray bark, the twigs glabrous or often pubescent. Leaves oblong-obovate or obovate, glabrous above, often pubescent beneath, resinous, 2\(\frac{1}{2}\)–4\(\frac{1}{2}\) long, 6\(\frac{1}{2}\)–18\(\frac{1}{2}\) wide, serrate with a few low teeth above the middle, or entire, obtuse or sometimes acute at the apex, narrowed at the base, short-petioled; stamine aments cylindrical or oblong, 3\(\frac{1}{2}\)–9\(\frac{1}{2}\) long; pistillate aments short, oblong; ripe drupes separated, globose, bluish white, very waxy, 1\(\frac{1}{2}\)–1\(\frac{3}{4}\)\(\frac{1}{2}\) in diameter, long-persistent, the bracts and bractlets deciduous.

In dry or moist sandy soil, Nova Scotia to Florida and Alabama and on the shores of Lake Erie. Occurs also in bogs in northern New Jersey and Pennsylvania. April–May. The fruit was much used as a source of wax by the early settlers of the eastern United States, and is still utilized along the coast of New England.

2. COMPTÔNIA Banks; Gaertn. Fr. & Sem. 2: 58. pl. 90. 1791.

A low, monoecious or dioecious branching shrub with terete brown branches and narrow, deeply pinnatifid, stipulate leaves, the young foliage pubescent. Aments expanding with the leaves, the stamine ones and their flowers as in Myrica. Fertile aments globose-ovoid, on monoecious plants appearing below the stamine, several-flowered. Ovary subtended by 8 linear-subulate persistent bractlets, which form an involucre to the ovoid-oblong bony nut. [Name in honor of Rev. Henry Compton, 1632–1713, bishop of Oxford.]

A monotypic genus of eastern North America.
i. Comptonia peregrina (L.) Coulter.
Sweet Fern. (Fig. 1162.)

Liquidambar peregrina L. Sp. Pl. 999. 1753.


C. asplenifolia Gaertn. Fr. & Sem. 2: 85. 1791.


A shrub, 1½-2½' tall, the branches erect or spreading. Leaves linear-oblong or linear-lanceolate in outline, short-petioled, obtuse or subacute at the apex, deeply pinnatifid into numerous oblique rounded entire or sparingly dentate lobes, 3'-6' long, 1/4'-1/2' wide, fragrant when crushed, the sinuses very narrow; stipules semi-cordate, mostly deciduous; stamine aments clustered at the ends of the branches, 1' or less long, their bracts reniform, acute; pistillate aments bur-like in fruit, the subulate bractlets longer than the light brown, shining, striate, obtuse nut.

In dry soil, especially on hill-sides, Nova Scotia to Manitoba, south to North Carolina, Indiana and Michigan. Ascends to 2000 ft. in Virginia. April-May.

Family 4. LEITNERIÆACEAE Drude, Phanerog. 407. 1879.

CORK-WOOD FAMILY.

Diococious shrubs or small trees, with large entire petioled alternate exstipulate (or sometimes stipulate?) leaves, and flowers of both sexes in aments, which expand before the leaves. Stamine flowers with no perianth; stamens 8-12, inserted on the receptacle; filaments distinct; anthers oblong, erect, 2-celled, the sacs longitudinally dehiscent. Pistillate flowers with a solitary 1-celled ovary, subtended by 3 or 4 minute glandular-lacerate bractlets (perianth?) style terminal, simple, grooved and flattened, slender, recurved and stigmatic above, caducous; ovule solitary, laterally affixed to the ovary wall, amphitropous. Fruit an oblong drupe with thin exocarp and hard endocarp. Testa thin. Endosperm thin, fleshy. Cotyledons flat, cordate at the base; radicle short, superior.

A family related morphologically to the Myricaceae, but its anatomical characteristics point to affinity with Liquidambar and Platanus. It comprises only the following monotypic genus of the southern United States.


Characters of the family. [In honor of Dr. E. P. Leitner, a German naturalist, killed in Florida during the Seminole war.]

1. Leitneria Floridâna Chapm. Leitneria. Cork-wood. (Fig. 1163.)


A shrub or small tree, attaining a maximum height of about 20' and a trunk diameter of 5', the bark gray and rather smooth, the young twigs, leaves and aments densely pubescent. Leaves oblong or elliptic-lanceolate, acute, obtuse or cuspidate at the apex, narrowed at the base, bright green, firm, 3'-6' long, 1'-3' wide, when mature, glabrous or nearly so above, finely pubescent, at least on the veins, and rugose-reticulated beneath; petioles 6'-15' long; stamine aments ascending, 1'-2' long, their bracts triangular-ovate, acute, tomentose; pistillate aments shorter, borne toward the ends of the twigs; drupe slightly compressed, about 10' long, 3'-4' thick, rugose-reticulated.

In swamps, southern Missouri to Texas, and in Florida. Wood lighter than cork and probably the lightest wood known, weighing only about 12½ lbs. per cubic foot. March.
**Willow Family.**

Dioecious trees or shrubs with light wood, bitter bark, brittle twigs, alternate stipulate leaves, the stipules often minute and caducous. Flowers of both sexes in aments, solitary in the axil of each bract. Aments expanding before or with the leaves. Staminate aments often pendulous; staminate flowers consisting of from one to numerous stamens inserted on the receptacle, subtended by a gland-like or cup-shaped disk; filaments distinct or more or less united; anthers 2-celled, the sacs longitudinally dehiscent. Pistillate aments pendulous, erect or spreading, sometimes racemose-like; pistillate flowers of a sessile or short-stipitate 1-celled ovary subtended by a minute disk; placentae 2-4, parietal; ovules usually numerous, anatropous; style short, slender, or almost wanting; stigmas 2, simple or 2-4-cleft. Fruit an ovoid, oblong or conic 2-4-valved capsule. Seeds small or minute, provided with a dense coma of long, mostly white, silky hairs. Endosperm none. Cotyledons plano-convex. Radicle short.

The family includes only the 2 following genera, consisting of 200 or more species, mostly natives of the north temperate and arctic zones.

1. **Populus.**
2. **Salix.**

**I. PÓPOLUS L. Sp. Pl. 1034. 1753.**

Trees with scaly resinous buds, terete or angled twigs and broad or narrow, usually long-petioled leaves, the stipules minute, fugacious. Bracts of the aments fimbriate or incised. Disk cup-shaped, oblique, lobed or entire. Staminate aments dense, pendulous. Staminate flowers with from 4-60 stamens, their filaments distinct. Pistillate aments sometimes racemose-like through the elongation of the pedicels, pendulous, erect or spreading. Ovary sessile; style short, stigmas 2-4, entire or 4-lobed. Capsule 2-4-valved. Coma of the seeds often very long and conspicuous. [Name ancient, used for these trees by Pliny.]

About 25 species, natives of the northern hemisphere. Besides the following, some 3 others occur in the western parts of North America.

1. **Populus alba L.** Abele. White or Silver-leaf Poplar. (Fig. 1164.)
2. **Populus balsamifera** L. Tacamahac.  
*Balsam Poplar.* (Fig. 1165.)


A large tree, with nearly smooth gray bark, reaching a maximum height of about 80° and a trunk diameter of 7°, the branches stout, spreading, the large buds very resinous, the foliage glabrous. Leaves broadly ovate, dark green and shining above, pale beneath, acute or acuminate at the apex, rounded or subcordate at the base, crenulate, 3'-5' long, petioles terete; aments and bracts somewhat pubescent; stamens 18-30; lobes of the stigmas broad; capsule ovoid, 2-valved, short-pedicelled.

In moist or dry soil, especially along streams and lakes, Newfoundland to Hudson Bay and Alaska, south to Maine, New York, Michigan, Idaho and British Columbia. Wood soft, weak, brown, compact; weight per cubic foot 23 lbs. April.


Leaves broader, cordate at the base; petioles usually pubescent. New Brunswick to New Jersey, west to Minnesota, mostly escaped from cultivation, apparently indigenous northward.

3. **Populus angustifolia** James. Narrow-leaved Cottonwood. (Fig. 1166.)

*Populus balsamifera var. angustifolia* S. Wats. *King's Exp.* 327. 1871.

A slender tree, maximum height about 65°, trunk diameter 2°; crown narrowly pyramidal, branches ascending, foliage glabrous. Twigs terete, gray; leaves lanceolate, ovate-lanceolate or ovate, spreading, drying brownish, gradually acuminate or acute at the apex or some of them obtuse, narrowed, rounded or rarely subcordate at the base, 2'-4½' long, ½'-1½' wide, finely crenulate from base to apex; petioles plano-convex, not flattened laterally; ⅔'-½' long; lateral veins 8-15 on each side of the blade; staminate aments oblong-cylindric, 1'-2½' long; lobes of the stigmas broad; capsules ovoid, short-pedicelled.

In moist soil, especially along streams, Northwest Territory to Dakota, Nebraska, New Mexico, and Arizona. Wood soft, weak, brown, compact; weight per cubic foot 24 lbs. April-May.

4. **Populus acuminata** Rydberg. Black Cottonwood. (Fig. 1167.)


A slender tree, with terete twigs, reaching approximately the dimensions of the preceding species, the crown broadly pyramidal with spreading branches, the foliage glabrous. Leaves rhomboid-lanceolate, spreading or drooping, drying green, abruptly or gradually long-acuminate at the apex, cuneate, obtuse or rounded at the base, 2'-6' long, 1'-2½' wide, crenulate or the base entire; petioles slender, 1'-2½' long; staminate aments about 1½' long; pistillate aments slender, drooping, 3'-5' long; capsules ovoid, obtuse, distinctly pedicelled.

Range apparently nearly that of the preceding species. April-May.
5. *Populus heterophylla* L. Swamp or Downy Poplar. (Fig. 1168.) *Populus heterophylla* L. Sp. Pl. 1034. 1753.

An irregularly branching tree, sometimes 80° high and with a trunk 3° in diameter, the bark rough. Young foliage densely tomentose. Leaves long-petioled, broadly ovate, obtuse or subacute at the apex, rounded, truncate or subcordate at the base, crenulate-denticulate, 5°-6° long, or those of young plants much larger, glabrous or somewhat floccose beneath when mature; petioles terete; bracts glabrous or nearly so; staminate aments stout, 3°-4° long, 9°-12° in diameter, drooping; stamens numerous; pistillate aments raceme-like, peduncled, erect or spreading, loosely flowered; capsules ovoid, acute, 2-valved, 4°-6° long, shorter than or equalling their pedicles.

In swamps, southern Connecticut and New York to Georgia, west to Louisiana, north in the Mississippi Valley to Indiana and Arkansas. Wood soft, weak, compact, brown, weight per cubic foot 26 lbs. April-May.

6. *Populus grandidentata* Michx. Large-toothed Aspen. (Fig. 1169.)


A forest tree with smooth, greenish-gray bark, maximum height about 75°, and trunk diameter 2°. Leaves ovate-orbicular, those of very young plants densely white-tomentose beneath, sometimes 1° long, with irregularly denticulate margins, those of older trees tomentose when young, glabrous when mature, short-acuminate, coarsely undulate-dentate, obtuse or truncate at the base 2°-4° long; petioles slender, flattened laterally; bracts silky, irregularly 4°-7-cleft; staminate aments 2°-4° long, about 5° in diameter, drooping; pistillate aments somewhat pubescent, dense, 3°-5° long in fruit, also drooping; stigma-lobes narrow; capsule conic, acute, 2-valved, about 3° long, rather less than 1° in diameter, papillose.

In rich woods, Nova Scotia to Ontario and Minnesota, south to New Jersey and in the Alleghanies to North Carolina and Tennessee. Wood soft, weak, light brown, compact; weight per cubic foot 26 lbs. April.

7. *Populus tremuloides* Michx. American Aspen. (Fig. 1170.)


A slender tree, with smooth, light green bark, reaching a maximum height of about 100° and a trunk diameter of 3°, the young foliage glabrous, excepting the ciliate margins of the leaves. Petioles very slender, flattened laterally, causing the leaves to quiver in the slightest breeze; leaves broadly ovate or orbicular, short-acuminate at the apex, finely crenulate all around, truncate, rounded or subcordate at base, 1°-2° broad, or those of very young plants much larger; bracts silky, deeply 3°-5° cleft into linear lobes; aments drooping, the staminate 1°-2° long, 3°-4° in diameter, the pistillate longer, dense; stigma-lobes linear; capsule like that of the preceding species, but somewhat smaller.

In dry or moist soil, Newfoundland to Hudson Bay and Alaska, south to New Jersey, Pennsylvania, Kentucky, in the Rocky Mountains to Mexico and to Lower California. Ascends to 3000 ft. in the Adirondacks. Wood soft, weak, light brown; weight per cubic foot, 25 lbs. March-May.
(Fig. 1171.)

A large tree, sometimes 100° tall and the trunk 4° in diameter, usually much smaller. Twigs terre; young foliage somewhat pubescent, the mature leaves firm, nearly or quite glabrous; petioles slender, flattened laterally; leaves broadly deltoid, abruptly acuminate at the apex, broadly cuneate or obtuse at the base, crenate, 2'-5' long; staminate aments 1'-2' long; pistillate aments 2'-5' long in fruit, spreading; capsule oblong, very obtuse, borne on pedicels of much less than their own length.

Valleys of the Hudson and Delaware Rivers, naturalized from Europe. April-May.

The Lombardy Poplar, *Populus deltoides*, commonly planted for ornament, occasionally spreads by sending up shoots from its subterranean parts.

(Fig. 1172.)
*Populus Carolinensis* Moench, Verz. Pl. 81. 1785.  

A large tree, the greatest of the poplars, attaining a maximum height of 150° and a trunk diameter of 7½°, the bark grayish-green, somewhat rough when old. Foliage glabrous; leaves broadly deltoid-ovate, abruptly acuminate at the apex, crenulate, truncate at the base, 4'-7' long; petiole flattened laterally, stout, about as long as the blade; bracts glabrous, deeply fimbriate; staminate aments drooping, 3'-5' long, 5'-6' in diameter; pistillate aments loosely flowered, becoming 6'-10' long in fruit; capsule ovoid, acute, 4'-5' long, 2-4-valved, shorter than or equalling their pedicels.

In moist soil, especially along streams and lakes, Quebec to the Northwest Territory, south to New Jersey, Florida, Colorado and New Mexico. Wood soft, weak, dark brown; weight per cubic foot 24 lbs. April-May. Also called Carolina Poplar.


Trees or shrubs, with single-scaled buds, the scales with an adherent membrane within, mostly narrow and short-petioled leaves and persistent or early deciduous broad or minute stipules. Bracts of the aments entire. Disk gland-like, small or minute. Staminate aments dense, erect, spreading or drooping. Staminate flowers with 1-10, mostly 2, stamens, their filaments distinct or sometimes united. Pistillate aments usually erect or spreading. Ovary sessile or short-stipitate. Style short or filiform. Stigmas 2, entire or 2-cleft. Capsule mostly 2-valved. [Name ancient.]

About 160 species, of wide geographic distribution throughout the north temperate and arctic zones, a few in the southern hemisphere. Besides the following, some 45 others occur in the northern and western parts of North America.

* Filaments pubescent, at least toward the base; stamens more than 2 (3-7).

No glands on petioles or stipules.
Capsule ovoid, about twice as long as its pedicel.
Leaves short-petioled, lanceolate.
Leaves narrowly lanceolate, green on both sides.
Leaves lanceolate, silvery-white beneath.
Leaves slender-petioled, broadly lanceolate.
Capsule long-conic, much longer than its pedicel.
Petioles and stipules prominently glandular.

** Filaments pubescent; stamens only 2.

Trees, cultivated and naturalized or adventive.
Capsule glabrous; filaments distinct.
Branches not drooping; leaves lanceolate.
Leaves glabrous on both sides.
Leaves silky on both sides when young.
Leaves linear-lanceolate; branches drooping.
Capsules tomentose; filaments united; leaves oblong-lanceolate.
River-bank shrub, with linear-lanceolate leaves.
Low arctic shrubs, with obovate or oval obtuse leaves.
Leaves glabrous, strongly reticulated beneath.
Leaves densely tomentose silky beneath.

*** Filaments glabrous; capsule tomentose or pubescent.

Stigmas sessile or very nearly so.
Leaves tomentose beneath.
Leaves oblong-lanceolate, slender-petioled; amens expanding with the leaves.
Leaves oblong-lanceolate, short-petioled; amens expanding before the leaves.
Leaves 2'–4' long; fruiting amens about 1' long.
Leaves 1'–2' long; fruiting amens ½' long.
Mature leaves glabrous or slightly silky beneath.
Leaves oblong or oblong-lanceolate, acute.
Leaves elongated-lanceolate, long-acuminate.
Capsule short-pedicelled, 1½'–3' long; leaves black in drying.
Capsule slender-pedicalled, 2'–3' long; leaves green in drying.

Style filiform, equalling or longer than the stigmas.
Leaves persistently tomentose or silky beneath.

Arctic or alpine shrubs; amens unfolding with the leaves.
Fruiting amens 1' or less long.
Pubescent silvery-smoky.
Pubescence tomentose.
Fruiting amens 2'–3' long.
Low bog shrub; leaves oblong.
Introduced tree; leaves linear-lanceolate, long-acuminate.
Mature leaves glabrous beneath.
Leaves 2'–3' long, shining above.
Leaves ½'–2' long, dull; low arctic shrubs.
Leaves oblong or lanceolate, short-petioled.
Leaves elliptic or broadly obovate, long-petioled.

**** Filaments glabrous; capsule glabrous.

Large shrubs, with serrate or serrulate leaves.
Mature leaves glabrous.
Leaves lanceolate or ovate-lanceolate, acuminate.

Shrubs.
Leaves green both sides, narrow; capsules 2'–3' long.
Leaves very glaucous beneath, broad; capsules 3'–5' long.

Tree 30°–50° high.
Leaves elliptic, obovate or oblong, merely acute.
Leaves glaucous beneath; capsule slender-pedicalled.
Leaves green both sides; capsule nearly or quite sessile.

Leaves densely silky-pubescent.

Low bog shrub, with entire glabrous leaves.

Low diffuse glabrous alpine and arctic shrubs.

Leaves oblong or obovate, narrowed at the base; amens many-sweeted.
Leaves orbicular, cordate at the base; pistillate amens few-sweeted.

1. Salix nigra Marsh. Black Willow. (Fig. 1173.)

A tree, with rough flaky brown bark, attaining a maximum height of about 120° and a trunk diameter of 3°. Leaves narrowly lanceolate, acute or acuminate at the apex, narrowed at the base, short-petioled, serrulate, somewhat pubescent when young, glabrous and green above, somewhat paler, and sometimes pubescent on the veins beneath when mature, 2½'–5' long, 2'–9' wide; stipules various, persistent or deciduous; amens expanding with the leaves, on short lateral branches, the staminate 1'–2' long, the pistillate 1½'–3' long and spreading in fruit; stamens 3–7, distinct, their filaments pubescent below; scales deciduous; stigmas nearly sessile; capsule ovoid, acute, glabrous, about twice as long as its pedicel.


Leaves narrower, 2'–3' wide, falcatà, green on both sides. Massachusetts to Florida.
2. **Salix Wardii** Bebb. Ward's Willow. (Fig. 1174.)


*Salix Wardii* Bebb, Gard. & For. 8: 353. 1895.

A tree, sometimes 30° high, the trunk reaching 8' in diameter, the branches spreading or drooping, the bark dark reddish brown, covered with small scales. Leaves lanceolate or oblong-lanceolate, long-acuminate or acute at the apex, rounded, subcordate, or some of them narrowed at the base, 2½'-7' long, ½'-1½' wide, bright green above, silvery white and usually somewhat pubescent beneath; stipules often large, sometimes persistent; aments expanding with the leaves, terminal, the stamineate 2'-4' long, the pistillate as long or shorter; stamens 3-6, separate; filaments pilose at the base; scales villous without, deciduous; capsule conic, glabrous, about twice as long as its pedicel.

Along streams and lakes, Maryland to Tennessee, Missouri and the Indian Territory, south to Florida. Wood dark brown. March-May.

3. **Salix amygdaloides** Anders. Peach-leaved Willow. (Fig. 1175.)


A small tree, similar to the preceding species, sometimes 70° high and the trunk 2° in diameter, the brown bark scaly. Leaves lanceolate or ovate-lanceolate, pubescent when young, glabrous when old, dark green above, paler and slightly glaucous beneath, long-acuminate at the apex, narrowed at the base, 3½'-5' long, about 1' wide, sharply serrulate, slender-petioled; petioles 3''-7'' long, glandless; stipules commonly fugacious; aments appearing with the leaves, terminal on short lateral branches, the stamineate 1'-2' long, the pistillate loose, spreading and 2½'-4' long in fruit; stamens more than 2; filaments distinct, pubescent at the base; scales deciduous; stigmas nearly sessile; capsule narrowly ovoid, acute, glabrous, at length about as long as its filiform pedicel.

On lake and river shores, Quebec to British Columbia, New York, Missouri and New Mexico. Wood soft, weak, light brown; weight 28 lbs. April-May.

4. **Salix lucida** Muhl. Shining Willow. Glossy Willow. (Fig. 1176.)


A tall shrub, or sometimes a tree 20° high, the bark smooth or slightly scaly, the twigs yellowish-brown, shining. Leaves lanceolate, ovate-lanceolate or ovate, mostly long-acuminate, narrowed or rounded at the base, sharply serrulate all around, green and glossy on both sides or bearing a few, scattered hairs when very young, 3'-5' long, 1'-1½' wide when mature; stipules small, semi-cordate or oblong, very glandular, commonly persistent; petioles stout, 3''-6'' long, glandular at the base of the blade; aments on short, lateral leafy branches, the stamineate stout, 1'-2' long, the pistillate dense, 2'-3' long in fruit, often long-persistent; bracts deciduous; stamens about 5; filaments pubescent below; stigmas nearly sessile; capsule narrowly ovoid, acute, glabrous, much longer than its pedicel.

In swamps and along streams and lakes, Newfoundland to the Northwest Territory, New Jersey, Kentucky and Nebraska. A most beautiful willow. April-May.
5. Salix fragilis L. Crack Willow. Brittle Willow. (Fig. 1177.)

Salix fragilis L. Sp. Pl. 1017. 1753.

A tall, slender tree, with roughish gray bark, attaining a maximum height of about 80° and a trunk diameter of 7°, twigs reddish green, very brittle at the base. Leaves lanceolate, long-acumin ate, narrowed at the base, sharply serrulate, glabrous on both sides, rather dark green above, paler beneath, 3'-6' long, 1/2'-1' wide; glandular at the base of the blade; petioles 3'-8'' long, glandular above; stipules semicordate, fugacious; stamineate aments 1'-2' long; stamens 2, or sometimes 3-4; filaments pubescent below, distinct; pistillate aments 3'-5' long in fruit, rather loose; stigmas nearly sessile; capsule long-conic, glabrous, 2 1/2'-3' long, short-pedicelled.

Escaped from cultivation, Massachusetts to New Jersey and Pennsylvania. Native of Europe. Hybridizes with the following species. The twigs break away and grow into new plants. April-May.

6. Salix alba L. White Willow. Huntingdon Willow. (Fig. 1178.)


A large tree, sometimes 90° tall and a trunk diameter of 8°; bark gray, rough; twigs brittle at the base. Leaves lanceolate or oblong-lanceolate, acute or acuminate, narrowed at the base, serrulate, silky-pubescent on both sides when young, less so and pale or glaucous beneath when mature, 2'-4 1/2' long, 4'-8' wide; stipules ovate-lanceolate, deciduous; petioles 2'-4' long, glandless or sparingly glandular; aments on short lateral leafy branches; scales deciduous; stamens 2; filaments distinct, pubescent at the base; pistillate aments linear-cylindrical, 1 1/2'-2 1/2' long; stigmas nearly sessile; capsule ovoid, acute, glabrous, short-pedicelled or sessile.

In moist soil, especially along streams, New Brunswick and Ontario to Pennsylvania, sparingly escaped from cultivation. Native of Europe. April-May.


Mature leaves bluish-green, glabrous, glaucous beneath. Occasional in the Eastern States.


Mature leaves glabrous above; twigs yellowish-green. The commonest form in North America.

7. Salix Babylónica L. Weeping Willow. Ring Willow. (Fig. 1179.)

Salix Babylonica L. Sp. Pl. 1017. 1753.

A large tree, with rough gray bark, sometimes attaining a height of 70° and a trunk diameter of 6°, the twigs slender, green, elongated, drooping. Leaves narrowly lanceolate, long-acuminate at the apex, serrulate all around, narrowed at the base, sparsely pubescent when young, glabrous when mature, green above, paler beneath, 4'-7' long, 3'-6' wide, sometimes curling into rings; petioles 3'-6' long, glandular above; aments appearing on short lateral leafy branches; scales ovate-lanceolate, obtuse, deciduous; stamens 2; style almost none; capsule ovoid-conic, sessile, glabrous.

Widely cultivated and sometimes spreading by the distribution of its twigs. Native of Asia. April-May.

Salix frágilis decipiens (Hoffm.) Anders., with yellowish or red twigs and smaller brighter green leaves, appears to be known only in cultivation within our area.
8. *Salix purpurea* L. **Purple Willow.** (Fig. 1180.)

*Salix purpurea* L. Sp. Pl. 1017. 1753.

A slender shrub or small tree, with purplish flexible twigs, maximum height about 12'; branches often trailing; bark smooth and very bitter. Leaves oblong-elliptic or spatulate, acute, serrulate, narrowed at the base, short-petioled, glabrous, green above, paler and somewhat glaucous beneath, 1½"-3' long, 2½"-4" wide, some of them commonly subopposite; stipules minute; petioles 1½"-2" long, not glandular; aments appearing before the leaves, dense, leafy-bracted at the base, the staminate about 1' long, the pistillate 1'-2' long, sessile or nearly so; stamens 2; filaments and sometimes also the anthers united, pubescent; scales purple, persistent; stigmas very nearly sessile; capsules ovoid-conic, obtuse, tomentose, 2½" long.

Sparingly escaped from cultivation in the Atlantic States. Native of Europe. Also called Bitter, Rose and Whitcord Willow. April–May.

9. *Salix fluviatilis* Nutt. **Sandbar Willow. River-bank Willow.** (Fig. 1181.)


*Salix fluviatilis* Nutt. Sylva, t. 73. 1812.

A much-branched shrub, 2°-12° high, forming thickets, or sometimes a slender tree, 20°-30° tall, and with a trunk 1° in diameter, the young foliage silky-pubescent, the mature leaves glabrous, or nearly so, those of seedlings pinnately dentate or lobed. Leaves linear-lanceolate or linear-oblong, 2½'-4' long, 2½"-5" wide, acuminate, remotely denticulate with somewhat spreading teeth, short-petioled, bright green; petioles not glandular; stipules minute or none; aments on short, leafy branches, linear-cylindric, the staminate dense, 1'-1½' long, the pistillate looser, about 2' long in fruit; scales deciduous; stamens 2; filaments pubescent, distinct; stigmas broad, sessile; capsule ovoid-conic, glabrous or silky, about 2' long.

Along streams and lakes, Quebec to the Northwest Territory and Oregon, south to Virginia, Kentucky and New Mexico. Wood soft, reddish-brown; weight per cubic foot 3½ lbs. April–May.

10. *Salix reticulata* L. **Net-veined Willow.** (Fig. 1182.)

*Salix reticulata* L. Sp. Pl. 1018. 1753.

A procumbent shrub, 3'-10' high, often sending out roots from the twigs, the young shoots 4-sided, purple-green. Leaves elliptic or obovate, thick, obtuse, narrowed, rounded or subcordate at the base, slender-petioled, glabrous or somewhat silky-pubescent when young, dark green above, not shining, glaucous and strongly reticulate-veined beneath, 1'-2' long; petioles 4'-12' long, channelled, not glandular; leaves obscurely crenulate or entire; stipules oblong, obtuse; aments terminal, long-stalked, dense; scales obtuse; stamens 2; filaments distinct, pubescent at the base; stigmas sessile; capsule ovoid-conic, sessile, glabrous or pubescent, about 3' long.

Labrador and Quebec to Alaska, south in the Rocky Mountains to Colorado. Also in northern Europe and Asia. June.
11. Salix vestita Pursh. Hairy Willow. (Fig. 1183.)


A low shrub, similar to the preceding species, the twigs 4-sided, green. Leaves obovate, thick, mostly retuse or emarginate at the apex, slightly crenulate, narrowed or rounded at the base, dark green and glabrous above, persistently tomentose-silky beneath, short-petioled, 1'/2' long; petioles 2'/4' long, channeled, not glandular; aments terminal, unfolding after the leaves, stalked; stamens 2; filaments distinct; capsules narrowly ovoid-conic, sessile, densely silky-tomentose, about 3" long.

Labrador and Quebec to the Northwest Territory. June.

12. Salix Bebbiana Sarg. Bebb’s Willow. (Fig. 1184.)


Salix Bebbiana Sarg. Gard. & For. 8: 453. 1885.

A shrub, 6°-18° tall, or sometimes a tree 25° high, the twigs pubescent or puberulent, terete. Leaves elliptic, oblong or oblong-lanceolate, acute, acuminately or some of them blunt at the apex, rounded or narrowed at the base, sparingly serrate or entire, dull green and puberulent above, pale, reticulate-veined and tomentose beneath or nearly glabrous on both sides when very old; petioles 2'/4" long; stipules semicordate, acute, deciduous; aments sessile, expanding with or before the leaves, dense, the staminate 1'/2' long, the pistillate 2' long in fruit; scales villous, persistent or deciduous; stamens 2; filaments distinct, glabrous; stigmas nearly sessile; capsule very narrowly long-conic, densely pubescent, twice as long as the filiform pedicel.

In dry soil and along streams, Anticosti to Hudson Bay and British Columbia, south to New Jersey, Pennsylvania, Nebraska and Utah. April-May.

13. Salix humilis Marsh. Prairie Willow. (Fig. 1185.)


A shrub, 2°-5° tall, the twigs tomentose or pubescent, terete. Leaves oblanceolate, petioled, 2'-'4' long, 4'/8" wide, acute at both ends or the lower broader and obtuse at the apex, sparingly denticulate, the margins slightly revolute, the upper surface dark green, dull, puberulent or glabrous, the lower densely and persistently gray-tomentose; petioles 2'/4" long; stipules obliquely lanceolate or ovate, acute, commonly persistent; aments unfolding much before the leaves, sessile, ovoid-oblong, short, dense, the pistillate about 1' long in fruit; stamens 2; filaments glabrous; stigmas nearly sessile; capsule narrowly conic, densely pubescent, much longer than its pedicel.

In dry soil, Nova Scotia to western Ontario, south to North Carolina, Tennessee and Nebraska. Hybridizes with S. discolor. April-May.
14. **Salix tristis** Ait. Dwarf Gray Willow. Sage Willow. (Fig. 1186.)


A tufted, slender shrub, 1°-2° tall, the twigs terete, puberulent, the roots long and thick. Leaves oblanceolate or linear-oblong, acute or obtusish, somewhat undulate, green and puberulent or glabrous above, persistently and densely white-tomentose beneath, numerous, crowded, 1'-2' long, their margins revolute; petioles about 1' long; stipules minute, deciduous; aments expanding much before the leaves, dense, very small, comparatively few-flowered, sessile, the pistillate globose-ovoid and about \( \frac{1}{2} \) long in fruit; scales persistent; stamens 2; filaments glabrous; stigmas sessile or nearly so; capsule ovoid with a long, slender beak, tomentose, about \( \frac{3}{2} \) long, much longer than its filament pedicel.

In dry soil, Nova Scotia (?), Maine to Minnesota, south to Florida and Tennessee. March-April.

15. **Salix discolor** Muhl. Glaucous Willow. Pussy Willow. (Fig. 1187.)


A shrub or low tree, maximum height 35', trunk diameter 1'; twigs puberulent or glabrous; young leaves sometimes pubescent. Mature leaves usually glabrous, bright green above, glaucous and nearly white beneath, oblong or oblong-lanceolate, acute at both ends, irregularly serrate or nearly entire, slender-petioled, 3'-5' long, 8'-18' wide; petioles 3'-12' long; stipules obliquely lanceolate or serrate, commonly deciduous; aments unfolding much before the leaves, dense, the pistillate 1 1/2'-3' long in fruit; scales persistent, obtuse, brown-purple, villous; stamens 2; filaments glabrous; stigmas nearly sessile; capsule narrowly conic, tapering to a slender beak, tomentose, 2 1/2'-3' long, much longer than its pedicel.

In swamps or on moist hillsides, Nova Scotia to Montana, Delaware and Missouri. Wood soft, weak, yellow-brown; weight per cubic foot 27 lbs. March-April.

16. **Salix sericea** Marsh. Silky Willow. (Fig. 1188.)


A shrub, 5°-12° tall, with slender purplish puberulent twigs, the young leaves densely silky-pubescent. Mature leaves glabrous or nearly so, lanceolate, acuminate, narrowed or obtuse at the base, serrulate all around with gland-tipped teeth, dark green above, paler and somewhat glaucous beneath, turning brown or black in drying, 2 1/2'-4' long, 5'-10' wide; stipules narrow, deciduous; petioles 2'-7' long, sometimes glandular; aments expanding before the leaves, sessile, usually with a few leafy bracts at the base, dense, the stamine about 1' long, the pistillate 1'-1 1/2' long in fruit; scales villous, persistent; stamens 2; filaments glabrous; style very short; capsule ovoid-oblong, obtuse, pubescent, short-pedicelled, about 1 1/2' long.

In swamps and along streams, Maine to Michigan and Virginia. May.
17. Salix petiolâris J. E. Smith. 
Slender Willow. (Fig. 1189.)

Salix petiolâris J. E. Smith, Trans. Linn. Soc. 6: 122. 1867.

A shrub, similar to the preceding species, but the young leaves only slightly silky, the branches slender, upright or ascending. Mature leaves lanceolate, acuminate at both ends, serrulate with blunt cartilaginous teeth, remaining green in drying, 4'-8' wide; petioles 2'-5'' long; stipules deciduous; aments expanding before the leaves, the pistillate short-peduncled, usually rather loose, about 1' long in fruit; stamens 2; filaments glabrous; stigmas nearly sessile; capsule tapering from an ovoid or oblong base, pubescent, 2''-3'' long, about twice as long as the filiform pedicel.

In swamps, New Brunswick to the Northwest Territory, south to Tennessee and Michigan. May.

Salix petiolâris graciilis Anders. in DC. Prodr. 16: Part 2, 235. 1868.
Pedicels nearly as long as the capsules; leaves rather narrower. Range undetermined.

18. Salix argyrocârpa Anders. Silver Willow. (Fig. 1190.)

S. argyrocârpa Anders. Mon. Soc. 107. j. 60. 1867.

An erect or diffuse shrub, 6'-12' high, the twigs dark green, nearly terete, shining. Leaves oblong or oblancoleate, acute at each end or the lower obtuse, short-petioled, entire or crenulate, bright green and glabrous above, persistently silvery-silky beneath, 1'-2' long, 3'-6'' wide, the margins slightly revolute; aments unfolding with the leaves, leafy-bracted at the base, dense, 1' or less long; scales persistent, villous; stamens 2, distinct, their filaments glabrous; style slender, longer than the stigmas; capsule oblong-conic, densely silvery, acute, 1''-1½'' long, about twice as long as its pedicel.


19. Salix desertôrum Richards. Desert Willow. (Fig. 1191.)


A shrub, 6'-12' high, with purplish-green twigs. Leaves oblong or oblancoleate, acute at the apex and cuneate at the base or the lower obtuse at both ends, entire or very nearly so, very short-petioled, tomentose on both sides or glabrate above when old, ½'-2' long, 2'-3' wide; stipules fugacious; aments expanding with the leaves, dense, ½' or less long, leafy-bracted at the base; stamens 2; filaments glabrous; style about as long as the deeply 2-cleft stigmas; capsule ovoid-conic, acute, densely tomentose, about 2'' long, very short-pedicelled.

Anticosti and Quebec to western arctic America, south along the Rocky Mountains to Colorado. Summer.
(Fig. 1192.)


A low arctic shrub, with terete brown twigs, the young shoots and leaves densely tomentose, becoming glabrate when old. Leaves elliptic or elliptic-lanceolate, entire, obtuse or acute at the apex, narrowed at the base, 1'/3' long, 2'/3' wide; petioles 1'/5' long; stipules deciduous; aments borne on short leafy branches, the staminate dense, about 1' long, the pistillate 2'/3' long in fruit, rather loose; stamens 2; filaments distinct; scales persistent, densely white-villous; capsule ovoid-conic, densely white-tomentose, sessile or very short-pedicelled, 3' long; style about as long as the stigmas.

Arctic America from Labrador to Alaska. Also in arctic and alpine Europe and Asia. Summer.

21. Salix candida Fluegge. Hoary Willow.  (Fig. 1193.)


An erect shrub, 2°-5° tall, the older twigs red or purple and terete, the younger densely white-tomentose. Leaves persistently white-tomentose beneath, green and loosely tomentose or becoming glabrate above when mature, oblong or oblong-lanceolate, thick, sparingly repand-crenulate or entire, acute at both ends or the lower obtuse at the apex, 2°-4° long, 3'/5'-8' wide, their margins slightly revolute; petioles 1'/2'-2'/ long; stipules lanceolate-subulate, about equalling the petioles, deciduous; aments expanding before the leaves, dense, cylindric, the staminate about 1' long, the pistillate 1'/2'-2' long in fruit; bracts villous, persistent; stamens 2; filaments glabrous; style filiform, red, three times as long as the stigmas; capsule ovoid-conic, acute, densely tomentose, 2'/2'-3' long, very short-pedicelled.

In bogs, Labrador and Hudson Bay to the Northwest Territory, south to New Jersey, western New York and Iowa. Hybridizes with S. petiolaris and S. cordata. May.

22. Salix viminalis L. Osier Willow.  
(Fig. 1194.)


A small slender tree or shrub, with terete green twigs. Leaves elongated-lanceolate or linear-lanceolate, long-acuminate at the apex, sparingly repand-crenulate or entire, revolute-marginated, short-petioled, dark green and glabrous above, persistently silvery-silky beneath, 3'-6' long, 2'/5'-8' wide; stipules narrow, deciduous; aments expanding before the leaves, dense, the pistillate 2'/3'-3' long and nearly 1/3' in diameter in fruit; stamens 2; filaments glabrous; style longer than the stigmas; capsule narrowly ovoid-conic, acute, silky-pubescent, about 3' long, very short-pedicelled.

Cultivated for wicker-ware and occasionally escaped into wet places in the Eastern and Middle States. Native of Europe and Asia. April-May.
23. *Salix phyllicifolia* L. Tea-leaved Willow. (Fig. 1195.)

*Salix phyllicifolia* L. Sp. Pl. 1016. 1753.

A shrub 1°-10° high, much branched, the twigs glabrous, dark purple-green, sometimes glaucous. Leaves oblong, lanceolate or elliptic, acute or obtuse at the apex, minutely repand-crenulate or entire, narrowed at the base, bright green and shining above, pale and glaucous beneath, ½'-3' long; ½'-1' wide; petioles 3'-8'' long; stipules minute, fugacious, or wanting; aments sessile, sparingly leafy-bracted at the base, dense, oblong-cylindric, the staminate 1' or less long, the pistillate 1'-2' long in fruit; scales villous, persistent; stamens 2; filaments glabrous; style rather longer than the stigmas; capsule conic, acute, pubescent or tomentose, 2½'' long, much longer than its pedicel.

Swamps, Labrador to Manitoba and the White Mountains of New Hampshire. Also in Europe. Summer.

24. *Salix Brownii* Bebb. Robert Brown's Willow. (Fig. 1196.)


A low, much branched shrub, the twigs 4-angled, slender. Leaves oblong or lanceolate, glabrous or sometimes ciliolate, acute or the lower obtuse at the apex, entire or rarely with a few minute distant teeth, narrowed at the base, short-petioled, 1'-2' long, 3'-8'' wide, remaining green in drying, the lower surface pale or glaucous, the margins not revolute; petioles only 1''-3'' long; stipules narrow, deciduous; aments borne on short leafy branches, the pistillate 1'-2½' long in fruit; scales villous, persistent; obovate, obtuse, green or black-tipped; stamens 2; filaments glabrous; style filiform, much longer than the stigmas; capsule ovoid-conic, tomentose, short-pedicelled, acute, about 1½'' long.

Labrador to Alaska, south to Quebec, and in the Rocky Mountains to Colorado. Summer.

25. *Salix arctica* Pall. Arctic Willow. Ground Willow. (Fig. 1197.)


A low branching shrub, the twigs terete or nearly so. Leaves glabrous, elliptic or broadly obovate, entire, obtuse and usually rounded at the apex, narrowed or rounded at the base, long-petioled, pale and glaucous beneath, 1'-2' long, ½'-1½' wide; petioles slender, ½'-1½' long; aments borne at the ends of short leafy branches, very dense, the pistillate 1'-2' long in fruit; scales dark purple, obovate, obtuse, densely white-villous, persistent; stamens 2; filaments glabrous; style filiform, longer than the stigmas; capsule conic, villous, very short-pedicelled.

Arctic America and Asia. Summer.
26. **Salix cordata** Muhl. Heart-leaved Willow. (Fig. 1198.)


A shrub, 5°-12° high, the twigs puberulent or glabrous; young leaves pubescent. Mature leaves oblong-lanceolate, green on both sides or paler beneath, acuminate at the apex, narrowed, obtuse or subcordate at the base, sharply serrate with glandular teeth, green in drying; stipules oblique, serrulate, usually large and persistent; petioles 4''-9'' long; aments bracted at the base, expanding before the leaves, the staminate about 1'' long, the pistillate 1½'-2½' in fruit; scales silky, persistent; stamens 2; filaments glabrous; style short; capsules narrowly ovoid, acute, glabrous, 2''-3'' long, short-pedicelled.

In wet soil, New Brunswick to British Columbia, south to Virginia, Missouri, Colorado and California. Hybridizes with *S. sericea* and other species. April-May.

**Salix cordata angustata** (Pursh) Anders. Mon. Sal. 159. 1867.

Leaves narrower, linear-lanceolate. Range of the type.


Small tree. Leaves lanceolate or oblanceolate. Manitoba and Northwest Territory to California.

27. **Salix glaucophylla** Bebb. Broad-leaved Willow. (Fig. 1199.)

*S. glaucophylla* Bebb, in A. Gray, Man. Ed. 6, 485. 1889.

A shrub, 4°-10° high, foliage glabrous or when young sparingly pubescent. Mature leaves ovate, obovate or oblong-lanceolate, firm, dark green and shining above, white-glaucous beneath, short-acuminate, the base rounded or acute, serrulate with gland-tipped teeth, 2'-4' long, ½'-2' wide; stipules large, persistent; petioles stout, 3'-6'' long; aments expanding before the leaves, leafy-bracted at the base, the staminate 1'-2' long, the pistillate 1½'-3' long in fruit; scales densely white-villous, persistent; stamens 2; filaments glabrous; style filiform; capsule beaked from an ovoid base, acute, glabrous, 3'-5' long, slender-pedicelled.


28. **Salix Missouriensis** Bebb. Missouri Willow. (Fig. 1200.)

*Salix cordata* var. vestita Anders. Mon. Sal. 159. 1867.

Not *S. vestita* Pursh, 1814.

**Salix Missouriensis** Bebb, Gard. & For. 8: 373. 1895.

A tree, often 50° high, the trunk sometimes 1½° in diameter, the thin gray bark with small appressed scales. Twigs of the season pubescent or puberulent; leaves lanceolate, or oblanceolate, acuminate, finely serrate with minute gland-tipped teeth, rounded or narrowed at the base, pubescent when young, glabrous or nearly so when mature, green above, pale and usually glaucous beneath, 3'-6' long, ½'-1½' wide; petioles ½' long or less; stipules often ½' long, persistent or deciduous; aments narrowly cylindric, unfolding long before the leaves, the staminate about 1½' long, the pistillate 3'-4' long; scales persistent, villous; stamens 2; filaments glabrous; style very short; capsule narrowly ovoid, glabrous, 3-4 times as long as its pedicel.

On river banks, Missouri and Nebraska. Wood dark brown. March-April.
29. Salix balsamifera (Hook.) Barratt. Balsam Willow. (Fig. 1201.)

Salix cordata var. balsamifera Hook. Fl. Bor. Am. 2: 140. 1839.


A shrub, 4°-10° high, the twigs glabrous, shining, the youngest foliage pubescent. Mature leaves elliptic, ovate-oval or obovate, thin, glabrous, acute or some of them obtuse at the apex, rounded or subcordate at the base, dark green above, glaucous and prominently reticulate-veined beneath, 2'-3' long, 1'-1½' wide, slightly crenulate-serrulate, the minute teeth glandular; stipules minute or none; petioles slender, 3'-6' long; stamens expanding with the leaves, leafy-bracted at the base, cylindric, the staminate dense, about 1' long, the pistillate rather loose, 2'-3' long in fruit; scales villous, persistent; stamens 2; filaments glabrous; style almost none; capsules very narrow, acute, glabrous, 2'-3½' long, slender-pedicelled.

In swamps, Labrador to Manitoba, south to Maine, Ontario and Minnesota. May.

30. Salix Barclayi Anders. Barclay's Willow. (Fig. 1202.)


A low shrub, with dark brown glabrous twigs, the young shoots pubescent. Leaves obovate, oval, or oval-lanceolate, short-pointed at the apex, serrulate, floccose-pubescent when young, when mature glabrous, bright green above, pale beneath, 1'-2' long, ½'-1' wide; petioles 1½'-2½' long; stipules ovate, acute, deciduous; aments unfolding with the leaves, borne at the ends of short branches, dense, spreading or erect, the staminate 1' long, the pistillate 2'-3' long in fruit; scales persistent, slightly villous; stamens 2; filaments distinct; capsule narrowly conic, glabrous, acute, 3' long; style longer than the stigmas.

Northwestern arctic America. Summer.

Salix Barclayi latiuscula Anders. in DC. Prodr. 16: Part 2, 255. 1868.

Leaves oval or obovate, subcordate at the base; stipules cordate. Newfoundland (according to Andersson).

31. Salix adenophylla Hook. Furry Willow. (Fig. 1203.)


A straggling shrub, 3°-8° high, the twigs, petioles, stipules and leaves dusky silvery-silky-tomentose, the silky hairs falling away from the leaves when old. Leaves ovate, acute or short-acuminate, or the lower obtuse at the apex, cordate or rounded at the base, finely serrulate with gland-tipped teeth, 1'-2' long, 8½'-1¼' wide; petioles stout, 1½'-3½' long, dilated at the base; stipules ovate-cordate, obtuse, serrulate, persistent; aments leafy-bracted at the base, dense, expanding with the leaves, the staminate about 1' long, the pistillate 1½'-4½' long in fruit; scales villous, persistent; stamens 2; filaments glabrous; style filiform, longer than the stigmas; capsule scissile or very nearly so, ovoid-conic, acute, 1½'-2½' long.

32. Salix myrtilloides L. Bog Willow. (Fig. 1204.)


An erect slender glabrous shrub, 1°-3° high, the twigs light brown, terete. Leaves oblong, elliptic or somewhat obovate, obtuse or acute at the apex, entire, mostly narrowed at the base, 1°-2½' long, 4''-5' wide, short-petioled, bright green above, pale or glaucous beneath, their margins slightly revolute; amments expanding with the leaves, leafy-bracted at the base, rather dense, 1° or less long, or the pistillate longer in fruit; scales persistent, obtuse, slightly villous; stamens 2; filaments glabrous; style shorter than or equaling the stigmas; capsule oblong-conic, obtuse, glabrous, 2½' long, 2-3 times as long as the filiform pedicel which slightly exceeds the scale.

In bogs, New Brunswick and Quebec to British Columbia, south to New Jersey and Iowa. Also in northern Europe. April-May.


Leaves narrower, oblong-linear or oblanceolate; pedicels sometimes longer. Range of the type.

33. Salix Úva-úrsi Pursh. Bearberry Willow. (Fig. 1205.)


A depressed or prostrate glabrous shrub, the terete brown branches 6'-12' long, diffuse from a deep central root. Leaves obovate or elliptic, obtuse or acute at the apex, narrowed at the base, crenulate-denticulate or entire, 4'-10' long, 2'-5' wide, prominently veined, bright green and shining above, pale beneath; petioles 1½'-2½' long; amments leafy-bracted at the base, dense, about ½' long in flower, the pistillate 1'-2' long in fruit; scales persistent, obovate, obtuse, densely silky; stamens usually solitary, rarely 2; filaments glabrous; style short; capsule ovoid-conic, acute, glabrous, very short-pedicelled.

Labrador and Hudson Bay, south to the summits of the mountains of New York and New England. May-June.

34. Salix herbácea L. Dwarf Willow.

(Fig. 1206.)

*Salix herbácea* L. *Sp. Pl.* 1018. 1753.

A depressed matted shrub, with very slender angled twigs 1'-6' long, the youngest foliage somewhat pubescent. Mature leaves glabrous, suborbiculare, rounded or retuse at the apex, cordate or rounded at the base, thin, crenulate-denticulate all around, finely reticulate-veined, bright green and shining on both sides, 5'-10' in diameter; petioles very slender, 2''-4'' long; amments terminating 2-leaved branchlets, 4-10-flowered, 2''-4'' long; scales obovate, obtuse, persistent, glabrous or nearly so; stamens 2; filaments glabrous; style rather longer than the 2-cleft stigmas; capsule narrowly conic, glabrous, nearly sessile.

Labrador and Quebec, through arctic America, and on the White Mountains of New Hampshire and Mt. Katahdin, Maine. Also in Europe and Asia. Summer.
Family 6. **BETULACEAE** Agardh, Aphor. 208. 1825.

**BIRCH FAMILY.**

Monoeious or very rarely dioecious trees or shrubs, with alternate petioled simple leaves, and small flowers in linear-cylindric oblong or subglobose aments. Stipules mostly fugacious. Staminate aments pendulous. Staminate flowers 1–3 together in the axil of each bract, consisting of a membranous 2–4-parted calyx or none, and 2–10 stamens inserted on the receptacle, their filaments distinct, their anthers 2-celled, the anther-sacs sometimes distinct and borne on the forks of the 2-cleft filaments. Pistillate aments erect, spreading or drooping, spike-like or capitate. Pistillate flowers with or without a calyx adnate to the solitary 1–2-celled ovary; style 2-cleft or 2-divided; ovules 1–2 in each cavity of the ovary, anatropous, pendulous. Fruit a small compressed or ovoid-globose, mostly 1-celled and 1-seeded nut or samara. Testa membranous. Endosperm none. Cotyledons fleshy. Radicle short.

Six genera and about 75 species, mostly natives of the northern hemisphere. Staminate flowers solitary in the axil of each bract, destitute of a calyx; pistillate flowers with a calyx. Staminate flowers with no bractlets; pistillate aments spike-like; nut small, subtended by or enclosed in a large bractlet.

Fruiting bractlet flat, 3-cleft and incised. Fruiting bractlet bladder-like, closed, membranous.

Staminate flowers with 2 bractlets; pistillate flowers 2–4, capitate; nut large, enclosed by a leafy involucre.

Staminate flowers 3–6 together in the axil of each bract, with a calyx; pistillate flowers without a calyx.

Stamens 2; filaments 2-cleft, each fork bearing an anther-sac; fruiting bracts 3-lobed or entire, deciduous.

Stamens 4; anther-sacs adnate; fruiting bracts woody, crose or 5-toothed, persistent. 5. **Betula.**


Trees or shrubs, with smooth gray bark, furrowed and ridged stems and straight-veined leaves, the primary veins terminating in the larger teeth. Aments expanding before the leaves. Staminate aments linear-cylindric, sessile at the ends of short lateral branches of the preceding season, their flowers solitary in the axil of each bract, consisting of 3–12 stamens; filaments short, 2-cleft, each fork bearing an anther-sac. Pistillate flowers in small terminal aments, 2 to each bract, consisting of a 2-celled ovary adnate to a calyx and subtended by a flat persistent bractlet, which becomes much enlarged, foliaceous and lobed or incised in fruit, the bracts deciduous; style slender or almost none; stigmas 2, subulate. Nut small, ovoid, acute, borne at the base of the large bractlet. [The ancient name.]

About 12 species, natives of the northern hemisphere, only the following American.

1. **Carpinus Caroliniana** Walt. American Hornbeam. Blue Beech. (Fig. 1207.)


A small tree, with slender terete gray twigs, attaining a maximum height of about 40° and a trunk diameter of 2½°. Leaves ovate-oblong, acute or acuminate at the apex, sharply and doubly serrate all around, rounded or subcordate at the base, somewhat inequilateral, 2½°–4° long, 1½°–1½° wide, green on both sides, glabrous above, slightly pubescent on the veins beneath, petioles very slender, 4°–7° long; staminate aments 1½°–1½° long, their bracts triangular-ovate, acuminate, puberulent; anther-sacs villous at the summit; bractlet of the pistillate flowers 3-lobed at the base, firu-membranous, strongly veined and on one side, often nearly entire on the other; nut somewhat compressed, 2° long.

In moist woods and along streams, Nova Scotia to Ontario and Minnesota, south to Florida and Texas. Wood very hard and strong, durable, light brown; weight per cubic foot 45 lbs. April–May, the fruit ripe Aug.–Sept.
2. **OSTRYA** Scop. Fl. Carn. 414. 1760.

Trees similar to the Hornbeams, the trunks furrowed, the primary veins of the leaves simple or forked, the aments expanding with or before the leaves. Staminate aments sessile at the ends of branchlets of the preceding season, their flowers as in *Carpinus*, solitary in the axil of each bract; filaments 2-cleft. Pistillate aments small, terminal, erect, the flowers 2 to each bract, subtended by a tubular, persistent bractlet which enlarges into a membranous, nerved, bladder-like sac in fruit. Style slender; stigmas 2, subulate. Nut ovoid-oblong, compressed, smooth, sessile in the base of the inflated sac. Mature pistillate ament hop-like. [The ancient name.]

Four species, the following, 1 in the Southwest, 1 in Europe and Asia, 1 Japanese.

1. **Ostrya Virginiana** (Mill.) Willd. Hop-hornbeam. Iron-wood. (Fig. 1208.)


A tree, with a maximum height of about 50°, trunk diameter of 2°, twigs of the season pubescent. Leaves ovate or oblong-ovate, the apex acuminate, the base rounded or inequilateral, sharply and doubly serrate, sparsely pubescent and green above, pubescent or tomentose beneath, 2½'⁻⁴' long, 1'⁻¹½' wide; petioles rarely more than 2' long; staminate aments 1½'⁻³' long, their bracts triangular-ovate, acuminate; anther-sacs villous at the summit; bractlet of each fertile flower forming a sac 6'⁻⁸' long and 4'⁻⁵' in diameter in fruit, acute, cuspidate, pubescent, villous near and at the base with bristly hairs, parallel-veined and finely reticulated; nut 2½' long, compressed, shining; ripe fertile aments erect or spreading, 1½'⁻²½' long.

In dry woods, Cape Breton Island to Minnesota, Florida and Texas. Wood similar to that of the Hornbeam, but heavier; weight per cubic foot 51 lbs. April-May. Fruit ripe July-Aug.


Shrubs or small trees, with broad thin serrulate or incised leaves. Staminate aments sessile at the ends of twigs of the previous season, expanding much before the leaves, the flowers solitary in the axil of each bract, of about 4 stamens and 2 bractlets; filaments 2-cleft or 2-divided, each fork bearing an anther-sac, which is villous at the summit. Calyx none. Pistillate flowers from scaly buds, clustered at the ends of short branches of the season, each in the axil of a bract, consisting of an incompletely 2-celled ovary adnate to a calyx, a short style and 2 slender stigmas; bractlets 2, enlarged in fruit, forming a leaf-like involucre to the nut, remaining nearly distinct or united into a tubular beak. Nut ovoid or oblong, sometimes compressed, large, bony. [Name Greek, from the helmet-like involucre.]

Species 7, in the northern hemisphere. Besides the following, another occurs in California. Involucre of 2 broad laciniate bractlets; leaves serrulate.

Involucral bractlets united, prolonged into a tubular bristly beak.

1. **Corylus Americana** Walt. Hazel-nut. (Fig. 1209.)

*Corylus Americana* Walt. Fl. Car. 236. 1788.

A shrub, 3'⁻⁸' tall, the young shoots russet-brown, densely hispid-pubescent with pinkish hairs, the twigs becoming glabrous. Leaves ovate or broadly oval, acute or acuminate at the apex, serrulate all around, cordate or obtuse at the base, glabrous or nearly so above, finely tomentose beneath, 3'⁻⁶' long, 2'⁻⁴½' wide; petals 2'⁻⁴' long; staminate aments mostly solitary, 3'⁻⁴' long; involucre of the nut compressed, composed of the 2 nearly distinct finely pubescent leaf-like bractlets, which are laciniate on their margins, commonly broader than high and more or less exceeding the nut; nut compressed, light brown, striate, ⅜' high.

2. **Corylus rostrata** Ait. Beaked Hazel-nut. (Fig. 1210.)


A shrub, similar to the preceding species, but the foliage usually less pubescent. Leaves ovate or narrowly oval, acuminate at the apex, cordate or obtuse at the base, incised-serrate and serrulate, glabrous, or with some scattered appressed hairs above, sparingly pubescent at least on the veins beneath, 2½”–4” long, 1½”–2½” wide; petioles 2½”–4” long; involucral bractlets bristly hairy, united to the summit and prolonged into a tubular beak about twice the length of the nut, lacinate at the summit; nut ovoid, scarcely compressed, striate, 5”–7” high.


Aromatic trees or shrubs, with dentate or serrate leaves, scaly buds and flowers of both kinds in aments expanding before or with the leaves, the pistillate erect or spreading. Staminate flowers about 3 together in the axil of each bract, consisting of a membranous, usually 4-toothed perianth, 2 stamens, and subtended by 2 bractlets; filaments short, deeply 2-cleft, each fork bearing an anther-sac. Pistillate flowers 2 or 3 (rarely 1) in the axil of each bract, the bracts 3-lobed, or sometimes entire, deciduous with the fruits; perianth none; ovary sessile, 2-celled; styles 2, stigmatic at the apex, mostly persistent. Nut small, compressed, membranous-winged on each side (a samara), shorter than the bracts. [The ancient name.]

About 35 species, natives of the north temperate and arctic zones.

**Trees.**

Fruiting aments peduncled; bark chalky-white. Leaves deltoid, acuminate; lateral lobes of fruiting bracts short, divergent. 1. *B. populifolia.*

Leaves ovate or suborbicular; lateral lobes of the fruiting bracts ascending. 2. *B. papyrifera.*

Fruiting aments pubescent; bark greenish-brown or brown.

Western; leaves ovate, often obtuse at the base. 3. *B. occidentalis.*

Eastern; leaves rhombic, acute at both ends. 4. *B. nigra.*

Fruiting aments sessile, at the ends of short branches; bark brown or yellowish.

Fruiting bracts 2½” long, lobed at the apex; leaves shining above. 5. *B. lenta.*

Fruiting bracts 4½” long, lobed to about the middle; leaves dull above.

**Shrubs.**

Twigs glandular-warty; leaves glabrous. 6. *B. glandulosa.*

Twigs not glandular-warty, glabrous or pubescent. 7. *B. nana.*

Leaves glabrous; upper fruiting bracts mostly entire. 9. *B. pumila.*

Young foliage densely pubescent; bracts 3-lobed. 8. *B. salicina.*

1. **Betula populifolia** Marsh. American White Birch. (Fig. 1211.)


A slender tree with very white smooth bark, tardily separating in thin sheets; maximum height 45; trunk diameter 1½; the twigs russet, warty. Leaves deltoid, pubescent on the veins when young, nearly glabrous when old, minutely glandular, dark green above, light green beneath, long-acuminate, sharply dentate and commonly somewhat lobed, obtuse or truncate at the base, 1½”–2½” long, 1½”–2” wide, slender-petioled; petioles channelled; staminate aments 2½”–3” long; pistillate aments cylindrical, in fruit 9½”–18½” long, 3½”–5” in diameter, slender-peduncled; fruiting bracts puberulent, 1½”–2½” long, their lateral lobes divergent, larger than the middle one; nut narrower than its wings.

In moist or dry soil, New Brunswick to southern Ontario, Pennsylvania and Delaware. Wood soft, weak. Leaves tremulous like those of the Aspens. May.
2. Betula papyrifera Marsh. Paper or Canoe Birch. (Fig. 1212.)


A large forest tree with maximum height of about 80 feet and trunk diameter of 3 feet. Bark, except of the young wood, peeling in thin layers. Leaves ovate, acute or acuminate, dentate and denticulate, subcordate, truncate or obtuse at the base, dark green and glabrous above, glandular and pubescent on the veins beneath, slender-petioled, 1½-4½" long, 1½-3½" wide; petioles ½-1½" long; staminate aments 2½-4½" long; pistillate aments cylindrical, slender-peduncled, 1½-2½" long, ½-½" in diameter in fruit, spreading or somewhat drooping; fruiting bracts 2½-3½" long, puberulent or ciliate; nut narrower than its wings.

Newfoundland to Alaska, northern Pennsylvania, Michigan and Washington. Wood hard, strong, reddish-brown; weight per cubic foot 37 lbs. The chalky-white outer bark interesting to tourists. April-May.


3. Betula occidentalis Hook. Western Red Birch. (Fig. 1213.)


A tree, attaining a maximum height of about 40 feet and a trunk diameter of 1½ feet, the bark smooth, dark bronze, the twigs gray-brown, warty. Leaves broadly ovate or nearly orbicular, acute or obtuse at the apex, sharply serrate, rounded or obtuse at the base, short-petioled, glabrous on both sides or sparingly pubescent on the veins beneath, 1½-2½" long; petioles slender, 2½-5½" long; pistillate aments manifestly peduncled, cylindrical, spreading or pendant, 1½-2½" long, about 5½" in diameter in fruit; fruiting bracts ciliate, about 3½" long, their lateral lobes ascending, usually shorter than the middle one; nut much narrower than its wings.

Western Nebraska to British Columbia, California and New Mexico. Wood soft, strong, brittle, light brown; weight per cubic foot 35 lbs. April-May.

4. Betula nigra L. River Birch. Red Birch. (Fig. 1214.)


A slender tree, sometimes 90 feet high and the trunk 2½ feet in diameter; bark reddish or greenish-brown, peeling in very thin layers; twigs reddish. Young shoots, petioles and lower surfaces of the leaves tomentose; leaves rhombic-ovate, apex acute or obtuse, irregularly serrate or somewhat lobed, base cuneate, when mature dark green and glabrous above, pale and glabrous or somewhat tomentose beneath, 1½-3½" long; petioles 3½-5½" long; staminate aments mostly clustered in 2's or 3's, 2½-3½" long; pistillate aments oblong-cylindric, spreading, peduncled, 1½-2½" long, 5½-6½" in diameter in fruit; fruiting bracts tomentose, about equally 3-lobed, 3½-5½" long; nut broadly obovate, wider than its wings, pubescent at the base.

Along streams and lakes, Massachusetts to Iowa and Kansas, south to Florida and Texas. Wood hard, strong, brown; weight per cubic foot 35 lbs. The bark of the branches peels off in almost membranous layers. April-May.
5. Betula lenta L. Cherry, Black or Sweet Birch. (Fig. 1215.)


A large forest tree, sometimes 80° high, with dark brown close smooth bark, becoming furrowed, not separating in layers; foliage aromatic; twigs smooth, warty, young leaves silky. Mature leaves ovate or ovate-oblong, acute or acuminate, the base cordate or rounded, sharply serrulate, bright green, and shining above, dull green and pubescent on the veins beneath, 2½'-4' long, 1'-2' wide; petioles 3'-6' long; staminate aments clustered, 2½'-4' long; pistillate aments sessile, dense, oblong, about 1' long and ½' in diameter in fruit, nearly erect; bracts glabrous or minutely puberulent, appressed, about 2'' long, nearly equally 3-lobed, the lateral lobes somewhat divergent; nut oblong, broader than its wings.

Newfoundland to western Ontario, Florida and Tennessee. Wood hard, strong, dark brown; weight per cubic foot 47 lbs. The aromatic oil of the branches and foliage (same as oil of wintergreen) is distilled in quantities and is an important article of commerce. Tree much resembles the cherry. April-May.

6. Betula lutea Michx. f. Yellow Birch. Gray Birch. (Fig. 1216.)


A large forest tree, similar to the preceding species, reaching a maximum height of about 100° and a trunk diameter of 4°, the bark yellowish or gray, separating in thin layers or close, the twigs gray-brown. Leaves ovate or oblong-ovate, mostly acuminate at the apex, rounded, obtuse or rarely subcordate at the base, sharply serrulate all around, dark green and dull above, pubescent on the veins beneath, ½'-4' long, petioles 4''-9'' long; staminate aments usually 2-4 together; pistillate aments sessile, oblong or oblong-cylindric, ½' or less long, 7''-9'' thick in fruit, rather loose; bracts nearly equally 3-lobed to the middle, ciliate, the lateral lobes ascending; nut broadly oblong, wider than its wings.

Newfoundland to Manitoba, south to North Carolina and Tennessee, mainly in the Alleghenies. Wood hard, strong, light brown; weight per cubic foot 41 lbs. April-May.

7. Betula glandulosa Michx. Glandular or Scrub Birch. (Fig. 1217.)


A shrub, 1°-4° high, the twigs brown, glandular-warty, not pubescent. Leaves orbicular, oval or oblong-ovate, glabrous, rounded at the apex; rounded, narrowed or cuneate at the base, crenate-dentate, bright green above, pale green and glandular-dotted beneath, short-petioled, ½'-1'' long; petioles 1''-3'' long; staminate aments commonly solitary, about ½'' long; pistillate aments cylindric, erect, peduncled, 5''-12'' long and about 2'' in diameter in fruit; fruiting bracts glabrous, the lateral lobes divergent, rather shorter than the middle one; nut oblong, usually narrower than its wings.

Newfoundland to Alaska, the higher mountains of Maine and northern New York, Michigan, Minnesota and in the Rocky Mountains to Colorado. Also in Asia. June-July.
8. **Betula nana** L. Dwarf Birch. (Fig. 1218.)

Betula nana L. Sp. Pl. 983. 1753.

A low diffuse shrub, similar to the preceding species, but the twigs glabrous, puberulent or glabrous. Leaves orbicular, obovate, or reniform and wider than long, bright green, firm, glabrous, on both sides when mature, deeply and incisely crenulate, rounded at the apex, rounded, obtuse or cuneate at the base, 3/8-10" long; petioles rarely more than 1/2" long; staminate aments 1/2-1" long, solitary or clustered; pistillate aments oblong, sessile or short-peduncled, erect or somewhat spreading, 3/8-5/8" long; fruiting bracts glabrous, the lower usually 3-lobed, the upper ovate or lanceolate, mostly entire; nut oblong, wingless or narrowly winged.

Greenland and Labrador to Hudson Bay. Also in northern Europe and Asia. May-June.

9. **Betula pumila** L. Low Birch. (Fig. 1219.)

Betula pumila L. Mant. 124. 1767.

A bog shrub, 2-12" tall, the twigs brown, becoming glabrous, the young foliage densely brownish-tomentose. Leaves obovate, broadly ovate or orbicular, rounded at both ends or some of them cuneate-narrowed at the base, rather coarsely dentate, when mature glabrous and dull green above, pale, persistently tomentose or becoming glabrous beneath and prominently reticulate-veined, 1/2-1 1/2" long; petioles 1 1/2'-3'" long; fruiting pistillate aments oblong-cylindric, erect, pendulous, 1' long or less, about 3" in diameter; bracts puberulent or ciliolate, the lateral lobes spreading at right angles, shorter than the middle one; nut oblong, mostly rather broader than its wings.

In bogs, Newfoundland to western Ontario and the Northwest Territory, south to New Jersey, Ohio and Minnesota. May-June.

5. **ÁLNUS** Gaertn. Fr. & Sem. 2: 54. pl. 90. 1791.

Shrubs or trees, with dentate or serrate leaves, few-scaled buds, and flowers of both kinds in aments, expanding before, with or after the leaves, making their first appearance during the preceding season, the staminate pendulous, the pistillate erect, clustered. Staminate flowers 3 or sometimes 6 in the axil of each bract, consisting of a mostly 4-parted perianth, 4 stamens and subtended by 1 or 2 bractlets; filament short, simple; anther-sacs adnate. Pistillate flowers 2-3 in the axil of each bract, without a perianth, but subtended by 2-4 minute bractlets; ovary sessile, 2-celled; styles 2; bracts woody, persistent, 5-toothed or erose. Nut small, compressed, wingless or winged. [Ancient Latin name derived from the Celtic, in allusion to the growth of these trees along streams.]

About 14 species, natives of the northern hemisphere and the Andes of South America. Besides the following, some 4 others occur in the western parts of North America.

Nut bordered by a membranous wing on each side.

1. **A. Alnobetula.** Nut acute-margined, wingless.

Leaves obovate, broadly oval or suborbicular, dull; aments expanding long before the leaves.

Leaves finely tomentose or glabrous beneath.

Leaves green, glabrous or sparingly pubescent beneath.

Leaves finely serrulate; foliage not glutinose; native.

Leaves dentate-serrate; twigs glutinous; introduced tree.

Leaves oblong, bright green and shining above; aments expanding in autumn.

2. **A. incana.**

3. **A. rugosa.**

4. **A. glutinosa.**

5. **A. maritima.**
1. Alnus Alnobetula (Ehrh.) K. Koch. Green or Mountain Alder. (Fig. 1220.)


*Betula viridis* DC. Fl. Fr. 3: 304. 1805.


A shrub, 2°-10° high, the young foliage glutinous and more or less pubescent. Leaves oval or ovate, obtuse or acute, sharply and more or less irregularly serrulate or incised-serrulate, when mature dark green and glabrous above, light-green and usually pubescent on the veins beneath, 2°-5° long, 1½'-3' wide; petioles 4'-12' long; aments expanding with the leaves, the staminate slender, naked, 1½'-2½' long, the pistillate from scaly buds, oblong or ovoid-oblong, slender-peduncled, becoming 6'-8' long and 4'-5' in diameter in fruit, their bracts irregularly 5-toothed; nut oblong, the thin wings about as broad as the body.

Newfoundland to Alaska, Massachusetts, New York, Michigan and British Columbia, and in the higher Alleghenies of Virginia and North Carolina. Also in Europe and Asia. June.

2. Alnus incana (L.) Willd. Speckled or Hoary Alder. (Fig. 1221.)


A shrub, or rarely a small tree, 8°-25° high, the twigs glabrous, the young shoots pubescent. Leaves oval or ovate, acute or sometimes obtuse at the apex, finely serrulate or dentate, with the teeth serrulate, obtuse or some of them acute at the base, dark green above, pale or glaucous and pubescent, at least on the veins beneath, 2°-5° long, 1½'-4' wide, the veins prominent on the lower surface; stipules oblong-lanceolate, deciduous; petioles 4'-12' long; aments appearing from naked buds, unfolding much before the leaves, the staminate 1½'-3' long, the pistillate obvoid, about ½' long and 3'/5' in diameter in fruit, their bracts 5-toothed; nut orbicular, cariaceous-margined.

In wet soil, Newfoundland to the Northwest Territory, south to southern New York, Pennsylvania and Nebraska. Also in Europe and Asia. Wood soft, light brown; weight per cubic foot 28 lbs. April-May.

3. Alnus rugosa (DuRoi) K. Koch. Smooth Alder. (Fig. 1222.)

*Betula Alnus rugosa* DuRoi, Harb. 1: 112. 1771.


*Alnus rugosa* K. Koch, Dendr. 2: Part 1, 635. 1872.

A shrub 5°-20° tall, or sometimes a small tree, attaining a maximum height of 40° and a trunk diameter of 6', the bark smooth, the younger shoots somewhat pubescent. Leaves green on both sides, obovate or oval, mostly obtuse and rounded at the apex, narrowed or rounded at the base, sharply and minutely serrulate, when mature glabrous above, usually pubescent on the veins beneath, 3°-5° long, stipules oval, deciduous; petioles 4'-12' long; aments appearing from naked buds, unfolding much before the leaves (or in the South after the leaves), the staminate 2°-4' long, the pistillate obvoid, 6°-9° long in fruit; nut ovate, narrowly cariaceous-margined.

In wet soil, or on hillsides, Maine to Ohio and Minnesota, Florida and Texas. Wood soft, light brown; weight per cubic foot 29 lbs. March-April.
4. *Alnus glutinosa* (L.) Medic. European Alder.  (Fig. 1223.)

*Betula Alnus var. glutinosa* L. Sp. Pl. 683. 1753.


A tree, reaching a maximum height of about 75° and a trunk diameter of 2½°, the bark smooth, the branches nearly horizontal, the foliage glutinous. Leaves broadly ovate, orbicular or obovate, thick, dark green, dull, often obtuse at both ends, dentate and the teeth dentate, glabrous above, pubescent on the veins beneath, 2'-5' long; petioles ½'-1' long; aments appearing from naked buds, expanding much before the leaves, the staminate 3'-4' long, the pistillate ovoid-oblong, 6'-9' long in fruit; nut wingless, coriaceous-margined.

In wet places, southern New York and New Jersey, escaped from cultivation and becoming naturalized in a few localities. Native of Europe. Wood soft, brown; weight per cubic foot 35 lbs. April.

5. *Alnus maritima* (Marsh.) Muhl. Seaside Alder.  (Fig. 1224.)


*Alnus maritima* Muhl.; Nutt. Sylva, 1: 34. t. 102. 1865.

A small tree, sometimes 30° tall and the trunk 6° in diameter, glabrous or very nearly so throughout. Leaves oblong, ovate-oblong or obovate, firm, acute at both ends, bright green and shining above, pale green and dull beneath, sharply serrulate, 2'-4' long, 1'-2' wide; petioles 3'-10" long; aments unfolding long after the leaves, their buds developing during the season, the staminate 1'-2½' long, the pistillate oblong, 9'-12' long, 5'-7' in diameter in fruit; nut oblong-obovate, wingless, coriaceous-margined.

In wet soil, southern Delaware and eastern Maryland; also in the Indian Territory. Closely related to *A. japonica* of northeastern Asia, and perhaps not specifically distinct from it. Wood soft, light brown; weight per cubic foot 31 lbs. Aug.-Sept.

Family 7. **FAGACEAE** Drude, Phan. 409. 1879.

**Beech Family.**

Trees or shrubs. Leaves alternate, petioled, simple, dentate, serrate, lobed, cleft or entire, pinnately veined, the stipules, if any, deciduous. Flowers small, monoecious, the staminate in pendulous erect or spreading aments, or capitate, the pistillate solitary or several together, subtended by an involucre of partly or wholly united bracts, which becomes a bur or cup. Petals none. Staminate flowers with a 4-7-lobed perianth and 4-20 stamens; filaments slender, distinct, simple; anther-sacs adnate, longitudinally dehiscent. Pistillate flowers with a 4-8-lobed urn-shaped or oblong perianth, adnate to the 3-7-celled ovary; ovules 1-2 in each cavity, only 1 in each ovary ripening, pendulous, anatropous; styles as many as the cavities of the ovary, linear, terminally or longitudinally stigmatic. Fruit a 1-seeded nut, with a coriaceous or somewhat bony exocarp. Testa thin. Endosperm none; cotyledons large, fleshy, often rugose; radicle short.

About 5 genera and 375 species, of very wide geographic distribution.

Staminate flowers capitate; nut sharply triangular.

Staminate flowers in slender aments; nut rounded or plano-convex.

Pistillate flowers 2-5 in each involucre; involucre becoming globose and very prickly in fruit, enclosing the nuts.

Pistillate flower 1 in each involucre; involucre of numerous scales forming a cup in fruit and subtending the acorn.

1. *Fagus.*

2. *Castanea.*

3. *Quercus.*
1. **Fagaceae.**

Trees, with smooth light gray bark, and serrate straight-veined leaves. Flowers appearing with the leaves, the staminate in slender-peduncled pendulous globose heads, the pistillate about 2 together in short-peduncled subulate-bracted involucres in the upper axils. Staminate flowers yellowish-green, subtended by deciduous bracts, consisting of a campanulate 4-8-lobed calyx, and 8-16 stamens with filiform filaments. Pistillate flowers with a 6-lobed perianth adnate to a 3-celled ovary; ovules 2 in each cavity, usually 1 only of each ovary maturing; styles 3, filiform. Nut coriaceous, sharply 3-angled, enclosed in the 4-valved bur. [Name from the Greek, to eat, referring to the esculent nuts.]

About 4 species, natives of the northern hemisphere. Only the following is native in North America.

1. **Fagus Americana** Sweet. American Beech. (Fig. 1225.)


A large forest tree, with maximum height of about 120°, and a trunk diameter of 4½", the lower branches spreading. Leaves ovate or ovate-oblong, firm, acuminate at the apex, obtuse or narrowed at the base, 2½-4½" long, 1½-3½" wide, densely silky when young, glabrous or nearly so when mature, green on both sides, not shining, rather coarsely serrate; petioles 2½-6½" long; heads of staminate flowers 6½-9½" in diameter, hanging on peduncles 1½-3½" long; bur 6½-10½" high, densely tomentose, its soft prickles recurved or spreading; nut pubescent, or at length nearly glabrous, brown; seed sweet.

In rich soil, Nova Scotia to Ontario and Wisconsin, south to Florida and Texas. Wood hard, strong, tough, close-grained; color light or dark red; weight 43 lbs. per cubic foot. April-May. Nuts ripe Sept.-Oct. Leaves of seedlings and young shoots are sometimes pinnatifid.

2. **Castanea** Adans. Fam. Pl. 2: 375. 1763.

Trees or shrubs, with serrate straight-veined leaves, their teeth sharply acuminate. Flowers appearing after the leaves, the staminate in erect or spreading narrowly cylindrical interrupted axillary yellowish aments, several in the axil of each bract, the bracts fugacious, the pistillate borne in prickly involucres at the bases of the staminate aments or in separate axils. Staminate flowers 2-bracteolate, consisting of a mostly 6-lobed campanulate perianth and numerous stamens, sometimes also with an abortive ovary; filaments filiform, long-exserted. Pistillate flowers 2-5 (commonly 3) in each involucre, consisting of an urn-shaped 6-lobed perianth adnate to the mostly 6-celled ovary, and usually with 4-12 abortive stamens; ovules 2 in each cavity, 1 ovule only of each ovary usually maturing; styles as many as the cavities of the ovary, slender, exserted; stigmas minute. Pistillate involucres enlarging and becoming a globose mostly 4-valved very prickly bur in fruit, enclosing 1-several nuts. Nut rounded or plano-convex, 1-seeded, the shell coriaceous. Seed large, sweet. Style mostly persistent. [Name Greek, from a city in Thessaly.]

Four or five species, natives of the northern hemisphere. Besides the following, another occurs in the southeastern United States.

Leaves green on both sides; nuts usually 2-5 in each involucre; large tree. 1. **C. dentata.**

Leaves densely white-tomentose beneath; nut usually solitary; shrub or small tree. 2. **C. pumila.**
1. Castanea dentata (Marsh.) Borkh. American Chestnut. (Fig. 1226.)


A large forest tree, with gray bark rough in longitudinal plates, reaching a maximum height of about 100 ft. and a trunk diameter of 14 ft.; lower branches spreading. Leaves oblong-lanceolate, glabrous, firm, acuminate at the apex, narrowed or rounded at the base, coarsely serrate, with very sharp-pointed ascending teeth, rather dark green above, lighter beneath, 5'-12' long, 1 1/2'-3' wide; petioles stout, 1/2'-1' long; staminate aments erect, numerous, borne solitary in the upper axils, 6'-12' long, 4''-5'' in diameter; burs 1 1/2' in diameter or less, commonly spicate, enclosing a solitary ovoid brown nut (rarely 2); seed very sweet.


2. Castanea pumila (L.) Mill. Chinquapin. (Fig. 1227.)

Fagus pumila L. Sp. Pl. 998. 1753.
Castanea pumila Mill. Gard. Dict. Ed. 8, no. 2. 1768.

A shrub or small tree, sometimes 45' high and with a trunk 3' in diameter, the young shoots puberulent. Leaves oblong, acute at both ends, sharply serrate with ascending or divergent teeth, dark green and glabrous above, densely white-tomentulose beneath, 3'-6' long, 1'-2 1/2' wide; staminate aments erect or somewhat spreading, 3'-5' long, 3''-4'' in diameter; burs 1 1/2' in diameter or less, commonly spicate, enclosing a solitary ovoid brown nut (rarely 2); seed very sweet.

In dry soil, New Jersey and Pennsylvania to Indiana, Florida and Texas. Wood strong, coarse-grained, dark brown; weight per cubic foot 37 lbs. June. Nuts ripe Sept.


Trees or shrubs, with pinnatifid lobed dentate crenate or entire leaves, deciduous or in some species persistent. Flowers very small, green or yellowish, appearing with or before the leaves, the staminate numerous in slender mostly drooping aments, the pistillate solitary in many-bracted involucres borne on the twigs of the preceding season or on the young shoots. Staminate flowers subtended by caducous bracts, consisting of a mostly 6-lobed campanulate perianth and 6-12 stamens with filiform filaments, sometimes also with an abortive pilose ovary. Pistillate flowers with an urn-shaped or oblong calyx, adnate to a mostly 3-celled ovary; ovules 2 in each cavity of the ovary, rarely more than 1 in each ovary maturing; styles as many as the ovary-cavities, short, erect or recurved. Fruit consisting of the imbricated and more or less united bracts of the involucre (cup), subtending or nearly enclosing the ovoid, oblong or subglobose 1-seeded coriaceous nut (acorn). [The ancient Latin name, probably of Celtic derivation, signifying "beautiful tree."]

About 300 species, natives of the northern hemisphere. Besides the following, some 30 others occur in the western and southern sections of North America.

* Leaves or their lobes bristle-tipped, deciduous; acorns maturing in autumn of second year.
† Leaves pinnatifid or pinnately lobed.

Leaves green on both sides.

Cup of the acorn saucer-shaped, much broader than high.
Cup 8'-12' broad; acorn ovoid; leaves dull.
Cup 4'-8' broad; leaves shining.
Acorn subglobose or short-ovoid; northern.
Acorn ovoid; southern.
Cup of the acorn turbinate or hemispheric.
Inner bark gray; leaves shining both sides.
Inner bark orange; leaves pubescent in the axils of the veins beneath.

Leaves white or gray-tomentulose beneath.

Large tree; leaf-lobes lanceolate or linear-lanceolate, long.
Shrub or low tree; leaf-lobes triangular-ovate, short.

1. Q. rubra.
2. Q. palustris.
3. Q. Texana.
4. Q. coccinea.
5. Q. velutina.
6. Q. digitata.
7. Q. nana.
FAGACEAE.

†† Leaves 3-5-lobed above the middle or entire, obovate or spatulate in outline.

Leaves obovate-cuneate, brown-floccose beneath.
Leaves spatulate, glabrous both sides.
††† Leaves entire, oblong, lanceolate or linear-oblong (sometimes lobed in no. 11).

Leaves linear-oblong, green and glabrous on both sides.
Leaves oblong, glabrous, dark green and shining above.
Leaves oblong or lanceolate, brown-tomentulose beneath.

** Leaves or their lobes not bristle-tipped, deciduous; acorns maturing in autumn of first year.

† Leaves pinnatifid or pinnately lobed.

Mature leaves pale, or glaucous and glabrous beneath; cup shallow.
Mature leaves tomentulose beneath; cup one-third to fully as long as the acorn.

Upper scales of the cup not awned.
Leaves yellowish-brown-tomentulose beneath; acorn ovoid.
Leaves white-tomentulose beneath; acorn depressed-globose.
Upper scales awned, forming a fringe around the acorn.
†† Leaves crenate or dentate, not lobed.

Fruit peduncled.
Peduncle much longer than petioles; leaves white-tomentulose beneath.
Peduncle equaling or shorter than the petioles; leaves gray-tomentulose beneath.

Teeth of the leaves acute or mucronulate.
Teeth of the leaves rounded.

Fruit sessile.
Tall tree; leaves oblong or lanceolate.
Shrub or low tree; leaves oval or obovate.

** ** Leaves entire (rarely with a few bristle-tipped lobes), evergreen.

1. Quercus rubra L. Red Oak. (Fig. 1228.)

Quercus rubra L. Sp. Pl. 996. 1753.


A large forest tree, with a maximum height of about 140 ft, and a trunk diameter of 7 ft, the bark dark gray, slightly roughened. Leaves ovate or somewhat obovate in outline, deciduous, when mature glabrous, or pubescent in the axils of the veins beneath, 4'-6' long, 5'-6' wide, dull green above, paler beneath, sinuses rounded, lobes triangular-lanceolate, tapering from a broad base to an acuminate apex, 1-4-toothed or entire, teeth and apices tipped with filiform bristles; petioles 1/4'-1/2' long; styles slender, spreading; fruit maturing the second autumn; cup saucer-shaped, its base flat or slightly convex, 8'-12' broad, bracts ovate or ovate-lanceolate, obtuse or the upper acute, appressed; acorn ovoid, about 1' long, 2-4 times as long as the cup.


A. DC. Prodr. 16: Part 2. 60. 1854.

2. Quercus palustris DuRoi. Swamp Oak. Pin Oak. (Fig. 1229.)

Q. palustris DuRoi, Harbk. 2: 268. pl. 5. f. 4. 1772.

A forest tree, maximum height about 120 ft and trunk diameter 5 ft, the lower branches deflexed; bark brown, rough when old. Leaves broadly oblong or obovate in outline, deeply pinnatifid, sometimes almost to the midrib, bright green glabrous and shining above, duller, glabrous or with tufts of hairs in the axils of the veins beneath, 3'-5' long, the lobes oblong, lanceolate or triangular-lanceolate, divergent, 1-4-toothed or entire, teeth and apices tipped with filiform bristles; styles slender; fruit maturing in the second autumn; cup saucer-shaped, 4'-6' broad, base flat, bracts triangular-ovate, acute or obtuse, appressed; acorn subglobose or ovoid, 4'-7' high, often striate, 2-3 times as long as the cup.

3. Quercus Texàna Buckley. Texan Red Oak. (Fig. 1230.)


A forest tree, similar to the preceding species and to *Q. rubra*, attaining a maximum height of about 200° and a trunk diameter of 8°, usually smaller. Bark reddish-brown, with broad ridges broken into plates; leaves mostly obovate in outline, bright green and shining above, paler and with tufts of wool in the axils beneath, 2°-6° long, truncate or broadly wedge-shaped at the base, deeply pinnatifid into 5-9 oblong or triangular lobes, which are entire or coarsely few toothed, the lobes and teeth bristle-tipped; styles short; fruit maturing in the autumn of the second season; cup deeply saucer-shaped, 5°-8° broad, its scales obtusish or acute, appressed; acorn ovoid, ½'-1' long, 2-3 times as high as the cup.

Southern Indiana to Iowa and Missouri, Florida and Texas. Wood hard, light red-brown; weight per cubic foot 57 lbs. April-May. Acorns ripe Sept.-Oct.

4. Quercus coccinea Wang. Scarlet Oak. (Fig. 1231.)

*Quercus coccinea* Wang. Amer. 44. pl. 4. f. 9. 1787.

A forest tree, attaining a maximum height of about 160°, the trunk diameter sometimes 5°; inner bark pale reddish or gray; foliage turning scarlet in autumn. Leaves deeply pinnatifid, glabrous, bright green and shining above, paler and sometimes pubescent in the axils of the veins beneath, 4°-8° long, rather thin, the lobes oblong or lanceolate, divergent or ascending, few-toothed, the teeth and apices bristle-tipped; fruit maturing in the autumn of the second season; styles slender, recurved-spreading; cup hemispheric or top-shaped, its bracts triangular-lanceolate, appressed or the upper slightly squarrose, mostly glabrous; acorn ovoid or ovoid-globose, 6°'-10° high, about twice as long as the cup.

In dry soil, Maine and Ontario to Minnesota, Florida and Missouri. Wood hard, strong, coarse-grained, light brown or red; weight 46 lbs. per cubic foot. May-June. Acorns ripe Sept.-Oct.

5. Quercus velutina Lam. Black Oak. Quercitrón. (Fig. 1232.)

*Quercus velutina* Lam. Encycl. 1: 721. 1783.

*Q. tinctoria* Bartram, Travels, 37. Name only. 1791.

*Q. coccinea var. tinctoria* A. Gray, Man. Ed. 5, 454. 1867.

A large forest tree, similar to *Q. coccinea*, maximum height about 150°, trunk diameter 5°; outer bark very dark brown, rough in low ridges, the inner bright orange. Leaves pinnatifid or lobed to beyond the middle, firm, brown-pubescent or sometimes stellate-pubescent when young, when mature glabrous and dark dull green above, pale green and usually pubescent on the veins beneath, the broad oblong or triangular-lanceolate lobes and their teeth bristle-tipped; fruit maturing in the autumn of the second season; cup hemispheric or top-shaped, commonly narrowed into a short stalk, its bracts mostly pubescent, the upper somewhat squarrose; acorn ovoid, ½'-1' high, more or less longer than the cup.

Maine to Ontario, Minnesota, Florida and Texas. Wood reddish-brown; weight per cubic foot 44 lbs. May-June.
6. Quercus digitata (Marsh.) Sudw. Spanish Oak. (Fig. 1233.)

Quercus digitata Sudw. Gard. & For. 5: 99. 1892.

A tree, with maximum height of about 95', and trunk diameter of 5'. Leaves dark green and glabrous above, gray-tomentulose beneath, deeply pinnatifid into 3-7 linear or lanceolate lobes, often falcate, acuminate, entire or dentate; teeth and apices bristle-tipped; terminal lobes commonly elongated; styles slender; fruit maturing during the second autumn; cup saucer-shaped with a turbinate base, 5"-7" broad, its bracts ovate, obtuse, appressed; acorn subglobose or depressed, about twice as high as the cup.


7. Quercus nana (Marsh.) Sarg. Bear or Scrub Oak. (Fig. 1234.)

Quercus ilicifolia Wang. Amer. 79. pl. 6. f. 17. 1787.
Quercus nana Sarg. Gard. & For. 8: 93. 1895.

A shrub or rarely a small tree, often forming dense thickets, maximum height about 25', and trunk diameter 6'; bark gray, nearly smooth. Leaves mostly obovate, 2'-5' long, short-petioled, dark green and glabrous above, grayish-white tomentulose beneath, 3-7-lobed; lobes triangular-ovate, acute, bristle-tipped; styles recurved; fruit maturing the second autumn; cup saucer-shaped, 4'/-6' broad, with a turbinate or rounded base; its bracts lanceolate, appressed; acorn globose-ovoid, more or less longer than the cup.

In sandy or rocky soil, Maine to Ohio, Delaware, and the mountains of Virginia and Kentucky. Wood hard, strong, light brown. May. Acorns ripe Oct.-Nov.

A hybrid of this, presumably with Q. coccinea, was found by Dr. Robbins at Uxbridge, Mass.

8. Quercus MARYLANDICA Muench. Black-Jack or Barren Oak. (Fig. 1235.)

Quercus nigra B. L. Sp. Pl. 995. 1733.
Quercus MARYLANDICA Muench. Hausv. 5: 253. 1770.

A tree, sometimes 60' high, usually lower; maximum trunk diameter 2'; bark nearly black, very rough in ridges. Leaves obovate in outline, stellate-pubescent above and brown-tomentose beneath when young, 3-5-lobed toward the broad usually nearly truncate apex, cuneate below, the lobes short, entire or sparingly toothed, bristle-tipped; mature leaves dark green, glabrous above, paler and more or less floccose beneath, 3'-7' long, 2'-5' wide; fruit maturing the second autumn; styles recurved; cup deep, 5'/-8' broad, its bracts oblong-lanceolate, appressed, pubescent; acorn ovoid, 2-3 times as high as the cup.

In dry soil, Long Island, N. Y., to Ohio and Nebraska, south to Florida and Texas. Wood hard, strong, dark brown; weight per cubic foot 46 lbs. May-June. Acorns ripe Oct.-Nov.


Quercus Brittoni W. T. Davis, Scienc. Am. 67: 145, is a hybrid with Q. ilicifolia. Staten Island, N. Y.
9. **Quercus nigra** L. Water Oak. (Fig. 1236.)

A tree, with maximum height of about 80° and trunk diameter of 4°; bark gray, rough in ridges. Leaves spatulate or obovate, 1-3-lobed at the apex, or some of them entire and rounded, coriaceous, short-petioled, rather bright green and shining on both sides, finely reticulate-veined, glabrous when mature except tufts of hairs in the axils of the veins beneath, 1½'-3' long, the lobes low, usually obtuse and bristle-tipped; styles recurved; fruit maturing the second autumn; cup saucer-shaped with a rounded base, 5''-7'' broad, its bracts appressed; acorn globose-ovoid, 2-3 times as high as the cup.

Along streams and swamps or sometimes on the upland, Delaware to Kentucky, Missouri, Florida and Texas. Wood hard, strong, cross-grained, light brown; weight per cubic foot 45 lbs. April-May. Acorns ripe Sept.-Oct. Leaves of seedlings and young shoots incised or pinnatifid, very bristly.

10. **Quercus Phellos** L. Willow Oak. (Fig. 1237.)

A tree, with slightly roughened reddish-brown bark, attaining a maximum height of about 80° and a trunk diameter of 3°. Leaves narrowly oblong or oblong-lanceolate, entire, acute at both ends, very short-petioled, bristle-tipped, glabrous or very slightly pubescent in the axils of the veins beneath when mature, 2'-4' long, 4''-12'' wide; styles slender, recurved-spreading; fruit maturing in the autumn of the second season; cup saucer-shaped, nearly flat on the base, 4''-6'' broad; acorn subglobose, 4''-6'' high.


**Quercus heterophylla** Michx. f. Hist. Am. 2: 87, pl. 16. 1801. 3-4 lobed. The Bartram Oak, probably a hybrid of *Q. phellos* with *Q. rubra*, but perhaps a distinct species, intermediate in leaf and fruit characters between the two, occurs from Staten Island to North Carolina. *Q. phellos* hybridizes also with *Q. nigra*.

11. **Quercus laurifolia** Michx. Laurel Oak. (Fig. 1238.)

Trunk sometimes 100° tall, reaching 4° in diameter at the base; bark nearly black, with flat ridges. Leaves oblong or oblong-obovate, often somewhat falcate, very green and shining above, paler beneath, glabrous when mature, 1½'-6' long, 5''-2'' wide, entire, or those of young shoots undulate-lobed, the apex bristle-tipped; styles rather short, recurving; fruit maturing in the autumn of the second season; abortive ovules in the summit of the acorn; cup saucer-shaped, 4''-6'' wide, its base somewhat rounded, its scales ovate, rounded, appressed; acorn ovoid or nearly hemispheric, 3-4 times as long as the cup.

Along streams and swamps, southeastern Virginia to Florida and Louisiana, mostly near the coast. Wood dark reddish-brown, strong; weight per cubic foot 48 lbs.
12. Quercus imbricaria Michx. Shingle Oak. (Fig. 1239.)


A forest tree, with maximum height about 100 ft., and trunk diameter of 3 1/2 ft. Leaves oblong or lanceolate, entire, coriaceous, acute at both ends, short-petioled, bristle-tipped, dark green above, persistently gray-tomentulose beneath, 5'/7' long, 9'/2' wide; styles recurved; fruit maturing the second autumn; cup hemispheric or turbinate, 5'/7' broad, its bracts appressed; acorn subglobose, 5'/7' high.

Central Pennsylvania to Michigan, Nebraska, Georgia, Tennessee and Arkansas. Wood hard, coarse-grained, light reddish-brown; weight per cubic foot 47 lbs. April-May.

Quercus Leaena Nutt. Sylva, 1: 134, pl. 5b, is a hybrid of this and Q. velutina, with intermediate characters. Ohio to Missouri and District of Columbia.

Quercus tridentata Engelm, Q. nigra var. tridentata A. DC. Prodr. 16: Part 2, 64, is a hybrid with Q. Marylandica. Illinois and Pennsylvania.

A hybrid with Q. palustris was found by Dr. Engelmann near St. Louis, Mo.

13. Quercus alba L. White Oak. (Fig. 1240.)

Quercus alba L. Sp. Pl. 996. 1753.

A large forest tree, with light gray bark scaling off in thin plates; maximum height about 150 ft., trunk diameter 8 ft. Leaves obovate in outline, green above, pale and more or less glaucous beneath, pubescent when young, nearly glabrous when old, thin, pinnatifid into 3-9 oblong obtuse ascending toothed or entire lobes, 4'-7' long, 2'-4 1/2' wide; petioles about 1/2' long; styles short, erect; fruit maturing the first season, peduncled; cup depressed-hemispheric, 7'/10' broad, its bracts thick, obtuse, woolly or at length glabrate, closely appressed; acorn ovoid-oblong, 1' high or less, 3-4 times as high as the cup.


Hybrids with Q. macrocarpa have been observed in Illinois; with Q. minor, from Illinois to Virginia and South Carolina, and with Q. Primus, near Washington, D.C., and New York.

14. Quercus minor (Marsh.) Sarg. Post or Iron Oak. (Fig. 1241.)


A tree, with rough gray bark, or sometimes a shrub; maximum height about 100 ft. and trunk diameter 4 ft. Leaves broadly obovate in outline, deeply lyrate-pinnatifid into 3-7 broad rounded often deeply undulate or toothed lobes, when mature firm, glabrous, dark green and shining above, brown-tomentulose beneath, 5'-8' long, 4'-6' wide or smaller; petioles stout, 1/2'-1' long; fruit maturing the first season, nearly or quite sessile; styles short; cup hemispheric, 6'/8' broad, base narrowed, its bracts lanceolate, subacute, slightly squarrose; acorn ovoid, 6'/10' high, 2-3 times as long as the cup.

In dry soil, Massachusetts to southern New York, Michigan, Florida and Texas. Wood hard, close-grained, very durable, brown; weight per cubic foot 58 lbs. May-June. Acorns ripe Sept.-Oct.
15. *Quercus lyrata* Walt. Swamp, Overcup or Post Oak. (Fig. 1242.)

*Quercus lyrata* Walt. Fl. Car. 235. 1753.

A large tree, maximum height about 100 ft and trunk diameter 3½ ft; bark gray or reddish, in thin plates. Leaves obovate in outline, mostly narrowed at the base, 6'/8' long, lyrate-pinnatifid or lobed to beyond the middle, thin, when mature bright green, glabrous and shining above, densely white-tomentulose beneath, the lobes lanceolate or oblong, rounded or subacute, entire or toothed, the upper pair the larger and usually divergent; petioles 3'-9'' long; fruit maturing the first season, peduncled; styles short; cup depressed-globose, 1½-1½'' in diameter, ½'-1'' high, its bracts broad, thin, cuspidate; acorn depressed-globose, ½'-1½'' high, nearly or quite immersed in the cup.

In swamps or along streams, New Jersey to Indiana and Missouri, Florida and Texas. Wood hard, strong, tough, close-grained, very durable, dark brown; weight per cubic foot 52 lbs. April–May.

16. *Quercus macrocarpa* Michx. Mossy-cup or Bur Oak. (Fig. 1243.)


A large tree, with gray flaky bark; maximum height about 160 ft, and trunk diameter 8 ft. Leaves obovate or oblong-ovate in outline, rather thin, irregularly lobed, pinnatifid, or some coarsely crenate; when mature bright green and shining above, grayish-white-tomentulose beneath, 4'-8' long, the lobes toothed or entire, rounded, ascending or somewhat divergent; petioles ½'-1'' long; fruit short-peduncled or sessile, maturing the first season; styles short; cup hemispheric or subglobose, 8''-2'' in diameter, its bracts floccose, thick, hard, ovate or lanceolate, the lower acute, the upper subulate-tipped, the tips forming a fringe around the acorn; acorn 8''-1½'' long, ovoid, 1-2 times as high as the cup.

In rich soil, Nova Scotia to Manitoba, south to Massachusetts, Pennsylvania, Kansas and Texas. Wood hard, strong, tough, close-grained; color dark brown; weight 46 lbs. May–June.

17. *Quercus platanoides* (Lam.) Sudw. Swamp White Oak. (Fig. 1244.)

*Quercus platanoides* Lam. Encycl. 1: 720. 1783.


A large tree, with flaky gray bark; maximum height about 110 ft and trunk diameter 6 ft. Leaves obovate, or oblong-ovate, coarsely toothed or sometimes lobed nearly to the middle, narrowed or rounded at the base, firm, when mature 4'-5'' long, 3½'-4½'' wide, dark green, dull and glabrous above, densely white-tomentulose beneath; petioles stout, 3'-4'' long; fruit maturing the first year; peduncles 2-5 times as long as the petioles; cup hemispheric, its bracts pubescent, lanceolate, appressed, the lower obtuse, the upper acute or acuminate; acorn oblong-ovoid, about 1½'' high; cup about 6'' high; seed rather sweet.

In moist or swampy soil, Quebec to Michigan, Georgia and Arkansas. Wood hard, strong, tough, close-grained, light brown; weight 48 lbs per cubic foot. May–June. Acorns ripe Sept.–Oct.
18. *Quercus Michaûxii* Nutt. Cow Oak. Basket Oak. (Fig. 1245.)


A large tree, with gray flaky bark; maximum height about 100° and trunk diameter 7°. Leaves obovate or broadly oblong, apex acute or acuminate, base narrowed, rounded or subcordate, when mature bright green, shining above, pale and gray tomentulose beneath, sharply toothed, 4'-7' long, 2½'-4½' wide, the teeth acute or mucronulate; petioles slender, ½'-1½' long; fruit maturing the first season, short-peduncled or sessile; styles very short; cup depressed-hemispheric, 1½'-1½' broad, its bracts thick, obtuse or lanceolate, appressed; acorns ovoid, 1½'-1½' high, about 3 times as high as the cup.

In moist soil, Delaware to Indiana, Arkansas, Florida and Texas. Wood hard, strong, tough, dense, durable; color light brown; weight 50 lbs. per cubic foot. April–May. Acorns ripe Sept.–Oct, sweet and edible.

19. *Quercus Prinus* L.

*Quercus Prinus* L. Sp. Pl. 996. 1753.

A large forest tree; maximum height about 100°, and trunk diameter 5°; lower branches spreading; bark brown, ridged, slightly flaky. Leaves coarsely crenate, oblong, oblong-lanceolate or obvate, when mature dark green, glabrous and feebly shining above, finely gray-tomentulose beneath, 5'-8' long, 1½'-4' wide; petioles slender, ½'-1½' long; fruit maturing the first season; peduncles equalling or shorter than the petioles; styles very short; cup hemispheric, ½'-1½' broad, its bracts tomentose, triangular-ovate, acute or cuspidate, appressed; acorn ovoid, 1½'-1½' high, 2-3 times as high as the cup; seed edible, but not very sweet.

In dry soil, Maine to southern Ontario, Alabama and Tennessee. Wood hard, strong, close-grained, durable; color dark brown; weight per cubic foot 47 lbs. May–June. Acorns ripe Oct.–Nov.

20. *Quercus acuminata* (Michx.) Sarg. Chestnut or Yellow Oak. (Fig. 1246.)

*Quercus acuminata* Michx. Hist. Chenes Am. no. 5. pl. 8. 1801.

*Quercus Muhlenbergii* Engelm. Trans. St. Louis Acad. 3: 301. 1877.

*Quercus acuminata* Sarg. Gard. & For: 8: 93. 1895.

A tree with gray flaky bark, much resembling the chestnut; maximum height about 160°, and trunk diameter 3½°. Leaves oblong, lanceolate or sometimes obovate, apex acuminate or acute, base narrowed or rounded; coarsely toothed, when mature dark green and shining above, pale, gray-tomentulose and prominently veined beneath, 4'-6' long, 1½'-2½' wide; petioles slender, ½'-1' long; fruit sessile or very short-peduncled, maturing the first season; cup hemispheric, 6'-8' broad, its bracts floccose, ovate, thick, acute or cuspidate, appressed; acorn ovoid, 6'-10' high, about twice as high as the cup.

In dry soil, preferring limestone ridges, Vermont and Ontario to Minnesota, south to Alabama and Texas. Wood hard, strong, dense, close-grained, durable, dark brown; weight per cubic foot 54 lbs. May–June. Acorns ripe Oct.–Nov., edible.
21. *Quercus prinoides* Willd. Scrub Chestnut Oak. (Fig. 1248.)


A shrub, 2°-15° tall, sometimes tree-like, the bark gray. Leaves obovate, coarsely toothed, when mature bright green and somewhat shining above, gray-tomentulose beneath, 2½'-5' long, 2'-3' wide, mostly acute or short-acuminate at the apex, narrowed at the base, the teeth short, triangular, subacute or obtuse; petioles slender, 3'-9' long; fruit sessile, maturing the first season; cup hemispheric, thin, about ½' broad and one-half as high, its bracts floccose, triangular-ovate or oblong-lanceolate, appressed; acorn ovoid, obtuse, 2-3 times as long as the cup; seed sweet.

In dry sandy or rocky soil, Maine to Minnesota, south to Alabama and Texas. Apparently intergrades with the preceding. April-May. Acorns ripe Sept.-Oct. Called also Chinkapin Oak.

22. *Quercus Virginiana* Mill. Live Oak. (Fig. 1249.)


A tree, with rough brown bark, attaining a maximum height of about 60° and trunk diameter of 7°, but often shrubby, the young shoots puberulent. Leaves evergreen, coriaceous, oblong, elliptic or oblanceolate, apex obtuse, base narrowed or rounded, entire or with a few bristle-tipped teeth, bright green and glabrous above, pale green and puberulent or becoming glabrous beneath, 1'-3' long; petioles stout, 1½'-3½' long; fruit peduncled, maturing the first season; peduncle 3¼'-1' long; cup turbinate, 5½'-8½' broad, its bracts closely appressed, ovate or lanceolate; acorn ovoid-oblong, about twice as high as the cup; seed not edible; cotyledons united.

In dry soil, Virginia to Florida, Texas and Mexico, mostly near the coast. Also in Cuba. Wood very hard, tough, close-grained and dense; color yellow-brown; weight per cubic foot 99 lbs. March-April. Acorns ripe Sept-Oct.

Family 8. **ULMACEAE** Mirbel, Élém. 2: 905. 1815.

**ELM FAMILY.**

Trees or shrubs, with alternate simple serrate petioled pinnately veined stipulate leaves, the stipules usually fugacious. Flowers small, monoecious, dioecious, perfect or polygamous, lateral or axillary, clustered, or the pistillate solitary. Perianth 3-9 parted or of 3-9 distinct sepal. Petals none. Stamens in our species as many as the perianth-lobes or sepals and opposite them; filaments straight; anthers ovate or oval, longitudinally dehiscent. Ovary 1-celled (rarely 2-celled), mostly superior; ovule solitary, pendulous, anatropous or amphitropous; styles or stigmas 2. Fruit a samara, drupe or nut. Endosperm of the seed little or none. Embryo straight or curved; cotyledons mostly flat.

About 13 genera and 140 species, widely distributed in temperate and tropical regions.

Flowers borne in clusters on twigs of the preceding season; fruit a samara, or nut-like.

1. **Ulmus.**

Flowers expanding before the leaves; calyx 4-5-cleft; fruit a samara.

2. **Planera.**

Flowers expanding with the leaves; calyx 4-5-cleft; fruit nut-like.

3. **Celtis.**

Flowers borne on twigs of the season, the pistillate mostly solitary; fruit a drupe.

Trees, with 2-ranked straight-veined inequilateral serrate leaves, with thin caducous stipules. Flowers perfect or polygamous, fascicled or racemose, greenish, unfolding before the leaves, borne axillary on the twigs of the preceding season. Calyx campanulate, 4-9-lobed, persistent, its lobes imbricated. Filaments erect, slender, exserted. Ovary sessile or stalked, compressed. Styles 2, divergent, stigmatic along the inner margin. Fruit a 1-seeded flat orbicular or oval samara, its membranous wings continuous all around except at the apex, commonly as broad as or broader than the body. Embryo straight. [The ancient Latin name of the elm; Celtic _elm._]

About 16 species, natives of the northern hemisphere. Besides the following, another occurs in the southwestern United States and one in Mexico.

Leaves smooth or slightly rough above; samara densely ciliate.

None of the branches corky-winged; samara-faces glabrous.

Some or all of the branches corky-winged; samara-faces pubescent.

- Leaves 2'-5' long; flowers racemose; northern. 1. _U. Americana._
- Leaves 1'-3' long; flowers fascicled; southern.

Leaves very rough above; samara not ciliate; twigs not corky-winged.

1. _Ulmus Americana_ L. American, White or Water Elm. (Fig. 1250.)


A large tree, with gray flaky bark, and glabrous or sparingly pubescent twigs and buds; maximum height about 120 ft, and trunk diameter 11°; the branches not corky-winged, terete. Leaves oval or obovate, apex abruptly acuminate, base obtuse or obtusish, and very inequilateral, sharply and usually doubly serrate, slightly rough above, pubescent or becoming glabrous beneath, 2'-5' long, 1'/2'-3' wide; flowers fascicled; pedicels filiform, drooping, jointed; calyx 7-9-lobed, oblique, its lobes oblong, rounded; samara ovate-oval, reticulate-veined, 5'-6' long, its faces glabrous, its margins densely ciliate; styles strongly incurved.

In moist soil, especially along streams, Newfoundland to Manitoba, Florida and Texas. Wood hard, strong, close-grained, compact, dark brown; weight per cubic foot 40.5 lbs. March-April. Samaras ripe in May.

2. _Ulmus racemosa_ Thomas. Cork or Rock Elm. (Fig. 1251.)


A large tree, attaining a maximum height of about 100° and a trunk diameter of 4', the young twigs puberulent; bud-scales ciliate and somewhat pubescent; branches, or some of them, winged by narrow plates of cork. Leaves similar to the preceding, but less sharply serrate, smooth above; flowers racemose; pedicels filiform, drooping, jointed; calyx-lobes oblong, rounded; samara oval, 6'-8' long, its faces pubescent or puberulent, its margins densely ciliate; persistent styles strongly incurved and overlapping.

In rich soil, Quebec to Ontario, Michigan, Tennessee and Nebraska. Wood hard, strong, tough, compact; color light reddish-brown; weight per cubic foot 45 lbs. April. Called also Cliff, Hickory or Swamp Elm.

_Ulmus campéstris_ L., from Europe, distinguished by its nearly or quite glabrous, not ciliate samaras, and wingless branches, rarely escapes from cultivation.
3. Ulmus alata Michx. Winged Elm. Wahoo. (Fig. 1252.)


A small tree, sometimes 50° high and with a trunk diameter of 2½°; the branches, or most of them, with corky wing-like ridges. Twigs and buds glabrous or nearly so; leaves oblong, oblong-lanceolate or oblong-ovate, acute, doubly serrate, base obtuse, inequilateral and sometimes subcordate, roughish above, pubescent beneath, at least on the veins, 1½-3° long, ½°-1½° wide, the veins ascending, some of them commonly forked; flowers fascicled; pedicels filiform; calyx-lobes obovate, rounded; samara oblong, 4°-5° long, pubescent on the faces, the margins densely ciliate; styles very slender.

In dry or moist soil, southern Virginia to Florida, west to southern Illinois, Arkansas and Texas. Wood hard, weak, compact; color brown; weight per cubic foot 47 lbs. March.

4. Ulmus fulva Michx. Slippery, Red or Moose Elm. (Fig. 1253.)

Ulmus pubescens Walt. Fl. Car. 111. 1788.


A tree, with rough gray fragrant bark, maximum height about 70°, and trunk diameter 2½°; twigs rough-pubescent; branches not corky-winged; bud-scales densely brown-tomentose. Leaves ovate, oval or obovate, very rough with short papillae above, pubescent beneath, sharply doubly serrate, acuminate at the apex, obtuse, inequilateral and commonly cordate at the base, 4°-5° long, 2½-2½° wide; flowers fascicled; pedicels 2°-3° long, spreading, jointed near the base; calyx-lobes lanceolate, subacute, samara oblong-ovate, 5°-6° long, pubescent over the seed, otherwise glabrous, the margins not ciliate, retuse.

In woods, on hills and along streams, Quebec to North Dakota, Florida and Texas. Wood hard, strong, compact, durable; color dark reddish-brown; weight per cubic foot 43 lbs. Foliage and mucilaginous inner bark very fragrant in drying. March-April.

2. PLÁNERA J. F. Gmel. Syst. 2: Part 1, 150. 1791.

Trees, similar to the elms, the flowers monocious or polygamous, unfolding with the leaves. Staminate flowers fascicled on twigs of the preceding season, the pistillate or perfect ones in the axils of leaves of the year. Calyx 4-5-cleft, campanulate, persistent, the lobes imbricated. Filaments filiform, straight, exserted. Ovary stalked, ovoid, slightly compressed, 1-celled. Styles 2, spreading, stigmatic along the inner side. Fruit nut-like; coriaceous, obliquely ovoid, compressed, ridged on the back, covered with short fleshy processes. Embryo straight. [Name in honor of Johann Jakob Planer, 1743-1789, Professor of Botany in Erfurt.]

A monotypic genus of southeastern North America.
1. **Planera aquática** (Walt.) J. F. Gmel. Planer-tree. Water Elm. (Fig. 1254.)

*Planera aquatica* J. F. Gmel. Syst. 2: Part 1, 150. 1791.

A small tree, sometimes 40° high, and with a trunk 2° in diameter, the foliage nearly glabrous. Leaves ovate or oblong-lanceolate, acute at the apex, obtuse or coriaceous and usually somewhat inequilateral at the base, serrate, 1'-2' long; petioles 1²'/²'-2²' long; stipules lanceolate, about as long as the petioles, deciduous; staminate flowers fascicled and somewhat racemose from sealy buds borne at the axils of leaves of the preceding season; perfect or pistillate flowers on short branches; fruit 2²'/²'-3²' long, about equalling its stalk, its soft processes ²'/²' long.

In swamps, Missouri to southern Indiana, Kentucky and North Carolina, south to Louisiana and Florida. Wood soft, weak, compact, light brown; weight per cubic foot 33 lbs. April-May.


Trees or shrubs, with saccate or entire pinnately veined or in some species 3-5-nerved leaves, and polygamous or monoecious (rarely dioecious) flowers, borne in the axils of leaves of the season, the staminate clustered, the fertile solitary or 2-3 together. Calyx 4-6-parted or of distinct sepal. Filaments erect, exserted. Ovary sessile. Stigmas 2, recurved or divergent, tomentose or plumose. Fruit an ovoid or globose drupe, the exocarp pulpy, the endocarp bony. Seed-coat membranous. Embryo curved. [Name ancient, used by Pliny for an African Lotus-tree.]

About 60 species, natives of temperate and tropical regions. Besides the following, some 3 others occur in the southern and southwestern parts of North America.

Leaves sharply serrate, thin; ripe drupe 4''-5'' in diameter.
Leaves entire or nearly so, thick; drupe 2½''-3'' in diameter.

1. **Celtis occidentalis** L. Hackberry. Sugar-berry. (Fig. 1255.)

*Celtis occidentalis* L. Sp. Pl. 1044. 1753.
*Celtis pumila* Pursh, Fl. Am. Sept. 200. 1814.

A tree or shrub, attaining a maximum height of about 125° and a trunk diameter of 5°, the bark dark and rough, the twigs glabrous. Leaves ovate or ovate-lanceolate, sharply serrate, mostly thin, acute or acuminate at the apex, inequilateral and 3-nerved at the base, pinnately veined, 1½'-4' long, 1½'-2½' wide, glabrous above, pubescent, at least on the veins, beneath; staminate flowers numerous; pistillate flowers usually solitary, slender-peduncled; calyx-segments linear-oblong, deciduous; drupe globose and purple, or nearly black when mature, or orange, 4''-5'' in diameter, sometimes edible.

In dry soil, Quebec to Manitoba, south to Louisiana, North Carolina, Missouri and Kansas. Wood soft, weak, coarse-grained; color light yellow; weight per cubic foot 40 lbs. April-May. Fruit ripe Sept. Also known as Nettle-tree and False Elm.
2. Celtis Mississippiana Bosc. Southern Hackberry. (Fig. 1256.)

Celtis Mississippiana Bosc, Dict. Agric. 10: 41. 1810.

A tree, similar to the preceding species, but commonly smaller, the bark light gray, rough and warty. Leaves ovate or lanceolate, firm, shining, entire or with a few low sharp teeth, 3-nerved and prominently pinnaately veined, glabrous on both sides, long-acuminate at the apex, inequilateral and obtuse or sometimes cordate at the base, 1'-3' long, ½'-1½' wide; peduncles mostly shorter than those of the preceding species; drupe globose, purple-black, 2½'-3'' in diameter.

In dry soil, North Carolina to southern Illinois and Missouri, south to Florida and Texas. Probably intergrades with C. occidentalis. April. Fruit ripe July-Aug.


MULBERRY FAMILY.

Trees, shrubs or herbs, mostly with milky sap, alternate or opposite petioled stipulate leaves, and small monoecious or dioecious axillary clustered flowers, or the pistillate flowers solitary in some exotic genera. Calyx mostly 4-5-parted. Petals none. Staminate flowers panicked, spicate or capitate, the stamens as many as the calyx-segments. Filaments erect or inflexed in the bud. Pistillate flowers capitate, spicate or cymose. Ovary superior, 1-celled in our genera. Ovule solitary, pendulous, anatropous. Styles 1 or 2. Fruit various. Embryo straight, curved or spiral.

About 55 genera and 925 species, natives of temperate and tropical regions. The largest genus is Ficus, the Fig, of which there are over 600 known species.

Trees or shrubs; stipules fugacious.

Staminate and pistillate flowers spiked; leaves dentate or lobed.

Staminate flowers racemose or spiked; pistillate capitate.

Pistillate perianth deeply 4-cleft; leaves entire.

Pistillate perianth 3-4-toothed; leaves various.

Erect or twining herbs; stipules persistent.

Twining vines; pistillate flowers in ament-like clusters.

Erect herb; pistillate flowers spicate.


Trees or shrubs, with milky sap, alternate dentate and often lobed, 3-nerved leaves, fugacious stipules, and small monoecious or dioecious flowers, in axillary ament-like spikes, the pistillate spikes ripening into a succulent aggregate fruit. Staminate flowers with a 4-parted perianth, its segments somewhat imbricated, and 4 stamens, the filaments inflexed in the bud, straightening and exserted in anthesis. Pistillate flowers with a 4-parted persistent perianth, which becomes fleshy in fruit, a sessile ovary, and 2 linear spreading stigmas. Fruiting perianth enclosing the ripened ovary, the exocarp succulent, the endocarp crustaceous. Alburnum scanty; embryo curved. [The ancient name of the mulberry; Celtic mor.]

About 10 species, natives of the northern hemisphere. Besides the following, another occurs in the southwestern United States.

Leaves rough above, pubescent beneath; fruit purple; spikes 1'-1½' long. 1. M. rubra.

Leaves smooth and glabrous, or very nearly so, on both sides; fruit nearly white; spikes 5'-7'' long. 2. M. alba.
1. **Morus rubra** L. Red Mulberry. (Fig. 1257.)


A tree, attaining a maximum height of about 65° and a trunk diameter of 7°, the bark brown and rough. Leaves ovate or nearly orbicular in outline, scabrous above, persistently pubescent beneath, or when young almost tomentose, acuminate at the apex, rounded, truncate or cordate at the base, serrate-dentate or 3-7-lobed, 7'-5° long; petioles slender, 7°-18° long; staminate spikes drooping, 1½'-3° long; pistillate spikes spreading or pendulous in fruit, 1'-1½° long, 4°-5° in diameter when mature, slender-peduncled, dark purple-red, delicious.

In rich soil, Vermont and Ontario to Michigan, south to Florida and Texas. Wood soft, weak, compact, durable; color light yellow; weight per cubic foot 37 lbs. April-May. Fruit ripe in June.

2. **Morus alba** L. White Mulberry. (Fig. 1258.)


A small tree, sometimes 40° high and with a trunk 3° in diameter, the bark light gray, rough, the branches spreading. Leaves ovate, thin, smooth, glabrous and somewhat shining on both sides, acute or abruptly acuminate at the apex, rounded, truncate or cordate at the base, varying from serrate to variously lobed, 2°-6° long; petioles slender, shorter than the blades; staminate spikes slender, drooping, about 1° long; pistillate spikes oblong or subglobose, drooping, 5°-7° long, 3° in diameter and white or pinkish when mature, not as succulent as those of the preceding species.

Sparingly escaped from cultivation, Maine and Ontario to Florida. Introduced from the Old World for feeding silkworms. May. Fruit ripe July-Aug.


*[MCLAURA* Nutt. Gen. 2: 233. 1818.]

A tree, with milky sap, thick entire dark green alternate petioled pinnately veined leaves, stout axillary spines, caducous stipules and dioecious axillary flowers, the staminate racemose, the pistillate capitate. Stamine flowers with a 4-parted calyx, its segments valvate, and 4 stamens, the filaments inflexed in the bud, straightening and somewhat exserted in anthesis. Pistillate flowers with a 4-cleft calyx enclosing the sessile ovary, and a filiform simple long-exserted style, the calyces becoming fleshy and enlarged in fruit, densely aggregated into a large globular head. Endosperm none; embryo curved. [Name Greek, signifying bow-wood.]

A monotypic genus of the south-central United States.
1. **Toxylon pomiferum** Raf. **Osage Orange.** (Fig. 1259.)


A tree with ridged brown bark, and spreading branches; maximum height about 60°, and trunk diameter 2½°; foliage puberulent when young, glabrous when mature. Leaves ovate, ovate-lanceolate or ovate-oblong, glossy, entire, 3'-6' long, apex acuminate, base obtuse, truncate or subcordate; petioles ½'-2' long; axillary spines straight, sometimes 3' long; staminate racemes ½'-1' long, usually numerous; flowers about 1'' broad; head of pistillate flowers peduncled, pendulous, about 1' in diameter, ripening into a hard yellowish tubercled syncarp 2'-6' in diameter.

In rich soil, Missouri and Kansas to Texas. Wood hard, very strong, dense, durable; color bright orange; weight per cubic foot 48 lbs. Much planted for hedges and occasionally spontaneous in the East. May-June. Fruit ripe Oct.-Nov.

3. **Broussonétia** L'Her; Vent. Tabl. 3: 547. 1799.

Trees, with milky sap, the leaves alternate, petioled, entire, serrate, or 3-5-lobed, 3-nerved at the base. Flowers dioecious, the stamine in cylindric ament-like spikes, the pistillate capitate. Staminate flowers with a deeply 4-cleft perianth, 4 stamens, and a minute rudimentary ovary. Pistillate flowers with an ovoid or tabular 3-4-toothed perianth, a stalked ovary and a 2-cleft style. Head of fruit globular, the drupes red, exserted beyond the persistent perianth. [Name in honor of Broussonet, French naturalist.]

About 4 species, natives of eastern Asia.

1. **Broussonetia papyrifera** (L.) Vent. **Paper Mulberry.** (Fig. 1260.)


*Brussounetia papyrifera* Vent. Tabl. 3: 548. 1799.

A small tree, sometimes 40° high, the young shoots hirsute-tomentose. Leaves mostly ovate, thin, long-petioled, serrate nearly all around, often deeply 3-lobed, sometimes with a lobe on one side only, as in *Sassafras*, rarely 5-lobed, rough above, tomentose beneath, 3'-8' long, the sinuses rounded; petioles ½'-3' long, hirsute-tomentose, at least when young; spikes of staminate flowers 2'-3' long; peduncled; heads of pistillate flowers ½'-1' in diameter, stout-peduncled.

Escaped from cultivation, southern New York to Georgia and Missouri. May-June.


Twining herbaceous perennial rough vines, with broad opposite thin petioled palmately veined serrate 3-7-lobed or undivided leaves, lanceolate membranous persistent stipules, and dioecious axillary flowers, the stamine panicked, the pistillate in ament-like drooping clustered spikes. Staminate flowers with a 5-parted calyx, the segments distinct and imbricated, and 3 short erect stamens. Pistillate flowers in 2's in the axil of each bract of the ament, consisting of a membranous entire perianth, clasping the ovary, and 2 filiform caducous stigmas. Fruiting aments conie-like, the persistent bracts subtending the compressed ovate achenes. Endosperm fleshy. Embryo spirally coiled. [Name said to be the diminutive of the Latin *humus*, earth.]

Two species, the following widely distributed through the north temperate zone, the other native of northeastern Asia.
MORACEAE.

1. Humulus Lupulus L. Hop. (Fig. 1261.)


A dextrorsely twining or prostrate vine, often 25° long, very rough with stiff reflexed hairs. Leaves orbicular or oval in outline, slender-petioled, deeply 3-7-cleft or some of the upper ones ovate, acute and merely serrate; petioles 11'-3' long; stipules reflexed, ovate or lanceolate, acuminate, 4'-12' long; panicles of staminate flowers 2'-5' long; ripe pistillate clusters (hops) 1'-2 1/2' long; fruiting bracts broadly ovate, concave, thin, glabrous or nearly so, obtuse, much longer than the achenes; fruiting calyx and achene strongly resinous-aromatic.


A stout erect and puberulent herb, with alternate and opposite petioled digitately 5-11-divided thin leaves, persistent subulate stipules, and greenish dioecious axillary flowers, the stamine paniced, the pistillate spicate. Staminate flowers with a 5-parted calyx, the sepals distinct and imbricated, and 5 short stamens. Pistillate flowers solitary in the axils of foliaceous bracts, consisting of a thin entire calyx clasping the sessile ovary, and 2 filiform caducous stigmas. Fruit a compressed achene. Endosperm fleshy; embryo curved.

The classic name of hemp.

A monotypic genus of central Asia.

1. Cannabis sativa L. Hemp. (Fig. 1262.)


An annual branching herb, 3'-10' tall, the inner fibrous bark very tough, the branches nearly erect. Leaves divided to the base, the segments lanceolate or linear-lanceolate, acuminate at both ends, sharply and coarsely serrate, 3'-6' long, 1/2'-1' wide; stamine panicles narrow, loose, peduncled, 3'-5' long; pedicels filiform, bracteolate, 1'-3' long; pistillate spikes erect, leafy-bracted, 1' long or less in fruit; achene crustaceous, ovoid-oblong, about 2" high.


Nettle Family.

Herbs (some tropical species shrubs or trees), with watery sap, alternate or opposite mostly stipulate simple leaves, and small greenish dioecious, monocious or polygamous flowers, variously clustered. Calyx 2-5-cleft, or of distinct sepals. Petals none. Stamens in the staminate flowers as many as the lobes or segments of the calyx (sepals) and opposite them, the filaments inflexed and anthers reversed in the bud, straightening at anthesis. Ovary superior, 1-celled; style simple; stigma capitate and penicillate, or filiform; ovule solitary, erect or ascending, orthotropous, or in some genera partly amphitropous. Fruit an achene. Endosperm oily, usually not copious; embryo straight.

About 40 genera and 475 species of wide geographic distribution.
Herbs with stinging hairs.
Leaves opposite; both kinds of flowers 4-parted; achene straight.
Leaves alternate; stamine flowers 5-parted; achene oblique.

Herbs without stinging hairs.
Flower-clusters panicled or spiked, not involucrate; leaves mostly opposite.
Pistillate calyx 3-parted or of 3 sepals.
Pistillate calyx 2-4-toothed or entire.
Flower-clusters involucrated by leafy bracts; leaves alternate.

Annual or perennial simple or branching herbs, with stinging hairs, opposite 3-7-nerved peltioed dentate or incised leaves, and distinct or connate stipules. Flowers very small and numerous, axillary, cymose-paniculate, or glomerate, dioecious, monocious or androgenous. Stamine flowers with a deeply 4-parted calyx and 4 stamens. Pistillate calyx 4-parted, the segments unequal, the outer ones usually smaller than the inner; ovary straight; stigma sessile or nearly so; ovule erect, orthotropous. Achene compressed, ovate or oblong, enclosed by the persistent membranous or slightly fleshy calyx. Seed-coat thin; endosperm little; cotyledons broad. [The ancient Latin name.]

About 30 species of wide geographic distribution.
Perennials, 2°-7° tall; flower-clusters large, compound.
Leaves ovate, cordate at base.
Leaves lacinate, rarely cordate.
Annuals, 6'-2° tall; flower-clusters small, mostly glomerate.
Leaves oval, lacinate-dentate; plant leafy at the top.
Leaves ovate or lanceolate, crenate; upper leaves very small.

1. Ur tica dioica L. Stinging or Great Nettle. (Fig. 1263.)

Perennial, densely beset with stinging hairs, stem rather stout, 2°-4° tall, puberulent above. Leaves thin, ovate, long-petioled, acute or acuminate at the apex, cordate at the base, sharply or incisedly serrate with triangular or lanceolate acute teeth, pubescent beneath, 3-5-nerved, 3'-5' long, 7'-3' wide; petioles very slender, shorter than the blades; stipules lanceolate; flower-clusters large, compound, cymose-paniculate; flowers dioecious or androgenous.

In waste places, Nova Scotia to Ontario and Minnesota, south to South Carolina and Missouri. Naturalized from Europe. Native also of Asia. Plant lower, stouter and much more stinging than the following species. July-Sept.

2. Urtica grácilis Ait. Slender Nettle. (Fig. 1264.)

Perennial, sparingly armed with stinging hairs, stem usually slender, erect, simple or with few erect branches, 2°-7° tall. Leaves lanceolate or ovate-lanceolate, slender-petioled, long-acuminate at the apex, narrowed or sometimes rounded at the base (rarely subcordate), sharply serrate, 3-5-nerved, sparingly pubescent, 3'-6' long, 7'-1½' wide; petioles shorter than the blades, usually bristly; stipules lanceolate; flower-clusters compound, smaller than those of the preceding species, but commonly longer than the petioles; flowers dioecious or androgenous.

3. Urtica urens L. Small Nettle. (Fig. 1265.)


Annual, stem rather stout, 6'-18' high, ascending or erect, it and its slender branches stinging-bristly. Leaves thin, glabrous or very nearly so, elliptic, oval or ovate in outline, deeply incised or sometimes doubly serrate, with acute, ascending or spreading teeth, 3-5-nerved, obtuse at both ends, or acutish, 1'-3' long, slender-petioled; petioles often as long as the blades; stipules short; flower-clusters oblong, rather dense, mostly shorter than the petioles; flowers androgynous.

In waste places, Newfoundland to northern New York, New Jersey and Florida. Also on the Pacific Coast. Naturalized from Europe. May-Sept.

4. Urtica chamaedryoides Pursh. Weak Nettle. (Fig. 1266.)


Annual, sparingly stinging-bristly but otherwise nearly or quite glabrous, stem very slender, weak, ascending, simple or branched, 6'-3' long. Leaves slender-petioled, thin, crenate-dentate, the lower broadly ovate or orbicular, obtuse at the apex and usually cordate at the base, ½'-1½' wide, the upper ovate or lanceolate, acute or acuminate at the apex, rounded or narrowed at the base, the uppermost very small; stipules lanceolate-subulate; flower-clusters small, glomerate, shorter than the petioles; flowers androgynous.

In thickets, Kentucky to Arkansas, south to Georgia and Texas. April-Aug.

2. URTICÁSTRUM Fabr. Enum. 204. 1759.

_Laportea_ Gaud. in Freyc. _Voy._ Bot. 498. 1826.

Perennial herbs, armed with stinging hairs, the leaves broad, alternate, serrate, petioled, the flowers monoecious or dioecious, sessile in loose axillary compound cymes. Staminate flowers in our species with 5 imbricated sepals, 5 stamens and a rudimentary ovary. Pistillate flowers with 4 unequal sepals, the outer 1 or 2 minute, an oblique or nearly straight compressed ovary and a subulate slender persistent style; ovule erect. Achenes very oblique, flat, reflexed. Seed-coat membranous. Endosperm scanty or wanting. [Latin, star nettle.]

About 25 species, mostly of tropical distribution, only the following North American.
1. Urticastrum divaricaturn (L.) Kuntze. Wood Nettle. (Fig. 1267.)

Urtica divaricata L. Sp. Pl. 94. 1753.
Urticastrum divaricatum Kuntze, Rev. Gen. Pl. 635. 1891.

Stem rather stout, erect or ascending, 1½-4½ tall. Leaves thin, ovate, long-petioled, acuminate or acute at the apex, sharply serrate, 3-nerved and pinnately veined, glabrous or with some stinging hairs, ³⁄₇'-7' long, 2'-5' wide; petioles very slender, 1½'-5' long; stipule solitary, small, lanceolate, 2-cleft, commonly deciduous; flower-clusters large and loose, often longer than the petioles, the lower staminate, the upper pistillate, divergent, 2'-6' broad in fruit; ultimate branches of the fruiting clusters flat, cuneate, emarginate; achene twice as long as the calyx, glabrous, 1½'-7' long.

In rich woods, Nova Scotia to Ontario and Minnesota, south to Florida and Kansas. Ascends to 3000 ft. in the Adirondacks. July-Aug.


[Fílea Lindl. Coll. pl. 4. 1821.]

Annual or perennial, glabrous or pubescent stingless herbs, with opposite petioled mostly 3-nerved leaves, connate stipules, and small numerous monoecious or dioecious flowers in axillary cymose or glomerate clusters. Staminate flowers mostly 4-parted (sometimes 2- or 3-parted) and with a rudimentary ovary. Pistillate flowers 3-parted, the segments in most species unequal, each subtending a staminodium in the form of a concave scale; ovary straight; stigma sessile, pedicillate. Achene compressed, ovate or suborbicular. Seed-coat thin. Endosperm scanty or none. [Name unexplained.]

About 150 species, chiefly in the tropics, most abundant in tropical America. Besides the following, another occurs in the southern United States.

1. Adícea púmila (L.) Raf. Clearweed. Richweed. (Fig. 1268.)

Urtica púmila L. Sp. Pl. 94. 1753.
Fílea púmila A. Gray, Man. 437. 1848.

Annual, stems pellucid, erect, usually branched, glabrous, succulent, 6'-2' high. Leaves membranous, ovate, slender-petioled, acuminate or acute at the apex, rounded or narrowed at the base, 3-nerved, coarsely dentate, 1'-5' long, sparingly pubescent with scattered hairs; petioles often as long as the blades and much longer than the pistillate flower-clusters; sepals of the pistillate flowers lanceolate, nearly equal; achene ovate, acute, ½'-7' long.

In swamps, shaded situations, often on old logs, New Brunswick to western Ontario and Minnesota, south to Florida, Louisiana and Kansas. Ascends to 3000 ft. in Virginia. Also in Japan. July-Sept.


Perennial stingless herbs (some tropical species shrubs or even trees), with opposite or alternate petioled 3-nerved leaves, distinct or connate stipules, and small monoecious or dioecious flowers, glomerate in axillary spikes or heads, the fertile clusters sometimes leafy at the summit. Staminate flowers mostly 4-parted or the calyx of 4 distinct sepals, usually with a rudimentary ovary. Pistillate calyx tubular or urn-shaped, 2-4-toothed or entire, enclosing the sessile or stalked ovary; stigma subulate, papillose or pubescent along one side. Achene enclosed by the withering-persistent pistillate calyx. [In honor of Georg Rudolph Böhmert, 1723-1803, Professor in Wittenberg.]

About 50 species, mostly natives of tropical regions, the following of eastern North America.
False Nettle. (Fig. 1269.)

_Arctium lappa_ L. Sp. Pl. 1396. 1753.

A perennial rough pubescent or nearly smooth and glabrous erect branching herb, 1½-3½ ft tall. Stem stiff; leaves ovate, ovate-oblanceolate, thin, slender-petioled, opposite, or some alternate, coarsely dentate, 1½-3½ in long; petioles shorter than the blades; stipules lanceolate-subulate, distinct; flowers dioecious or androgy- nous; staminate spikes usually interrupted, the pistilloid mostly continuous, 4-1½ in long; achene ovate-ovoid, acute, rather less than 1½ in long.

In moist soil, Quebec and Ontario to Minnesota, south to Florida and Kansas. July-Sept.


Leaves firm, rough above, tomentose beneath, short-petioled or nearly sessile, usually reflexed; fruiting spikes much longer than the petals. Pennsylvania, New Jersey, and southern New York.


Annual or perennial stingless diffuse or erect herbs, with alternate entire or pinnately divided leaves, no stipules, and axillary glomerate polygamous flowers, involucrate by leafy bracts. Calyx of the staminate flowers 4-parted or of 4 (rarely 3) distinct sepals. Fertile flowers with a tubular or campanulate 4-lobed calyx investing the ovary, a short or slender style, and a penicillate stigma. Achene enclosed by the withering-persistent pistillate calyx. [Ancient Latin, referring to the growth of some species on walls.]

About 7 species, widely distributed; besides the following, another occurs in the southern United States.

1. Parietaria Pennsylvanica Muhl.  
Pennsylvania Pellitory. (Fig. 1270.)


Annual, pubescent, stem weak, simple or sparingly branched, ascending or reclining, very slender, 4½-15 in long. Leaves lanceolate or oblong-lanceolate, membranous, dotted, acuminate at the apex, narrowed at the base, 3-nerved and with 1-3 pairs of weaker veins above, slender-petioled, 1½-3½ in long, 4½-1½ in wide; petioles 4½-1½ in long, almost filiform; flowers glomerate in all except the lowest axils, the clusters shorter than the petals; bracts of the involute linear, 2-3 times as long as the flowers; style almost none; achene about 1½ in long.


MISTLETOE FAMILY.

Parasitic green shrubs or herbs, containing chlorophyll, growing on woody plants and absorbing food from their sap through specialized roots called haustoria (a few tropical species terrestrial). Leaves in the following genera opposite, in *Razoumofofskya* reduced to opposite scales. Flowers regular, terminal or axillary, clustered or solitary, dioecious or monoecious, and perianth simple, or in some exotic genera perfect, and with perianth of both calyx and corolla. Calyx-tube adnate to the ovary, its limb entire, toothed or lobed. Stamens 2-6; anthers 2-celled or confluentely 1-celled. Ovary solitary, erect; style simple or none; stigma terminal, undivided, obtuse. Fruit a berry. Seed solitary, its testa indistinguishable from the endosperm, which is usually copious and fleshy; embryo terete or angled.
MISTLETOE FAMILY.

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About 21 genera and 500 species, widely distributed; most abundant in tropical regions. Leaves scale-like, united at the base; anthers 1-celled; berry peduncled. Leaves thick, flat; anthers 2-celled; berry sessile.

1. Razoumofskya

2. Phoradendron

1. Razoumofskya pusilla (Peck) Kuntze. Small Mistletoe. (Fig. 1271.)


Plant inconspicuous, stems 2'-10' long, nearly terete when fresh, somewhat 4-angled when dry, simple or sparingly branched, greenish-brown, slender. Scales suborbicular, appressed, obtuse, about 1/2' wide, connate at the base; flowers strictly dioecious (the staminate and pistillate plants sometimes on different trees), solitary in most of the axils, longer than the scales; berry ovoid-oblong, acute, about 1" long, nodding on a slightly exerted peduncle; seeds enclosed in a viscid mucus.


Shrubs, parasitic on trees, with opposite coriaceae flat entire or undulate faintly nervved leaves, terete usually jointed and brittle twigs, and dioecious axillary spicate bracted small flowers, solitary or several in the axil of each bract. Staminate flowers with a 3-lobed (rarely 2-lobed) globose or ovoid calyx, bearing a sessile transversely 2-celled anther at the base of each lobe. Pistillate flowers with a similar calyx adnate to the ovoid inferior ovary. Style short, obtuse or capitulate. Fruit a sessile ovoid or globose fleshy berry. Endosperm copious. [Greek, tree-thief, from its parasitic habit.]

About 80 species, all American. Besides the following, 5 or 6 others occur in the Western States.

1. Phoradendron flavescens (Pursh) Nutt. American Mistletoe. (Fig. 1272.)


A branching glabrous or slightly pubescent shrub, the twigs rather stout, terete, brittle at the base. Leaves oblong or obovate, rounded at the apex, narrowed into short petioles, 3-5-nerved, entire, 1'-2' long, 5'-10' wide, dark green, coriaceous; petioles 1'-4' long; spikes solitary, or 2 or 3 together in the axils, linear, shorter than the leaves; berry globose, white, about 2' in diameter.

Parasitic on deciduous leaved trees, notably on the Tupelo and Red Maple, central New Jersey to Ohio, Indiana and Missouri, south to Florida and Texas. May-July.

Herbs or shrubs (some exotic genera trees), with alternate or opposite entire extipulate leaves. Flowers clustered or solitary, axillary or terminal, perfect, monoecious or dioecious, mostly greenish. Calyx adnate to the base of the ovary, or to the disk, 3-6-lobed, the lobes valvate. Petals none. Stamens as many as the calyx-lobes and inserted near their bases, or opposite them upon the lobed or annular disk; filaments slender or short. Ovary 1-celled; ovules 2-4, pendulous from the summit of the central placenta; style cylindrical, conic or sometimes none; stigma capitulate. Fruit a drupe or nut. Seed 1, ovoid or globose. Testa none; endosperm copious, fleshy; embryo small, apical.

About 25 genera and 250 species, mostly of tropical distribution, a few in the temperate zones. Perennial herbs: flowers perfect, cymose or solitary. Shrub; flowers imperfect, mostly dioecious, racemose.


Glabrous erect perennial herbs, some (or all?) parasitic on roots of other plants. Leaves alternate, oblong, oval, lanceolate or linear, entire, pinnately veined. Flowers perfect, terminal or axillary, rarely solitary, cymose, bractless. Calyx campanulate, the base of its tube adnate to the ovary, its limb 5-lobed (rarely 4-lobed). Stamens 5, or rarely 4, inserted at the bases of the calyx-lobes and between the lobes of the disk, attached to the middle of the lobes by tufts of hairs. Anthers ovate, 2-celled. Fruit drupaceous, globose or ovoid, crowned by the persistent calyx. [Greek, referring to the hairy attachments of the anthers.]

Four known species, the following North American, one European.

Cymes mostly corymbose-clustered at the summit of the stem; leaves acute, sessile; style slender. Leaves oblong, pale green; fruit globose urn-shaped.

1. Comandra umbellata (L.) Nutt. Bastard Toad-flax. (Fig. 1273.)

2. Comandra pallida A. DC. Pale Comandra. (Fig. 1274.)

Similar to the preceding species but paler and glaucous, usually much branched, leaves narrower, linear or linear-lanceolate, acute or the lowest and those of the stem oblong-elliptic; cymes few-several-flowered, corymbose-clustered at the summit; peduncles usually short; pedicels about 1" long; calyx purplish, about 2" high; fruit ovoid-oblong, 31/2'-4' high and 2'-21/2' in diameter, crowned by the upper part of the calyx-tube and its 5 obovate lobes.

In dry soil, Manitoba to British Columbia, south to Minnesota, Kansas, Texas, New Mexico and California. April-July.

A branching shrub (the Asiatic species trees), with thin alternate pinnately-veined entire short-petioled deciduous leaves, and dioecious or polygamous small greenish racemose flowers. Staminate flowers with a campanulate 3–5-cleft calyx, the lobes valvate, recurved or spreading, pubescent at the base within; disk of 3–5 distinct glands or scales; stamens 4 or 5, inserted between the glands and opposite the calyx-lobes; filaments short; anthers ovate. Pistillate and perfect flowers with a top-shaped calyx adnate to the obovoid ovary; style short, stout; stigma capitate, depressed. Fruit a pear-shaped or oval drupe, the endocarp thin and endosperm of the seed very oily. [Name from *Pyrus*, the pear, from the similar shape of the fruit.]

Three species, the following and two Asiatic.

1. **Pyrularia pubera** Michx. Oil-nut. Buffalo-nut. (Fig. 1276.)

   *Pyrularia oleifera* A. Gray, Man. Ed. 2, 382. 1858.

A straggling or erect much branched shrub, 3°–15° tall, with terete twigs, the young foliage pubescent. Leaves oblong, oblong-lanceolate or somewhat obovate, nearly glabrous when mature, acute or acuminate at both ends, 3°–5° long, 8°'–1½° wide; petioles 2°'–4° long; racemes terminating short branches, the stamine many-flowered, 1°–2° long, the pistillate few-flowered and shorter; pedicels slender, 1½°–2° long; stamine flowers about 2° broad; calyx 3–5-cleft; drupe about 1° long, crowned by the ovate acute calyx-lobes.

In rich woods, southern Pennsylvania to Georgia, mostly in the mountains. May. Fruit ripe Aug.–Sept.


**BIRTHWORT FAMILY.**

Herbs or shrubs, acaulescent, or with erect or twining and leafy stems. Leaves alternate or basal, petioled, mostly cordate or reniform, exstipulate. Flowers axillary or terminal, solitary or clustered, perfect, mostly large, regular or irregular. Calyx-tube adnate to the ovary, its limb 3-lobed, 6-lobed or irregular. Petals none. Stamens 6–many, inserted on the pistil, the anthers 2-celled, extrorse, their sacs longitudinally dehiscent. Ovary wholly or partly inferior, mostly 6-celled; ovules numerous in each cavity, anatropous, horizontal or pendulous. Fruit a many-seeded mostly 6-celled capsule. Seeds ovoid or oblong, angled or compressed, the testa crustaceous, smooth or wrinkled, usually with a fleshy or dilated raphe; endosperm copious, fleshy; embryo minute.
Five genera and about 200 species, of wide distribution in tropical and temperate regions.
Acaulescent herbs; perianth regular, 3-lobed, persistent; filaments distinct.

1. *Asarum*
Leafy erect herbs or twining vines; perianth irregular, deciduous; anthers sessile, adnate to the stigma.

**1. ASARUM L.** Sp. Pl. 442. 1753.
Acaulescent perennial often clustered herbs, with slender aromatic branched rootstocks, thick fibrous-fleshy roots, long-petioled cordate ovate hastate or orbicular entire leaves, and solitary large peduncled purple-brown or mottled flowers, borne very near or upon the ground. Calyx campanulate or hemispheric, adnate to the ovary at least below, regularly 3-lobed, the lobes valvate. Stamens 12, inserted on the ovary; filaments short, stout; connective of the anthers-sacs more or less continued beyond them as a tip. Ovary partly or wholly inferior, 6-celled, the parietal placenta intruded; ovules numerous, horizontal or pendulous. Capsule coriaceous, crowned by the withering-persistent calyx and stamens, subglobose or hemispheric, at length bursting irregularly or longitudinally dehiscent. Seeds compressed. [The ancient name, meaning obscure.]

About 15 species, natives of the north temperate zone. Besides the following, 3 others occur in western North America. The species are known as *Asarabacca*.

Calyx-lobes lanceolate, acuminate; style 6-lobed; plant pubescent.

1. *A. Canadense*.

Calyx-lobes short, rounded; styles 6, each 2-cleft; plants glabrous or nearly so.

Anthers not pointed; leaves orbicular or broadly ovate; calyx campanulate.

Calyx 6'-8' long, contracted at the throat.

Calyx 8'-20' long, not contracted at the throat.

Anthers pointed; leaves or some of them hastate; calyx urn-shaped.

2. *Asarum Virginicum*.

3. *A. macranthum*.

4. *A. articulatum*.

**2. Asarum Virginicum L.**

*Asarum Virginicum* L. Sp. Pl. 442. 1753.

Rootstocks slender, scaly, clustered, simple or branched. Leaves 1-3 to each plant or branch, coriaceous, glabrous, orbicular or broadly ovate, rounded at the apex, 1½'-3' wide, usually mottled, the basal sinus open or nearly closed; petioles pubescent along one side or glabrous, 3'-7' long, ascending; flower short-peduncled, purple, 6''-8'' long; calyx campanulate, narrowed at the throat, its tube adnate to the lower part of the ovary, free above, the lobes ovate or nearly semicircular, about one-third as long as the tube; peduncle ¾'-¾' long; filaments much shorter than the anthers; anthers not pointed; styles 6, each 2-lobed, the stigmas sessile below the lobes; capsule hemispheric, about 4'' high.

In rich woods, Virginia and West Virginia to Georgia and South Carolina. Ascends to 2900 ft. in Virginia. May-June.
3. Asarum macranthum (Shuttlw.) Small. Large-flowcrered Asarum. (Fig. 1279.)

*Homotropa macranthum* Shuttlw.; Small, Mem. Torr. Club, 4: 130, as synonym. 1894.


Glabrous, rootstocks more or less branched. Leaves 1 or 2 to each plant or branch, broadly ovate or suborbicular, dark green and usually mottled above, paler beneath, 2'–4' long, 1½'–3' wide, obtuse or subacute at the apex, the basal sinns mostly narrow; petioles 3'–8' long, ascending; calyx tubular-campanulate, 8'–20' long, not or scarcely contracted at the throat, the lobes somewhat unequai, obtuse, mottled with violet on the inner side, one-third to one-half as long as the tube; peduncle 8'–20' long; filaments shorter than the anthers; anthers equally 4-ribbed, not pointed; styles 5, each 2-cleft.

In rich mountain woods, Virginia and North Carolina. May–July.

4. Asarum arifolium Michx. Halberd-leaved Asarum. (Fig. 1280.)


Pubescent, at least on the veins of the leaves, rootstocks slender, usually branched and with 1 or 2 leaves to each branch. Leaves rather thick, usually mottled, obtuse at the apex, 2'–5' long, some of them hastate, some suborbicular, the basal sinns often broad; petioles more or less pubescent, 3'–8' long, erect or ascending; flower stout-peduncled, about 1' long; calyx urn-shaped, mично contracted at the throat, the lobes rounded, about one-fifth as long as the tube, which is adnate to the lower half of the ovary; anthers nearly sessile, short-pointed; styles 6, 2-cleft, with a sessile stigma below the cleft; capsule subglobose, about 8' in diameter.

In woods, Virginia to Tennessee, Florida and Alabama. Ascends to 3000 ft. in Virginia. April–June.


Perennial herbs or twining vines. Leaves alternate, mostly petioled and entire (some exotic species 3–7-lobed), cordate, palmately 3–many-nerved. Flowers irregular, solitary or clustered. Calyx adnate to the ovary, at least to its base, the tube narrow, usually inflated around the style and contracted at the throat, the limb spreading or reflexed, entire, 3–6-lobed or appended. Stamens mostly 6; anthers sessile, adnate to the short style or stigma, 2-celled, the sacs longitudinally dehiscient. Ovary partly or wholly inferior, mostly 6-celled with 6 parietal placentae. Style 3–6-lobed. Capsule naked, septicidally 6-valved. Seeds very numerous, horizontal, compressed, their sides flat or concave. [Named for its supposed medicinal properties.]

About 180 species, widely distributed in tropical and temperate regions. Besides the following, some 6 others occur in the southern and western United States.

Erect herbs.

- Calyx-tube bent; flowers solitary, on basal scaly branches.
- Calyx-tube straight; flowers axillary, clustered.

Tall twining vines; flowers axillary; calyx-tube bent.

Leaves minutely pubescent; calyx-limb flat, spreading.

Leaves tomentose; calyx-limb rugose, reflexed.

1. *A. Serpentraria*.

2. *A. Clermonti*.

3. *A. macrophylla*.

4. *A. tomentosa*.
1. Aristolochia Serpentina L. Virginia Snakeroot. Serpentine. (Fig. 1281.)


A perennial pubescent nearly erect herb, 10'-3' tall, with short rootstocks and fibrous aromatic roots. Leaves ovate, ovate-lanceolate or oblong-lanceolate, thin, green on both sides, acuminate at the apex, cordate or hastate at the base, 1'-5' long, 1'-2' wide; petioles 1/2'-1' long; lowest leaves reduced to scales; flowers solitary and terminal, on slender basal scaly branches; tube of the calyx curved like the letter S, enlarged at the ovary and at its throat, the limb short, spreading, slightly 3-lobed; anthers contiguous in pairs; stigma 3-lobed; capsule subglobose, ridged, about 1/2' in diameter. Flowers sometimes cleistogamous.


2. Aristolochia Clematitis L. Birthwort. (Fig. 1282.)


Herbaceous, perennial; stem erect, glabrous, zigzag, striate, 1'-2' tall. Leaves dark green, reniform, subacute or obtuse at the apex, glabrous or their margins minutely spinulose-ciliate, strongly reticulate-veined, 2'-5' wide; petioles shorter than the blades; flowers fascicled in the axils, 1'-1 1/2' long; tube of the calyx yellowish green, straight, enlarged around the ovary, the lobes appendaged; anthers equidistant.

Near Ithaca and Flushing, N.Y. Escaped from cultivation. Native of southern Europe. Summer.

3. Aristolochia macrophylla Lam. Dutchman's Pipe. (Fig. 1283.)

Aristolochia macrophylla Lam. Encyl. t. 253. 1783. 

A twining vine, the stem sometimes 1' in diameter and 30' long, the branches very slender, terete, green, glabrous. Leaves thin, broadly reniform or suborbicular, densely pubescent beneath when young, glabrous or nearly so and 6'-15' broad when mature; petioles slender, 1'-3' long; peduncles solitary or 2 or 3 together in the axils, about as long as the petioles, each with a suborbicular clasping bract at about the middle 1/2'-1' in diameter; calyx-tube strongly curved, 1' or more long, inflated above the ovary, contracted at the throat, yellowish-green, veiny, the limb flat, spreading, purple-brown, somewhat 3-lobed; anthers contiguous in pairs under the 3 lobes of the stigma; capsule oblong-cylindric, strongly parallel-nerved, 2'-3' long, 8'-10' in diameter.

4. Aristolochia tomentosa Sims. Woolly Pipe-vine. (Fig. 1284.)


A twining vine, similar to the preceding, but the twigs, petioles, leaves and peduncles persistently tomentose. Leaves sub-ombilicus or broadly ovate, obtuse or rounded at the apex, 3'-6' broad when mature; petioles rather stout, 1'-5' long; peduncles axillary, mostly solitary, slender, bractless; calyx densely tomentose, the tube sharply curved, yellowish green, about 1½ long, its throat nearly closed, the limb becoming reflexed, wrinkled, dark purple, 3-lobed; anthers contiguous in pairs beneath the 3 spreading lobes of the stigma; capsule oblong-cylindric.

In woods, Missouri and southern Illinois to North Carolina, Alabama and Florida. May-June.


BUCKWHEAT FAMILY.

Herbs, twining vines, shrubs or trees, with alternate or sometimes opposite or whorled simple mostly entire leaves, jointed stems, and usually sheathing united stipules (ocreae). Flowers small, regular, perfect, dioecious, monoeocious or polygamous, spicate, racemose, corymbose, umbellate or panicled. Petals none. Calyx inferior, free from the ovary, 2-6-cleft or 2-6-parted, the segments or sepals more or less imbricated, sometimes petaloid, sometimes developing wings in fruit. Stamens 2-9, inserted near the base of the calyx, or in staminate flowers crowded toward the centre; filaments filiform or subulate, often dilated at the base, distinct or united into a ring; anthers 2-celled, the sacs longitudinally dehiscent. Pistil solitary; ovary superior, 1-celled; ovule solitary, orthotropous, erect or pendulous; style 2-3-cleft or 2-3-parted (rarely 4-parted), sometimes very short; stigmas capitate or tufted, rarely 2-cleft; fruit a lenticular 3-angled or rarely 4-angled achene, usually invested by the persistent calyx; seed shaped like the pericarp; endosperm mealy; cotyledons accumbent or incumbent, flat; embryo straight or curved.

About 30 genera and 800 species, of wide geographic distribution.

Flowers subtended by involucres.

Ocreae present; calyx 2-4-parted; stamens 3 or fewer.

Ocreae none; calyx 6-cleft or 6-parted; stamens 9; achene 3-angled.

Flowers not involucrate; stamens 4-8.

Ocreae present; stigmas tufted.

Calyx 6-parted; style 3-parted; achene 3-angled.

Calyx 4-parted; style 2-parted; achene lenticular.

Ocreae present; stigmas capitate.

Pedicels mostly several together; achene much surpassing the calyx.

Pedicels usually fascicled; achene mostly enclosed by the enlarged calyx.

Pedicels solitary; leaves jointed at the base.

Ocreae obscure or wanting; stigmas 2-cleft.

1. MACOUNASTRUM Small.

[KOENIG A. L. Mant. 35. 1767. Not König Adans. 1753.]

Low glabrous annual herbs, with fibrous roots, erect or spreading simple or forked stems, alternate or opposite entire leaves, funnelform membranous ocreae, and minute perfect terminal clustered flowers, subtended by a several-leaved involucre. Calyx 2-4-parted (usually 3-parted), greenish-white, the segments valvate, equal; pedicels short, subtended by transparent bracts; stamens 2 or 4, alternate with and often protruding between the calyx-segments; filaments short, stout; anthers ovoid. Style 2-3-parted; stigmas capitate; achene ovoid, 3-angled or lenticular, exceeding the persistent calyx; embryo eccentric, accumbent.

Two or three species, the following circumboreal, the others of the higher Himalayas.

*Text contributed by Dr. JOHN K. SMALL.
1. **Macounastrum Isáldicum** (L.) Small. Macounastrum. (Fig. 1285.)

*Koenigia Islandica* L. Mant. 35. 1767.

Stems very slender, 1'-4' long, sometimes tufted. Leaves obovate, oblong or almost orbicular, 1'-5' long, fleshy, obtuse at the apex, sessile or short-petioled; ocreae about ½' long; involure consisting of 3-6 obovate or orbicular leaves more or less united at their bases; flowers fascicled in the involures, short-pedicelled; calyx ½' long, the segments ovate-lanceolate, rather obtuse; stamens very short; style-branched short; achene less than 1" long, brown, often slightly curved, striate, its faces convex.

Greenland and Labrador to Hudson Bay and Alaska. Also in arctic Europe and Asia. Summer.


Annual or perennial acaulescent or leafy-stemmed herbs, some species very woody at the base, with simple or branched, often tufted stems, and entire alternate opposite or whorled leaves. Flowers small, fascicled, cymose, unbellate or capitate, subtended by 5-8-toothed or cleft campanulate top-shaped or almost cylindrical involures. Calyx 6-cleft or 6-parted, usually colored, the segments equal or the outer ones larger. Stamens 9, included or exserted; filaments filiform, often villous; anthers oblong. Style 3-parted; stigmas capitate. Achene pyramidal, 3-angled, more or less swollen near the base, invested by the calyx-segments, or winged. Embryo axial or somewhat eccentric. [Greek, referring to the woolly and jointed stems.]

About 160 species, natives of America, mostly of the western United States.

Stem leafy to the summit.

Stem leaves alternate; stem strigose.

Achenes glabrous, winged in fruit.

Achenes villous, not winged.

Stem leaves whorled; stem tomentose.

Robust; basal leaves rounded at the base; flowers yellow.

Slender: basal leaves narrowed at the base; flowers white or pink.

Stem leafy below, naked above.

Involucres erect on branches of the cymes.

Involucres in axillary and terminal clusters.

Leaves narrowly oblong or oblong-lanceolate, flat, long-petioled.

Leaves oblong, more or less crisped, short-petioled.

Acaulescent; scapose; scapes more or less tufted.

Scape simple; inflorescence capitule.

Densely tomentose; leaves spatulate, numerous.

Slightly tomentose; leaves linear or linear-spatulate, few.

Scape branched at the summit.

Involucrescence regularly umbellate.

Involucrescence irregularly umbellate or paniculate.

Involucrescence cymose.

Scape branched throughout; involucres solitary on deflexed peduncles.

1. **Eriogonum alátum** Torr. Winged Eriogonum. (Fig. 1286.)


Perennial by a long thick root, stem rather stout, erect, strigose, paniculately branched, somewhat angled, 1'-3' tall. Leaves mostly basal, spatulate, oblanecolate or narrowly obovate, 1'-3' long, those of the stem alternate, nearly linear, short-petioled, all obtuse or subacute at the apex, glabrous or pubescent and with midrib prominent beneath, ciliate; panicle open; bracts lanceolate or subulate; involucres cymose at the ends of the branches, campanulate, 5-toothed, 1'-1½' long, the segments obtuse and somewhat reflexed; calyx yellowish, 1' long, campanulate; stamens slightly exerted; achene long-pointed, 2½'-3' long, reticulated, closely invested by 3 wings.

On plains, western Nebraska to Texas, west to Colorado and New Mexico. June-Sept.
2. Eriogonum longifolium Nutt. Long-leaved Eriogonum. (Fig. 1287.)


*E. longifolium* Scheele, Linnaea, 22: 150. 1849.

Perennial, strigose throughout, stem stout, erect, paniculately or corymbose branched, leafy, finely grooved, 2'-3' tall. Leaves narrowly oblong or linear-oblong, obtuse at the apex, more or less tomentose beneath, the upper sessile, the lower narrowed into perioles with dilated and sheathing bases; bracts lanceolate or subulate; involucres turbinate-campanulate, 1½'-2'' long; peduncles ½'-1'' long or less; calyx oblong-campanulate, 2''-3'' high, 5-parted to near the base, very villous; stamens and style-branches exserted; achene 2½'' long, much enlarged at the base, villous, loosely invested by the calyx-segments, not winged.

Southern Missouri to Texas. Also in Florida. June-Nov.

3. Eriogonum Állei S. Wats. Allen's Eriogonum. (Fig. 1288.)

*E. Allen* S. Wats. in A. Gray, Man. Ed. 6, 734. 1890.

Perennial, floccose-tomentose throughout, stem rather stout, erect, sparingly branched above, 1½'-1½'' tall. Leaves oblong, or ovate-oblong, 1½'-3'' long, the basal long-petioled, obtuse at both ends, those of the stem in whorls of 3-5 at the somewhat swollen nodes, short-petioled, narrowed at the base, the upper small and bract-like; inflorescence compoundly cymose; involucres top-shaped, 5-toothed, 2½''-3'' long, the teeth obtusish; bracts leaf-like, spatulate; calyx yellow, 1½'' long, broadly campanulate, its segments obovate or orbicular; stamens and style-branches exserted.


4. Eriogonum Jamesii Benth. James' Eriogonum. (Fig. 1289.)

*Eriogonum Jamesii* Benth. in DC. Prodr. 14: 7. 1856.


Perennial, base woody, scaly, somewhat branched, stem usually spreading, branched, tomentose, slender, 6'-18' long, the branches erect, 3 or 4 times forked, light brown or reddish. Leaves mostly basal, spatulate or oblong, 1'-4' long, long-petioled, the upper smaller, sessile in whorls of 3 or 4 at the somewhat swollen nodes, all obtuse or subacute, dark green and sparingly tomentose above, densely gray-tomentose beneath, their margins sometimes slightly revolute and crisped; inflorescence compoundly cymose; involucres turbinate-campanulate, 2'' long, 5-toothed, the teeth rounded; bracts foliaceous, narrowly oblong or oblong-spatulate; calyx white or pink, campanulate, villous, 2½''-3'' long, its segments oblong or obovate; stamens and style-branches exserted; achene 2½''-3'' long, smooth, villous near the apex, its angles margined.

5. Eriogonum annuum Nutt. Annual Eriogonum. (Fig. 1290.)


Annual, white floccose-tomentose throughout, simple or branched, leafy below, naked above, 1½-3½' tall. Leaves oblong, oblong-lanceolate or oblanceolate, acute or obtuse at the apex, narrowed or acuminate at the base, petioled, the margins somewhat revolute or crisped; inflorescence cymose; involucres top-shaped, 1½'-1½" long, secund, erect, 5-toothed, the teeth obtuse; bracts triangular, not foliaceous; calyx white or whitish, ½"-1" long, campanulate, 6-cleft to beyond the middle, the lobes ovate; achene pointed, less than 1" long, its angles smooth, its base almost globular.

On plains, Nebraska to Texas, west to New Mexico, extending into Mexico. July-Sept.


Slender Eriogonum. (Fig. 1291.)


Perennial, woody, especially below, more or less floccose-tomentose throughout; stem erect or ascending, branched, especially from the base, leafy below, naked above, 6'-12' high. Leaves oblong or oblanceolate, obtuse at the apex, narrowed into short petioles, ½'-2' long, the upper bract-like; inflorescence compoundly cymose; involucres top-shaped, 1½" long, 5-toothed, the teeth obtuse; bracts triangular; calyx yellow, white or pink, 1½" long, campanulate, at length constricted near the middle; stamens and style-branches included; achene pointed, 1½" long, rough on the angles.

Western Nebraska to Washington, south to New Mexico and California. July-Oct.


More densely floccose-tomentose; stem diffusely branched; leaves linear-oblong or linear; inflorescence 2-3 times compound, elongated; flowers white. Nebraska to Montana and New Mexico.

7. Eriogonum corymbosum Benth.

Crisp-leaved Eriogonum. (Fig. 1292.)

E. corymbosum Benth. in DC. Prodr. 14: 17. 1836.

Perennial, woody, densely floccose-tomentose throughout; stem erect, branched, leafy below, naked above, 6'-12' tall. Leaves oblong, obtuse at the apex, narrowed at the base, petioled, ½'-1½' long, their margins more or less crisped; inflorescence compoundly cymose; involucres short-campanulate, 5-toothed, about 1½" long, the teeth subacute; bracts triangular or triangular-lanceolate, not foliaceous; calyx broadly campanulate, 1½'-1½" long, constricted near the middle, 6-cleft, the segments fiddle-shaped, emarginate, the 3 inner ones shorter than the outer; style-branches exserted; achene 1½" long, enlarged at the base, rough on the angles.

Kansas to New Mexico, west to Utah and Arizona. Aug.-Sept.
8. Eriogonum múlticéps Nees. Brunched Eriogonum. (Fig. 1293.)

_E. múlticéps_ Nees, Max. Reise N. A. 2: 446. 1841.


Perennial, by a slender root, scapose, densely white-tomentose throughout; stems short, tufted, much branched, sometimes several inches long. Scapes simple, 1'-5' high; leaves spatulate, 1/2'-2' long, numerous, obtuse at the apex, narrowed below into petioles; inflorescence capitulate; involucre 3-12, sessile, 1 1/2'' long, 5-6-toothed, the teeth acute; bracts foliaceous, spatulate; calyx white or rose-color, 1 1/2''-2 1/2'' long, campanulate, somewhat villous, 6-cleft to about the middle, the segments cuneate, obtuse or emarginate; stamens and style-branches exserted; achene 1/2'' long.


9. Eriogonum pauciflorum Pursh. Few-flowered Eriogonum. (Fig. 1294.)


Perennial, root long and slender, stems very short, simple or sparingly branched, loosely tufted, covered by the scarious dilated bases of the petioles. Scapes erect, slender, simple, slightly tomentose, 2'-6' high; leaves linear or linear-spatulate, 1'-3' long, rather obtuse, but apparently acute from the strongly revolute margins, glabrous or sparingly pubescent above, white-tomentose or cottony beneath, narrowed into slender petioles; inflorescence capitate; involucres 4-10, 1 1/2'' long, turbinate-campanulate, 5-toothed, the teeth obtuse, more or less reflexed; calyx white, campanulate, 1 1/2'' long, glabrous, the segments ovate; achene 1 1/2'' long, its faces swollen at about the middle, inconspicuously striate-reticulated.


10. Eriogonum flávum Nutt. Yellow Eriogonum. (Fig. 1295.)

_Eriogonum flávum_ Nutt. Fras. Cat. 1813.


Perennial, scapose, white-tomentose throughout, root short, scaly, spindle-shaped, stem very short and thick, simple and solitary or tufted and creeping, woody. Scapes 2'-12' tall, erect; leaves crowded on the short stem, linear-oblong or oblong-spatulate, 1'-3' long, mostly obtuse at the apex, flat, narrowed into petioles; petioles dilated at the base and imbricated; inflorescence regularly umbellate; involucres top-shaped, 2'-2 1/2'' long, nearly entire, rather densely clustered; peduncles 1/2'-1 1/2'' long; bracts spatulate, foliaceous; calyx yellow, 3'' high, top-shaped, very villous, the segments obovate; stamens and style-branches exserted; achene constricted at the middle, 2'' long, villous at the summit, the angles undulate, the faces swollen.

Nebraska and Kansas to the Northwest Territory and Arizona. June-Sept.
Long-rooted *Eriogonum*. (Fig. 1296.)  
*Eriogonum lachnogynum* Torr.; Beeth. in DC. Prodr.  
14: 8. 1848.

Perennial, scapose, root long, fusiform, stems stout and short, tufted, much branched, covered with the dilated petiole-bases. Scape erect, slender, 4′-12′ tall, white-tomentose, sparingly branched above; leaves numerous, crowded, lanceolate or narrowly oblong, ½′-1′ long, acute at the apex, narrowed at the base, silky above, white-tomentose beneath, long-petioled, their margins somewhat revolute; inflorescence irregularly umbellate or paniculate; involucres broadly campanulate or nearly hemispheric, ½′-2′ high, sessile or peduncled, 5-toothed, teeth obtuse; bracts small, lanceolate; calyx campanulate, ½′ long, villous; stamens and style-branches exerted.

Western Kansas to Colorado and Arizona. May-Nov.

Narrow-leaved *Eriogonum*. (Fig. 1297.)  

Perennial, scapose, stem short, thick and woody, more or less tomentose; scapes erect or nearly so, glabrous, 4′-12′ tall; leaves crowded, narrowly oblanceolate, spatulate or nearly linear, 1′-3′ long, obtuse at the apex, narrowed into long petioles, white-tomentose on both sides, the margins sometimes revolute; inflorescencecompoundly cymose; involucres oblong-turbinate, 1′ long, 5-toothed, teeth obtuse; bracts triangular, not foliaceous; calyx yellow, ovoid-campanulate, about 1′ long, 6-cleft, the lobes oblong or fiddle-shaped, emarginate; stamens and style-branches exerted; achene 1½′ long, enlarged at base.

Nebraska to Oregon, south to Utah and New Mexico. July-Sept.

Nodding *Eriogonum*. (Fig. 1298.)  

Annual, low, stem very short; scape erect, usually much branched, 6′-12′ high. Leaves confined to the short stem, orbicular or oblong-orbicular, less than 1′ long, obtuse or slightly apiculate, flat, floccose-tomentose, especially beneath, petiolar; inflorescence paniculate; involucres campanulate, slightly more than ½′ long, solitary on slender deflexed peduncles 1′ long or less, 5-cleft to near the middle, the lobes obtuse; bracts triangular or lanceolate, not foliaceous; calyx whitish, campanulate, ½′ long; 6-parted, slightly constricted near the summit, the segments fiddle-shaped; stamens and style-branches included; achene ½′ long, nearly globular at the base, rough on the angles.

Nebraska to New Mexico and Utah. July-Sept.

Perennial or annual, leafy-stemmed herbs, some species slightly woody, the leaves in some mainly basal. Stem grooved, mostly branched, erect, spreading or creeping. Leaves entire or undulate, flat or crisped, the ocreae usually cylindric, brittle and fugacious, the inflorescence consisting of simple or compound, often panicked racemes. Flowers green, perfect, dioecious, or polygamo-monoecious, whorled, on jointed pedicels. Corolla none. Calyx 6-parted, the 3 outer sepals unchanged in fruit, the 3 inner ones mostly developed into wings, one or all three of which usually bears a callosity (tubercle); wings entire, dentate, or fringed with bristle-like teeth. Stamens 6, included or exserted; filaments very short, glabrous; anthers oblong. Style 3-parted; stigmas peltate, tufted; achene 3-angled, the angles more or less margined. Embryo curved or nearly straight, borne in one of the faces of the 3-angled seed. [The ancient Latin name.]

About 130 species, of wide geographic distribution. Besides the following, some 6 others occur in the southern and western parts of North America.

* Leaves hastate; flowers dioecious; foliage acid; low species.

Inner sepals not developing wings in fruit; achene granular. Fruiting inner sepals developing wings; achene smooth.

Basal leaves numerous; wings orbicular-cordate.

Basal leaves few; wings broadly oblong-cordate.

* * * Leaves not hastate; flowers perfect or polygamo-dioecious; foliage scarcely or not at all acid; tall species.

Leaves flat, bright or light green, or glaucescent.

Wings ½"-1½" broad, reddish; no tubercles.

Wings small, not red, bearing tubercles.

Tubercles usually 3.

Pedicles little longer than the wings.

Pedicles several times longer than the wings.

Tubercle usually 1; pedicels equalling the wings.

Leaves wavy-margined or crisped, dark green, not glaucescent.

Wings entire, more or less undulate.

Lower leaves narrowed or acuminate at the base.

Tubercle 1.

Tubercles 3.

Lower leaves cordate or rounded at the base.

Tubercles wanting.

Tubercles mostly 3.

Inflorescence not leafy; pedicels long.

Inflorescence leafy; pedicels short.

Tubercle 1; inflorescence not leafy; pedicels short.

Wings toothed or fringed.

Lower leaves cordate.

Wings ovate or oblanceolate; tubercles mostly 2.

Wings hastate or ovate-hastate; tubercle 1.

Lower leaves mostly narrowed at base; wings with 4 spreading bristle-like teeth.

1. Rumex Acetosella L. Field or Sheep Sorrel. (Fig. 1299.)


Annual or perennial, glabrous, dioecious, stem slender, erect or nearly so, simple or branched, the rootstock woody, horizontal or creeping. Leaves narrowly hastate, 1'-4' long, obtuse or acute at the apex, usually widest above the middle, petioled, the basal auricles entire or 1-2-toothed, or the uppermost leaves nearly linear and not auricled, all papilllose; ocrea silvery, 2-parted, soon lacerate; flowers in erect panicked racemes; racemes interrupted; calyx green, ½" long, pedicelled; stamens exserted; achene less than 1½" long, very granular, exceeding the persistent calyx, its angles not margined.

In dry fields and on hillsides throughout North America except the extreme north. In large part naturalized from Europe. Sometimes a troublesome weed. Foliage very acid. Native also of Asia. Ascends to 6000 ft. in North Carolina. May-Sept.
2. Rumex hastátulus Muhl. Phenomena's Sorrel. (Fig. 1300.)

*R. Engelmannii* Meisn. in DC. Prodr. 14: 64. 1856.

Perennial from a woody base, glabrous, dioecious; stem rather strict, simple or branched, erect, 5'-20' tall. Leaves hastate, oblong or oblongate, 1'-5' long, the basal numerous, more or less auricled at the base, subacute, petioled, those of the stem linear, all papillose; ocrea silvery, 2-parted, at length lacerate; racemes ascending, at length interrupted; calyx green, slender-pedicelled, winged in fruit; pedicels equalling or longer than the wings; wings orbicular, mostly broader than high, cordate, 1 1/2'-1 3/4'' long; stamens slightly exserted; achene reddish, smooth, shining, less than 1'' long, invested by the calyx-wings, its angles margined.

On the sea-coast, southern New York to Florida and on the plains from Kansas to Texas, a geographic distribution nearly the same as that of *Chenopodium leptophyllum*. March-Aug.

3. Rumex Acetósa L. Sorrel. Sour Dock. (Fig. 1301.)

*Rumex Acetosa* L. Sp. Fl. 337. 1753.

Perennial, glabrous, dioecious; stem erect, simple, grooved, 1'-3' tall. Leaves oblong-hastate or ovate-sagittate, 1'-5' long, acute at the apex, crisped or erose on the margins, the basal few, long-petioled, the upper subsessile, the acute auricles entire or 1-toothed and more or less reflexed; ocrea lacerate; racemes nearly erect, crowded, at length interrupted; calyx green, 1'' long, pedicelled, winged in fruit; pedicels equaling or shorter than the wings, jointed near the middle; wings broadly ovate or orbicular, cordate, 2''-2 1/2'' long; achene rather more than 1'' long, pointed, smooth, shining, blackish, invested by the calyx-wings.


4. Rumex venósus Pursh. Veined Dock. (Fig. 1302.)


Perennial by a woody rootstock, glabrous, stem rather stout, erect, somewhat flexuous, 6'-15' tall, grooved, branched. Leaves ovate, ovate-lanceolate or oblong, 1'-5' long, acute at both ends or acuminate at the base, petioled, rather coriaceous; ocrea funnelform, thin, brittle; racemes mostly erect, soon interrupted; calyx red, pedicelled, very conspicuously winged in fruit; pedicels at maturity rather stout, slightly shorter than the wings, jointed at about the middle; wings large, 1 1/2'-1 3/4'' broad, suborbicular with a deep sinus at the base, veiny, reddish; style-branches divergent in fruit; achene 3'' long, smooth, shining, its faces concave, its angles margined.

Northwest Territory to Oregon and Washington, south to Missouri and Nevada. May-Aug.
5. **Rumex salicifolius** Weim. White, Pale or Willow-leaved Dock. (Fig. 1303.)


Perennial, glabrous, pale green; stem erect, ascending, or sometimes spreading, simple or branched, grooved, flexuons, 1°-3° high. Leaves lanceolate, linear-lanceolate or the lower oblong, acute or acuminate at both ends, or rarely obtuse at the apex, petioled; racemes erect, divergent or reflexed, dense, in fruit interrupted below; flowers in dense clusters; calyx pale green, 1" long, pedicelled, winged in fruit; pedicels slightly longer than the wings, jointed near the base; wings triangular-ovate, 1½" long, undulate or subdentate, each bearing a large ovoid tubercle; achene 1½" long, dark red, smooth, shining, its faces concave, its angles slightly margined.

In swamps, Labrador to southern New York, Florida, Texas and Lower California. Also in Europe. May-Sept.

6. **Rumex verticillatus** L. Swamp Dock. (Fig. 1304.)


Perennial, glabrous, rather bright green; stem stout, grooved, simple or nearly so, erect, ascending or decumbent, 2°-5° long, more or less flexuous when old. Leaves narrowly oblong, oblong-lanceolate or lanceolate, 2'-12' long, narrowed at both ends or obtusish at the apex, slightly papillose, long-petioled; racemes interrupted below, spreading in fruit; flowers in rather dense whorls; calyx green, 1½" long, winged in fruit; pedicels stout, thickened above, jointed near the base, 3-5 times as long as the wings; wings broadly deltoid, 2½" long, more or less decurrent on the pedicel, each bearing a narrowly ovoid tubercle; style-branches reflexed in fruit; achene 1½" long, reddish, pointed, smooth, shining, its faces concave.

In swamps, Quebec to Ontario and Iowa, south to Florida and Texas. May-July.

7. **Rumex altissimus** Wood. Tall or Peach-leaved Dock. (Fig. 1305.)


Perennial, glabrous, rather pale green; stem stout, erect, simple or sparingly branched above, grooved, 2°-4° tall. Leaves lanceolate, oblong-lanceolate or ovate-lanceolate (sometimes oblongate) 2'-10' long, acute at both ends, papillose; panicle rather open; racemes slightly interrupted in fruit; flowers densely whorled; calyx light green, 1½" long, winged in fruit; pedicels slender, jointed near the base, as long as the wings; wings triangular-cordate, 2½'-2½" long, usually one of them only bearing an ovoid tubercle; achene 1½" long, dark red, smooth, shining, its faces concave.

Along streams and in swamps, Massachusetts to Nebraska, Maryland and Texas. April-June.
(Fig. 1306.)


Perennial, glabrous, stem erect, simple or sparingly branched, grooved, 2°-5° tall. Lower leaves ovate-lanceolate, long-petioled, 4'-16' long, the upper oblong-lanceolate or oblong-elliptic, acute or obtusi; the uppermost lanceolate; fruiting panicle dense; racemes erect, somewhat interrupted in fruit; flowers densely whorled; calyx green; pedicels slender, 2-4 times as long as the calyx-wings, joined below the middle; wings orbicular-cordate, 2'-3' long, one of them bearing a prominent ovoid callosity; achene 1½' long, light brown, smooth, shining, its faces concave, its angles obscurely margined.


9. Rumex Brítánnica L.  
Great Water-Dock.  
(Fig. 1307.)


Perennial, glabrous, dark green, stem stout, erect, more or less branched, grooved, 3°-6° tall. Leaves lanceolate or oblong-lanceolate, the lower 1°-2° long, long-petioled, the upper 2'-6' long, short-petioled; fruiting panicle dense; racemes nearly erect, more or less interrupted; flowers densely whorled; calyx light green; pedicels slender, conspicuously jointed above the base, ½-2 times as long the calyx-wings; wings broadly cordate, 3' long, irregularly dentate, each bearing a large callosity; achene ovoid-oblong, or oblong, 2' long, pointed at both ends, brown, smooth, shining, its faces concave, its angles slightly margined.


(Fig. 1308.)


Perennial, glabrous, stem stout, strict, erect or nearly so, strongly grooved, simple or sparingly branched, 2°-5° high. Leaves lanceolate or ovate-lanceolate, bluish-green, somewhat crisped and wavy-margined, papillose, the lower 8'-12' long, obtuse or subacute at the apex, more or less cordate at the base, long-petioled, the upper smaller and usually lanceolate; panicle rather dense, leafless or nearly so, erect; racemes usually not interrupted; flowers loosely whorled; calyx pale green, 1' long; pedicels obscurely jointed below the middle, 2-3 times longer than the calyx-wings; wings triangular-ovate, 2½'-4½' long, somewhat dentate or undulate, bearing no tubercles; achene oblong, 2½'-2½' long, short-pointed, chestnut-brown, smooth, shining.

In wet places, Labrador to Alaska, Ontario, Rocky Mountains to Texas, and to California. May-Aug.
11. Rumex crispus L. Curled Dock. (Fig. 1309.)


Perennial, glabrous, dark green; stem rather slender, erect, simple or branched above, grooved, 1°-3½° tall. Leaves crisped and wavy-marginated, the lower oblong or oblong-lanceolate, 6'-12' long, long-petioled, the upper narrowly oblong or lanceolate, 3'-6' long, short-petioled, all cordate or obtuse at the base, more or less papilllose; panicle rather open; racemes simple or compound, by the elongation of the pedicels apparently continuous in fruit; flowers rather loosely whorled; calyx dark green; fruiting pedicels 1½-2 times as long as the calyx-wings, jointed near the base; wings cordate, 1½'-2'' long, truncate or notched at base, crenate-dentate, or nearly entire, each bearing a tubercle; achene 1'' long, dark brown, shining.


12. Rumex conglomeratus Murray. Clustered or Smaller Green Dock. (Fig. 1310.)


Perennial, glabrous, pale green; stem slender, erect, simple or branched, grooved, 1°-3° tall. Leaves ovate, oblong or lanceolate, 1'-5' long, some of them slightly fiddle-shaped, acute at the apex, obtuse at the base, crenulate and slightly crisped on the margins, petioled; panicle loose and open in fruit; racemes leafy, slender, ascending, much interrupted; flowers loosely whorled; calyx small, green; pedicels shorter than or equalling the calyx-wings, jointed near the base; wings ovate, fiddle-shaped, 1½'' long, toothed near the base, each bearing a large oblong callosity; achene less than 1'' long, pointed, red, smooth, shining, its faces convex.

In waste places, Virginia to South Carolina. Also in California. Naturalized from Europe. May-July.

13. Rumex sanguineus L. Bloody or Red-veined Dock. (Fig. 1311.)


Perennial, glabrous, stem slender, erect, grooved, simple or branched, 1°-3° high. Leaves oblong, oblong-lanceolate or lanceolate, 1'-6' long, the lower long-petioled, cordate at the base, acute or obtuse at the apex, usually red-veined, the upper short-petioled; panicle loose; racemes slender, spreading, not leafy, interrupted; flowers loosely whorled; calyx very small; pedicels slender, 1-1½ times as long as the calyx-wings, jointed at the base; wings oblong, 1½'' long, one of them bearing a spherical-oblong callosity; achene less than 1'' long, sharp-pointed, dark red, smooth, shining, its faces convex.

In waste places and ballast, southern New York to Virginia and Louisiana. Uncommon. Naturalized or adventive from Europe. May-Aug.
14. *Rumex pulcher* L. Fiddle Dock. (Fig. 1312.)


Perennial, dark green; stem slender, erect or procumbent, grooved, diffusely branched, 1'-3' long, the branches spreading. Leaves oblong, or some of the lower fiddle-shaped, 1'-6' long, long-petioled, obtuse at the apex, cordate at the base; upper oblong or oblong-lanceolate, 1'-3' long, short-petioled, usually narrowed at both ends; petioles more or less pubescent; panicle loose; racemes long, divergent, sometimes reflexed, much interrupted, rather leafy; flowers few in the whorls; calyx very small, green; pedicels equalling the calyx-wings, joined at or below the middle; wings ovate or oblong-ovate, 2" long, truncate at the base, one larger than the others or all three of different sizes, fringed with spine-like teeth, usually two, sometimes one or all three bearing tubercles; achene 1/" long, pointed, reddish, smooth, shining, its faces concave.

In waste places, Virginia to Florida and Louisiana. Also on the Pacific Coast and in ballast about the northern seaports. Naturalized from Europe. June-Sept.

15. *Rumex obtusifolius* L.


Perennial, glabrous, dark green; stem stout, erect, simple or sparingly branched, grooved, more or less scurvy above, 2°-4° tall. Lower leaves oblong-lanceolate, 6'-14' long, long-petioled, all cordate or rounded at the base, obtuse or acute at the apex, the upper lanceolate or oblong-lanceolate, 2'-6' long, short-petioled, the margins somewhat undulate or crisped; panicle rather open; racemes nearly erect, continuous or interrupted below; flowers loosely whorled; pedicels slender, somewhat longer than the calyx-wings, united below the middle; wings hastate, 2"-2½" long, fringed with a few spreading spiny teeth, one of them bearing an oblong tubercle; achene 1/" long, pointed, dark red, smooth, shining, its faces concave, its angles slightly margined.


16. *Rumex persicarioides* L. Golden Dock. (Fig. 1314.)


Annual, pubescent, pale green; stem rather stout, erect and simple, or diffusely branched, 1½-3½ high, or sometimes spreading or creeping, very leafy. Leaves lanceolate, or oblong, 1'-12' long, narrowed at the base, or sometimes cordate, or sagittate, acute at the apex, the margins undulate and more or less crisped; panicle simple or compound; racemes erect, leafy-bracted, mostly interrupted; flowers densely whorled; pedicels slender, 1-1½ times as long as the calyx-wings, united at the base; calyx very small; wings oblong, 1½ long, with 1-3 bristles on each margin, each bearing an ovoid or oblong callosity; achene less than 1/" long, pointed, reddish, smooth, shining, its faces convex, its angles slightly margined.

On sandy shores, New Brunswick to Virginia, extending across the continent through British America, south in the interior to Kansas and New Mexico and on the Pacific Coast to California. Has been confounded with *R. maritimus* L. of the Old World. July-Oct.

Low fleshy glabrous perennial herbs, with slender erect stems. Leaves mostly basal, long-petioled, reniform or orbicular, ciliate, palmately nerved, with cylindric ocreae. Flowers perfect, small, green, in terminal panicked racemes. Calyx unequally 4-parted, the outer segments smaller than the inner; stamens 6, included; filaments short, subulate, glabrous; anthers oblong. Ovary 1-celled; ovule solitary; style short, 2-parted, its branches divergent; stigmas fimbriate, persistent on the large wings of the fruiting calyx. Achene ovate, lenticular. Embryo straight, borne in the centre of the endosperm. [Greek, sour, from the acid leaves.]

Two known species, the following, and one in the Himalayas.

1. **Oxyria digyna** (L.) Camptd. Mountain Sorrel. (Fig. 1315.)


*R. digyna* Campd., *Rumex* 155. Pl. 3. f. 3. 1819.


Rootstock large, chaffy; stems scape-like, simple or sparingly branched, leafless or nearly so, 2'-12' tall. Leaves reniform or orbicular-reniform, 1½'-1½' wide, undulate, sometimes emarginate at the apex, the basal long-petioled; ocreae oblique, loose, those on the stem bearing flowers; racemes many-flowered; flowers slender-pedicelled; segments oblong, the inner erect, the outer reflexed in fruit; achene pointed, smooth, surrounded by a broad membranous wing.

Greenland and Labrador to Alaska, south to the White Mountains of New Hampshire and in the Rocky Mountains to Colorado. Also in northern Europe and Asia. July-Sept.

5. **FAGOPYRUM** Gaertn. Fr. & Sem. 2: 182. 1791.

Annual or perennial rather fleshy usually glabrous leafy herbs, with erect, simple or branched, striate or grooved stems. Leaves alternate, petioled, hastate or deltoid, with oblique, cylindric or funnelform ocreae. Flowers small, white or green, in terminal or axillary usually paniculate racemes, perfect, borne solitary or several together from each ocreola, slender-pedicelled. Calyx about equally 5-parted, persistent and unchanged in fruit, the segments petaloid, shorter than the achene. Stamens 8, included; filaments filiform, glabrous; anthers oblong. Ovary 1-celled, 1-ovuled; style 3-parted; stigmas capitate. Achene 3-angled. Embryo central, curved, dividing the mealy endosperm into two parts; cotyledons broad. [Greek, beech-wheat, from the similarity of the grain.]

About 6 species, natives of Europe and Asia.

Racemes panicked or corymbose; angles of the achene not crested.

Racemes mostly simple; angles of the achene crested, undulate.

1. **Fagopyrum** Fagopyrum (L.) Karst. Buckwheat. (Fig. 1316.)


*Fagopyrum euculatum* Moench, Meth. 290. 1794.


Annual, glabrous except at the nodes, stem strongly grooved when old, 1'-3' high. Leaves hastate, 1'-3' long, abruptly narrowed above the middle, acuminate, the nerves on the lower surface slightly scurfy; ocreae brittle and fagacious; racemes mostly panicked, sometimes corymbose, many-flowered, erect or inclined to droop; pedicels as long as the calyx; segments white or whitish; stamens included; style-branches deflexed in fruit; achene acute, 2½' long, about twice as long as the calyx, its faces pinnately-straite when mature, the angles acute, entire.

In waste places, and persistent in fields after cultivation. Reported from almost all parts of the northern United States and southern British America. Native of eastern Europe or western Asia. June-Sept.
2. Fagopyrum Tatricum (L.) Gaertn.
   Tartary Buckwheat.  (Fig. 1317.)


Annual, similar to the preceding species, but the leaves deltoid-hastate or oblong-hastate, often broader than long, 1'–1' wide, acute or short-acuminate at the apex; racemes terminal and axillary, mostly solitary, simple and few-flowered, long-peduncled; flowers whitish, short-pedicelled; achene subacute, 2½' long, its angles crested with 3 prominent lobes above the middle, its faces pinnately sulate from a conspicuous groove.

In waste places, eastern Canada and New England. Adventive from Asia. Summer.


Annual or perennial, terrestrial or aquatic herbs, some species woody, with erect, prostrate, climbing or floating stems, alternate sessile or petioled entire leaves, continuous with, or jointed, to the cylindrical funnelform or two-lobed, often lacerate or fringed ocreae. Flowers small, normally perfect, green, white, pink or purple, variously clustered, the clusters terminal or axillary. Pedicels jointed, subtended by ocreae or ocreolae; calyx 4-5-parted or 4-5-cleft, the outer sepals or segments somewhat larger than the inner; stamens 5–9, included or exserted; filaments filiform, or dilated at the base, glabrous; anthers oblong; style 2-3-parted or 2-3-cleft, its branches included or exserted; stigmas capitate; achene lenticular or 3-angled (rarely 4-angled), invested by or exceeding the calyx. Embryo near the end of the seed, in one of its angles. [Greek, many-knees, from the swollen joints of some species.]

About 200 species, of wide geographic distribution. Besides the following, some 33 others occur in the western and southern parts of North America.

1. Flowers in terminal spicate racemes; calyx 5-cleft or 5-parted; stem not twining.
   Raceme solitary; alpine species; perennial, not aquatic.
   Racemes solitary or 2; aquatic or swamp species; perennials.
   Leaves oblong, elliptic, or elliptic-lanceolate, not acuminated.
   Leaves narrowly lanceolate, or oblong-lanceolate, not acuminated.
   Racemes several or numerous; annuals or perennials, mostly terrestrial.
   Ocreae naked or ciliolate, their limbs not spreading.
   Racemes drooping.
   Achene ovate; style 2-parted to near the base.
   Achene broadly oblong-ovoid; style 2-cleft to below the middle.
   Racemes erect.
   Style-branched scarcely or slightly exserted.
   Achene broadly oblong, biconvex.
   Achene orbicular, flat.
   Style branches long-exserted; achene ovate, somewhat gibbous.
   Ocreae fringed with bristles, their limbs not spreading.
   Racemes not interrupted, erect; achene lenticular or 3-angled.
   Ocreae conspicuously fringed; achene broadly ovate.
   Ocreae inconspicuously fringed; achene narrowly ovate.
   Racemes not interrupted, erect; achene always 3-angled.
   Ocreae conspicuously fringed.
   Ocreae inconspicuously fringed.
   Leaves mostly glabrous above; achene pointed at the top.
   Leaves strigose above; achene pointed at both ends.
   Racemes not interrupted, drooping.
   Racemes interrupted, erect or drooping.
   Achene granular and dull; racemes drooping.
   Achene smooth, shining; racemes erect.
   Ocreae fringed with bristles, their limbs normally spreading.

2. Flowers in long naked much interrupted spicate racemes; calyx 4-parted.

3. Flowers in axillary clusters; stems more or less wiry, not twining.
   Plants prostrate; achene invested by the calyx.
   Achene pointed at the apex, rounded at the base.
   Leaves mostly acute; style 3-parted to the middle.
   Leaves mostly oblanceolate; style 3-parted to the base.
   Achene pointed at both ends.
   Plants prostrate; achene protruding beyond the calyx.
   Leaves mostly longer than the internodes; sea beach species.
   Leaves shorter than the internodes; plant of waste places.

20. *P. arniculare.*
21. *P. littorale.*
22. *P. Bellardi.*
23. *P. maritimum.*
24. *P. Royti.*
Plants erect or ascending, rather stout.
Achene invested by the calyx.
Leaves ovate, oblong or obovate, persistent.
Leaves narrowly lanceolate or linear-oblong, persistent.
Leaves oblong-lanceolate or narrowly obovate, fugacious.
Achene much exserted beyond the calyx.
Plants strictly erect and very slender.
Leaves with a lateral impression on either side of the midvein; fruiting pedicels stout, erect.
Leaves without lateral impressions; fruiting pedicels slender, deflexed.

4. Flowers in axillary and terminal clusters, racemes or panicled racemes; stems mostly twining.

Stems twining; herbaceous vines.
Outer segments of the calyx unchanged, or keeled in fruit.
Achene granular and dull; ocrea not bristly.
Achene smooth and shining; ocrea bristly.
Outer segments of the calyx conspicuously winged in fruit.
Calyx-wings not incised.
Fruiting calyx 5'-6' long, the wings crisped.
Calyx-wings incised.
Stems stout, erect, tall; outer calyx-segments winged in fruit.

5. Flowers in capitulate clusters or racemes; stem climbing by recurved prickles.
Leaves sagittate; achene 3-angled.
Leaves halberd-shaped; achene lenticular.

1. Polygonum viviparum L. Alpine Bistort. (Fig. 1318.)

Perennial by a corn-like rootstock, mostly glabrous and somewhat glaucous; stems solitary or clustered, erect, simple, slender, 2'-10' tall. Basal leaves oblong or lanceolate, 1'-8' long, rather acute at the apex, cordate or subcordate at the base, long-petioled; stem leaves narrowly lanceolate or linear, 1'-3' long, the lower petioled, the upper sessile, their margins often revolute; ocrea long, clasping below, open above; raceme terminal, narrow, rather dense, bearing a number of dark colored bulblets about its base; calyx 5-parted, pale rose-color or white; stamens 8, exserted; style 3-parted, its branches exserted; achene oblong, 3-angled.

Greenland and Labrador to Alaska, south to the high summits of the mountains of New England, and in the Rocky Mountains to Colorado. Also in arctic and alpine Europe and Asia. June-Aug.

2. Polygonum amphibium L. Water Persicaria. (Fig. 1319.)

Aquatic, perennial, glabrous when mature; stem floating or submersed, simple or sparingly branched, 4'-20' long. Leaves oblong, elliptic or elliptic-lanceolate, 11/2'-4' long, petioled, obtuse or subacute at the apex, slightly inequilateral, rounded or narrowed at the base, sometimes ciliate; ocrea cylindric, those of the branches often longer than the internodes, their limbs sometimes spreading, usually glabrous; raceme terminal, usually solitary, 11/2'-1' long, dense, erect, oblong or ovoid; calyx rose-color, 5-parted; stamens 5, exserted; style 2-cleft, exserted; achene orbicular oblong, lenticular, 11/2' long, biconvex, black, smooth and shining, or granular.

In ponds and lakes, Quebec to Alaska, south to northern New Jersey, Kentucky, Colorado and California. Ascends to 2000 ft. in the Adirondacks. Also in Europe. July-Aug.
3. Polygonum Hartwrightii A. Gray. 
Hart Wright's Persicaria. (Fig. 1320.)


Perennial by rootstocks, more or less hispid throughout; stem ascending, decumbent or erect, 6'-2' high, many-jointed, grooved, usually rather stout. Leaves lanceolate, oblong-lanceolate or oblanceolate, 3'-6' long, obtuse or subacute at the apex, short-petioled or sessile; ocrea cylindric, varying from one-half to as long as the internodes, the limb abruptly spreading, fringed with short bristles; racemes usually solitary, dense, 3'-1' long, oblong; calyx rose-colored, 5 parted; stamens 5, exerted; style exerted, 2-cleft to beyond the middle; achene oblong, biconvex, lenticular, black, smooth, shining.

In swamps or moist soil, Hudson Bay to Oregon, south to southern Pennsylvania, Kansas, Nevada and Lower California. June-Aug.

4. Polygonum emersum (Michx.) Britton. 
Swamp Persicaria. (Fig. 1321.)


Perennial by long creeping or horizontal rootstocks, glabrous or strigose-pubescent; stem erect or assurgent, commonly simple, channeled, enlarged at the nodes, 1'-3' high. Leaves ovate-lanceolate or oblong-lanceolate, or the upper sometimes narrowly lanceolate, 2½'-8' long; acute or usually acuminate at the apex, rounded or cordate at the base, petioled, the lateral nerves prominent, sometimes forking; ocrea cylindric, becoming loose, not ciliate; racemes 1 or 2, erect, 1'-3' long, linear-oblong, dense, calyx dark rose-color, 5 parted; stamens 5, exerted; style 2-cleft, exerted; achene broadly obovate or orbicular, 1½'' long, very convex, lenticular, black and slightly granular, but shining.

In swamps and moist soil, Ontario to Northwest Territory and British Columbia, south to Virginia, Louisiana and Mexico. Ascends to 3000 ft. in Virginia. July-Sept.

5. Polygonum Portoricense Bertero. 
Dense-flowered Persicaria. (Fig. 1322.)


Polygonum Portoricense Bertero; Meisn. in DC. Prodr. 14: 121. 1856.

Perennial, more or less scurfy; stem erect, decumbent or floating, 3'-5' long or longer, branched, enlarged at the nodes, often dark brown. Leaves lanceolate or linear-lanceolate, 1½'-12' long, acuminate at both ends, obscurely punctate, short-petioled, the nerves prominent beneath; ocrea cylindric, sometimes bristly when young, naked when mature, sometimes hispid; racemes spicate, paniculate, often in pairs, 1'-5' long, dense, erect; calyx white or whitish, 5 parted to near the base; stamens 6-8, included; style 2-3-cleft, somewhat exerted; achene lenticular and strongly biconvex or 3-angled, 1½'' long, broadly oblong, orbicular or even broader than high, black, smooth and shining, or minutely granular.

In wet soil, Missouri to Florida, Texas, the West Indies and South America. May-Nov.
6. Polygonum incarnatum Ell. Slender Pink Persicaria. (Fig. 1323.)


Annual, glabrous or nearly so, stem erect, simple or branched above, more or less swollen at the nodes, 2°–1° tall. Leaves lanceolate, 3′–9′ long, ½′–1½′ wide, acuminate at both ends, short-petioled, sparingly punctate and ciliate; ocreae cylindric, long, loose, brittle, sometimes ciliate when young, glabrous when mature; racemes panicked, drooping, 1½′–4′ long, linear, many-flowered; calyx white or pink, small, 5-parted; stamens 6; style 2-parted to near the base; achene ovoid-oblong, lenticular, about 1′ long, flat or biconcave, smooth, shining.

In wet soil, Vermont to Illinois, south to Florida and Louisiana. June–Sept.

7. Polygonum lapathifolium L. Dock-leaved or Pale Persicaria. (Fig. 1324.)

*Polygonum lapathifolium* L. Sp. Pl. 360. 1753.

Annual, stem simple or much branched, erect or ascending, swollen at the nodes, 1°–3° high, the peduncles and pedicels glandular. Leaves lanceolate or oblong-lanceolate, 2′–10′ long, usually broader than those of the preceding, attenuate to the apex, acuminate at the base, short-petioled, ciliate, inconspicuously punctate; ocreae cylindric, ribbed or striate; racemes panicked, 1′–4′ long, drooping, narrow, rather dense; calyx pink, greenish or white, 5-parted; stamens 6; style 2-parted to below the middle; achene broadly oblong or ovoid, lenticular, 1′ long, brownish or black, slightly reticulated but shining, its faces concave.


Generally robust and glabrous; stem stout, reddish, purple spotted and with a purple ring below each ocrea, much thickened at the nodes; leaves conspicuously punctate; racemes 1′–3′ long, less drooping, often erect; achene slightly larger. Occasional in the range of the type.

*Polygonum lapathifolium incarnatum* (Schmidt) Koch, Syn. Fl. Germ. 711. 1837.

*Polygonum incarnatum* Schmidt, Fl. Boem. 4: 90. 1755.

Low, stem slender, erect, 2′–12′ high, slightly scurfy; leaves lanceolate, ovate or oblong, usually narrowed at the base, white-tomentose beneath, glabrous above; racemes ½′–1½′ long. In waste places, Nova Scotia to Ontario, New York and British Columbia.

8. Polygonum Pennsylvanicum L. Pennsylvania Persicaria. (Fig. 1325.)


Annual, glabrous below; stem erect, simple or branched, 1°–3° tall, the upper parts, the peduncles and pedicels glandular. Leaves lanceolate, acuminate at the apex, petioled, ciliate, 2′–11′ long, the upper sometimes glandular beneath; ocreae cylindric, thin, naked, glabrous; racemes panicked, erect, thick, oblong or cylindric, dense, 1′–2′ long; calyx dark pink or rose-color, 5-parted; stamens 8 or fewer; style 2-cleft to about the middle; achene orbicular or mostly broader than high, 1½′ long, short-pointed, lenticular, smooth, shining.

9. Polygonum longistylum Small. Long-styled Persicaria. (Fig. 1326.)


Annual or perennial, glabrous except the glandular upper branches and peduncles; stem erect, rather slender, 1°-3° tall, becoming somewhat woody below. Leaves lanceolate or ovate-lanceolate, 1'-6' long, acuminate at both ends, petioled, their margins undulate, slightly crisped, more or less ciliate; ocrea cylindric, entire, brittle, soon falling away; racemes panicled, sometimes geminate, 1'-4' long, rather dense, erect; calyx lilac, 5-parted to below the middle, the lobes petaloid; stamens 6-8, included; style 2-parted, slender, conspicuously exserted; stigmas black; achene broadly ovate, lenticular, slightly gibbous on both sides, long-pointed, black, granular, but somewhat shining, 1¼" long.


10. Polygonum Persicaria L. Lady's Thumb. (Fig. 1327.)


Annual, glabrous or puberulent; stem erect or ascending, simple or much branched, ½°-2° high. Leaves lanceolate or linear-lanceolate, 1'-6' long, short-petioled or nearly sessile, acuminate at both ends, conspicuously punctate, usually with a dark triangular or lunar blotch near the centre, their margins entire or slightly eroded, often ciliate; ocrea cylindric, nearly glabrous, fringed with short bristles; racemes solitary or panicled, ½'-2' long, ovoid or oblong, dense, erect; calyx pink or dark purple; stamens mostly 6; style 2-3-parted to below the middle; achene broadly ovate and lenticular, often gibbous or 3-angled, 1¼'-1½" long, smooth and shining.


11. Polygonum persicarioides H.B.K.

Southwestern Persicaria. (Fig. 1328.)


Perennial, glabrous or minutely pubescent; stem erect, decumbent or creeping, simple or branched, 1°-3°. Leaves lanceolate or linear-lanceolate, acuminate at both ends, punctate, short-petioled or subsessile, ½'-1½' long; ocrea cylindric, glabrous or sparingly strigillose, fringed with short bristles; spicate racemes more or less panicled, erect, 1'-3' long, narrowly oblong or linear, loosely-flowered; calyx rose-color tinged with green, 5-parted to below the middle; stamens 8 or fewer, included; style 2-3-parted to near the base; achene lenticular and biconvex, or 3-angled, more or less gibbous, 1½" long, ovoid or broadly oblong, short-pointed, black, minutely granular, but shining.

Nebraska to Mexico; widely distributed in tropical America. June-Sept.
12. Polygonum Careyi Olney. Carey's Persicaria. (Fig. 1329.)


Annual, rough-glandular throughout, stem erect, 1°-3° tall, simple or sparingly branched above. Leaves oblong-lanceolate or linear-lanceolate, the uppermost nearly linear, 2°-11° long, short-petioled or nearly sessile, acuminate at both ends, hispid on the midrib, ciliate, sparingly punctate; ocreae cylindric, sparsely hispid, fringed with long bristles; racemes several, narrow, terminal, loosely-flowered, drooping, 1°-2½° long; calyx purplish; stamens 5 or sometimes 8; style 2-parted to below the middle; achene lenticular, broadly ovoid or obvoid, 1½''-1½'' long, short-pointed, thick, smooth and shining.


13. Polygonum setaceum Baldw. Bristly Persicaria. (Fig. 1330.)


Perennial, glabrous or strigose-pubescent above, stem 2°-4° high, erect, simple or sparingly branched; leaves lanceolate or oblong-lanceolate, 2°-9° long, mostly short-petioled, acuminate at both ends, ciliate, inconspicuously punctate; ocreae cylindric, long, strigose, fringed with very long bristles; racemes few, terminal, 1°-2½° long, erect, linear-oblong, sometimes geminate, rather loosely flowered; calyx white or pink; stamens 8; style 3-parted to below the middle; achene 3-angled, oblong or obvoid, short, thick-pointed, ½''-2½'' long, minutely reticulated and rather dull, or smooth and shining.

In swamps, southern Missouri to Louisiana, east to North Carolina and Florida. June-Sept.

14. Polygonum Opelousanum Riddell. Opelousas Persicaria. (Fig. 1331.)


Perennial, glabrous or nearly so throughout, stem slender, erect or ascending, sparingly or considerably branched, 1°-3° tall, becoming woody below. Leaves linear or linear-lanceolate, 1½''-5'' long, sessile, ciliate; ocreae cylindric, strigose, fringed with long bristles; spicate racemes panicled, erect, often geminate, ½''-2' long, not densely flowered; calyx white, pedicelled, 5-parted to below the middle; stamens 8 or fewer, included; style deeply 3-parted; achene 3-angled or rarely 4-angled, broadly ovoid or obvoid, ¾'' long, black, smooth and shining.

Missouri to Louisiana, Texas and Mexico. July-Sept.
15. Polygonum hydropiperoides Michx. Mild Water Pepper. (Fig. 1332.)


Perennial, glabrous or strigillose, stem erect, decumbent or prostrate, simple or branched above, slender, 1°-3° long. Leaves narrowly lanceolate or oblong-lanceolate, varying to linear-lanceolate, 2'-6' long, short-petioled, acute at apex, ciliate, pubescent with appressed hairs on the midrib beneath; ocreae cylindrical, loose, striigose, fringed with long bristles; racemes panicked terminal, erect, narrow, more or less interrupted, 11/2'-3' long; calyx pink or greenish; stamens 8; style 3-parted to below the middle; achene 3-angled, ovoid or oblong, 1'/4'-1'/2' long, smooth, shining.

In swamps and wet soil. New Brunswick to Minnesota and California, south to Florida and Mexico. June-Sept.


More robust than the type, stem 2'-3' long, clothed with stout appressed hairs; leaves lanceolate, obtuse; ocreae more or less ciliate; calyx white or whitish, often conspicuous. Quebec to West Virginia and Indiana. Also in California.

16. Polygonum Hydrópiper L. Smart-weed. Water Pepper. (Fig. 1333.)


Annual, glabrous, stem erect, simple or branched, red or reddish, sometimes green, 8'-24' tall. Leaves lanceolate or oblong-lanceolate, 1'-4' long, short-petioled, acute or acuminate at the apex, undulate or slightly crisped, punctate, ciliate, very acrid, ocreae cylindrical, fringed with short bristles, sometimes slightly pubescent, usually swollen at the base by the development of several flowers within; racemes panicked, 1'-3' long, narrow, drooping, interrupted; calyx green, 3-5-parted (usually 4-parted) conspicuously punctate; stamens 4 or sometimes 6; style short, 2-3-parted; achene lenticular or 3-angled, broadly oblong or ovoid, slightly gibbous, 1'/4''-1'/2'' long, granular, dull.

In moist waste places, almost throughout North America. Naturalized from Europe in our area, perhaps indigenous in the far Northwest. July-Sept.

17. Polygonum punctátum Ell. Dotted or Water Smart-weed. (Fig. 1334.)


Annual or perennial, glabrous or very nearly so, stem erect or ascending, rarely prostrate, simple or branched, 1°-3° long. Leaves lanceolate or oblong-lanceolate, 1'-8' long, acuminate at both ends, petioled, ciliate, conspicuously punctate, acrid, the midrib often with a few scattered hairs; ocrea cylindrical; falling away at maturity; fringed with long bristles; racemes terminal, narrow, erect or slightly drooping; loosely flowered, 1/2'-3' long; calyx greenish; stamens 8; style 2-3-parted to the base; achene oblong, short, thick, lenticular or 3-angled 1'/4'' long, smooth, shining.

In swamps and wet places, throughout North America except the extreme north. June-Oct.


*Polygonum acre* var. leptostachyum Meisn. in DC. Prodr. 14: 108. 1856.

Rather smaller; stem slender, 1°-2° long; leaves narrower; racemes very slender and much in-
terrated, clustered at the summit; achene about 1" long, oblong, shining. Vermont to California, south to Florida and Mexico.


Larger and stouter than the type, leafy; stem 2°-5° tall, conspicuously enlarged at the nodes; leaves 2'-8' long; racemes thicker, 1'-4' long, interrupted below; achene 1½' long, slightly granular, somewhat obovoid; calyx-segments white. Massachusetts to Florida, near the coast.

18. **Polygonum orientale** L. Prince's Feather. (Fig. 1335.)


Annual, more or less hispid, stem erect, 1°-8° tall, branched. Leaves ovate or broadly oblong, 3'-12' long, petioled, acuminate at the apex, ciliate; petioles slightly winged; ocrea cylindric, loose, with or without a spreading border, ciliate; racemes panicked, oblong-cylindric, 1'-4' long, dense, drooping; flowers large for the genus, calyx dark rose-color or crimson; stamens 7, exserted; style 2-cleft to above the middle, included; stigmas large; achene orbicular or broader than long, lenticular, flat, nearly 1½" in diameter, finely reticulated and rather dull.


19. **Polygonum Virginianum** L. Virginia Knotweed. (Fig. 1336.)


Annual, nearly glabrous or strigose-pubescent, stem erect or arching, simple or branched above, 1°-4° tall. Leaves ovate or elliptic-ovate or ovate-lanceolate, short-petioled, acuminate at the apex, 2°-5° long, sparingly ciliate; ocrea cylindric, strigose, fringed with short bristles; racemes spicate, erect, terminal and axillary, naked, greatly elongated and interrupted, sometimes 12' long; calyx curved, greenish or rose-color, 4-cleft; stamens 5; style long, exserted, 2-parted to the base, its branches at length curled; achene 2° long, ovate-oblong, lenticular, strongly biconvex, dark brown or cream-colored, smooth, shining.

In woods, Nova Scotia to Minnesota, south to Florida and Texas. Ascends to 4000 ft. in North Carolina. July-Nov.

20. **Polygonum aviculare** L. Knot-grass. Door-weed. (Fig. 1337.)


Annual or commonly perennial, slender, glabrous, dull green or bluish green, stem prostrate or ascending, simple or branched, 4'-2° long. Leaves oblong, linear or oblanceolate, 3'-10" long, nearly sessile or short-petioled, jointed to the ocrea, narrowed at the base, usually acute at the apex, not conspicuously veined; ocrea oblique, silvery, 2-parted or at length lacerate; clusters axillary, 1-5-flowered; flowers small, short-pedicelled; calyx green, 5-parted, the lobes with white or pink borders; stamens 5-8; style short, 3-parted to near the base; achene 3-angled, ovoid, 1° long, acute, reticulated.

POLYGONACEAE.

21. Polygonum littorale Link. Shore Knotweed. (Fig. 1338.)


Annual or perennial, stout, glabrous, bright green or slightly glaucous, stem 1'-4' long, prostrate or ascending, diffusely branched from a woody base, striate. Leaves oblong, oblong-lanceolate or oblanceolate, 2'-9' long, obtuse or subacute at the apex, mostly acuminate at the base, prominently veined, often crisped, jointed to the ocreae; ocreae oblique, 2-parted, at length lacerate; flowers axillary, 2-6 in each cluster; calyx green, its lobes whitish-margined or carmine; stamens 8; style short, 3-parted to the base; achene broadly ovoid, 3-angled, 1'/4' long, more or less narrowed at the base and apex.


22. Polygonum Bellardi All. Bellard’s Knotweed. (Fig. 1339.)

Polygonum Bellardi All. Fl. Ped. 2: 205. pl. 90. f. 2. 1783.

Annual, dingy green, stem slender, prostrate or spreading, 1'-3' long, simple or diffusely branched, striate. Leaves oblong-lanceolate or linear-lanceolate, short-petioled, 2'-20' long, acute at the apex, acuminate at the base, distant, prominently veined beneath, jointed to the ocreae; ocreae oblique, silvery, slightly lacerate when young, becoming much incised when old; flowers 1-3 together in the axils; calyx green, its lobes white-margined; stamens 8; style 3-parted to the base, very short; achene ovoid or oblong-ovoid, 3-angled, rather pointed at both ends, 1'/4' long, reticulated and rather dull.

In waste grounds, Washington, D. C. Adventive from eastern Europe or western Asia.

23. Polygonum maritimum L. Seaside Knotweed. (Fig. 1340.)


Perennial or sometimes annual, glaucous, glabrous, root usually deep, woody, stem prostrate or ascending, branched, 8'-20' long, deeply striate. Leaves ovate or oblong, mostly equaling or longer than the internodes, 3'-12' long, fleshy, veined beneath, somewhat rugose above, conspicuously jointed to the ocreae, the margins often revolute; ocreae large, silvery, 2-parted or at length lacerate, becoming brown at the base; flowers 1-3 together in the axils, becoming slender-pedicelled; calyx white or pinkish; stamens 8; style short, 3-parted; achene 3-angled, ovoid or narrowly ovoid, 1'/4' long, acute or acuminate, smooth, shining, longer than the calyx.

In sands of the seashore, Maine to Florida. Also on the coast of Europe. July-Sept.
24. *Polygonum Rayi* Babingt. Ray's Knotweed. (Fig. 1341.)


Perennial or annual, glabrous, slightly glaucous, stem 3'-24" long, prostrate, usually much branched, striate. Leaves ovate-lanceolate or oblong, 3'/-15" long, short-petioled, acute or obtusish at the apex, veined beneath, inconspicuously so above, shorter than the internodes, inconspicuously jointed to the ocreae; ocreae 2-parted, becoming lacerate, silvery, brown and glaucous at the base when old; flowers 2-4 together in the axils; stamens 5 or 6; style short, 3-parted to the base; achene ovoid, 3-angled, 2'/-3" long, slightly granular but shining, much exceeding the calyx.

In waste places, New Brunswick and Prince Edward Island to British Columbia, south along the Atlantic Coast to Virginia. Naturalized from Europe? May-Sept.

25. *Polygonum erectum* L. Erect Knotweed. (Fig. 1342.)


Annual, glabrous, stem erect or ascending, 8'-2° high, terete, nearly simple or much branched. Leaves oval, oblong or obovate, subsessile or short-petioled, 3'/-18" long, obtuse or subacute at the apex, conspicuously jointed to the ocreae; ocreae oblique, funnelform, soon lacerate, silvery when young; flowers 1-2 together in the axils; calyx greenish, enlarged in fruit; stamens 6 (sometimes 5) style very short, 3-parted to near the base; achene ovoid-pyramidal, 3-angled, 1½" long, reticulated and dull, invested by the calyx, or the apex slightly protruding.

In moist or dry soil, Ontario to the Northwest Territory, Tennessee and Arkansas. July-Sept.

26. *Polygonum exsertum* Small. Long-fruited Knotweed. (Fig. 1343.)


Annual, glabrous, sometimes slightly glaucous, stem slender, brownish, erect or nearly so, conspicuously striate, branched, 1½'-3° tall. Leaves lanceolate, rarely oblanceolate, 1½'-1½" long, acute or cuspidate at the apex, acuminate at the base, nearly sessile; ocreae 2-4-parted when young, soon lacerate, silvery, becoming brownish; calyx greenish, or white, 6-parted to near the base; stamens 5 or 6, included; style 3-cleft or 3-parted, very short; achene 3-angled, narrowly pyramidal, 2½'-3½" long, more or less constricted above the middle, chestnut-brown, smooth, shining, 2-3 times as long as the calyx, at length twisted.

27. Polygonum ramosissimum Michx. Bushy Knotweed. (Fig. 1344.)


Annual, bright green or yellowish green, glabrous, stem erect or ascending, usually very much branched, slender, striate, usually rigid, 4'-4° tall. Leaves lanceolate or linear-oblong, short-petioled, 3'-20' long, acuminate at both ends, persistent, conspicuously jointed to the ocreae; ocrea oblique, funnelform, few-nerved, becoming deeply lacerate; flowers several together in the axillary clusters, short-pedicelled; calyx 5-6-parted, greenish-white; stamens 6 or fewer; style very short, 3-parted to the base; achene 3-angled, acute, sometimes slightly protruding beyond the calyx, nearly 11/2" long, black, reticulated, dull.

In saline soil, Minnesota to the Northwest Territory, New Mexico and California, and on the Atlantic coast from Maine to New Jersey. July-Sept.

28. Polygonum camporum Meisn. Prairie Knotweed. (Fig. 1345.)

_P. camporum_ Meisn. in Mart. Fl. Bras. 5: 21. 1855.

Annual or perennial, glabrous, stem mostly erect, slightly striate, much branched, sometimes slightly glaucous, 2°-3° tall. Leaves linear-lanceolate or oblong, soon falling away, subsessile, rather obtuse at the apex, veined beneath, 3'-12' long; ocreae funnelform, early lacerate and fugacious, dark brown; flowers several together in the axillary clusters, slender pedicelled; pedicels short; stamens 6; style short, 3-parted; achene pyramidal-ovoid, 3-augled, black, nearly 11/2" long, smooth, shining.

On prairies, Nebraska to Louisiana and New Mexico. Also in South America. July-Sept.

29. Polygonum tenuum Michx. Slender Knotweed. (Fig. 1346.)


Annual, glabrous, somewhat rough about the nodes, stem very slender or filiform, erect, simple or branched, somewhat 4-angled, 4'-12' tall. Leaves linear or linear-lanceolate, sessile, acuminate at the apex, 2'-12' long, articulated to the ocreae, 1-ribbed with a lateral impression on each side of the rib, the margins minutely scabrous or serrulate; ocrea funnelform, soon lacerate; flowers several in the axillary clusters, green, subsessile; calyx-lobes whitish; stamens 6; style 3-parted nearly to the base, its branches diverging; fruit erect; achene 3-angled, black, 1'/11'-11/2' long, reticulated on the angles, the centre of its faces smooth.

BUCKWHEAT FAMILY.

30. Polygonum Douglasii Greene.
Douglas' Knotweed. (Fig. 1347.)


Annual, similar to the preceding species, glabrous, somewhat rough at the nodes, sometimes slightly glaucous, stem erect, 8'-18' tall, simple or usually much branched, almost terete. Leaves oblong or narrowly lanceolate, ½'-2' long, subsessile, rather thin, flat or revolute, with no lateral impressions parallel to the mid-rib; ocreae oblique, short, soon lacerate; clusters axillary, several-flowered; the flowers and fruit deflexed; calyx green with white or rose-colored margin; stamens 8; style 3-parted; achene 3-angled, 1½'-2' long, oblong or ovoid-oblong, black, smooth and shining.

Northwest Territory and British Columbia to New Mexico and Indian Territory, east through Ontario to northern New York and Vermont. June-Sept.

31. Polygonum Convulvulus L. Black Bindweed. (Fig. 1348.)


Annual, glabrous, scurfy, stem twining or trailing, 6'-3° long, mostly branched, the internodes elongated. Leaves ovate-sagittate or the uppermost lanceolate-sagittate, long-petioled, acuminate at the apex, slightly ciliate, ½'-3' long; ocreae oblique, short, on the margin; axillary clusters or racemes loosely flowered; flowers greenish, pendulous on slender pedicels; calyx 5-parted, closely investing the achene, the outer lobes slightly or not at all keeled; stamens 8; style short, nearly entire; stigmas 3; achene 3-angled, obovoid-pyramidal, 1½'' long, thick-pointed, black, granular, rather dull.


32. Polygonum cilinoda Michx.
Fringed Black Bindweed. (Fig. 1349.)


Perennial, sparingly pubescent, stem red or reddish, twining or prostrate, 1°-10° long. Leaves broadly ovate or somewhat hastate, acuminate at the apex, cordate at the base, rather long-petioled, undulate, finely ciliate, 1'-4' long, or the upper smaller; ocreae small, armed with reflexed bristles near the base; racemes mostly panicled, axillary and terminal, interrupted; calyx whitish; style short, 3-parted to the base; achene 3-angled, oblong-pyramidal or ovoid, nearly 1½'' long, very smooth and shining.

33. Polygonum scandens L. Climbing False Buckwheat. (Fig. 1351.)

Perennial, glabrous, stem climbing, 2°-20° long, rather stout, striate, branched, rough on the ridges. Leaves ovate, acuminate, cordate at the base, 1'-6' long or the upper smaller, the larger long-petioled, finely punctate, the margins scabrous; ocreae oblique, smooth and glabrous; racemes usually numerous and panicked, interrupted, leafy, 2'-8' long; flowers yellowish-green, long-pedicelled; calyx 5-parted, the three outer segments very strongly winged and decurrent on the pedicels, especially in fruit; stamens 8; style almost none; stigmas 3; fruiting calyx 5'-6' long, the wings crisped, not incised; achene 2'-2 1/2' long, 3-angled, rather blunt at both ends, smooth, shining.

In woods and thickets, Nova Scotia to Ontario and the Rocky Mountains, south to Florida, Nebraska and Texas. Aug.-Sept.

34. Polygonum dumetorum L. Copse or Hedge Buckwheat. (Fig. 1350.)

Perennial, glabrous, similar to the preceding species, stem extensively twining, 2°-12° long, striate, much branched. Leaves ovate or somewhat hastate, and sometimes inequilateral, acuminate at the apex, cordate at the base, 1'-2 1/2' long, long petioled, or the upper smaller and nearly sessile; ocreae oblique, smooth; racemes mostly axillary, numerous, much interrupted, leafy-bracted, 2'-5' long; flowers yellowish-green, pendulous; calyx 5-parted, the three outer segments winged or keeled and much enlarged in fruit; stamens 8; style short, 3-parted; fruiting calyx 3'-4' long, the wings nearly flat, not incised; achene oblong, 3-angled, 2'-long, inclined to be pointed at both ends, black, smooth, shining.

Prairies of Illinois and about St. Louis, Mo. Also in the vicinity of Knoxville, Tenn. Naturalized from Europe? July-Sept.

35. Polygonum cristatum Engelm. & Gray. Crested False Buckwheat. (Fig. 1352.)

Perennial, scurfy, stem slender, twining, 2°-10° long, more or less branched. Leaves triangular or ovate, 1'-5' long, acuminate at the apex, undulate, truncate or cordate at the base, rather long-petioled; ocreae cylindric-funnel-form; flowers in axillary simple or compound often naked racemes 1'-5' long; pedicels about 2 1/2' long, jointed near the middle; calyx greenish-white, 2'-2 1/2' long, 5-parted to near the base, the 3 outer segments keeled and at maturity winged; stamens 8, included; style none; stigmas 3; fruiting calyx 3'-4' long, its wings incised; achene 3-angled, oblong, black, smooth, shining, about 1 1/2' long.

Sandy woods and rocky banks, southern New York to Georgia, the Indian Territory and Texas. Aug.-Oct.
36. *Polygonum Zuccarini* Small. Japanese Knotweed. (Fig. 1353.)


Perennial, glabrous, more or less scurfy, stem stout, erect, woody below, terete or slightly angled, much branched, 4°-8° tall. Leaves oblong-ovate or ovate-lanceolate, petioled, 2'-6' long, acuminate-cuspidate at the apex, truncate or subcordate at the base, reticulate-veined on both surfaces, their margins undulate; ocrea oblique, smooth, fugacious; racemes mostly terminal, panicled, 2'-4' long, or axillary, many-flowered, more or less pubescent; flowers greenish-white, long-pedicelled; outer segments of the 5-parted calyx very broadly winged in fruit; stamens 8; style 3 parted; achene 3-angled, narrowly oblong or oblong-pyramidal, 1¾"-1⅞" long, black, smooth, shining.


37. *Polygonum sagittatum* L. Arrow-leaved Tear-thumb. (Fig. 1354.)


Annual, light green, stem slender, weak, decumbent, or climbing over other plants by the abundant sharp recurved prickles which arm its 4 prominent angles. Leaves lanceolate-sagittate or oblong-sagittate, ½'-3' long, obtuse or acute at the apex, slightly rough on the margins, the lower petiolated, the upper subsessile; petioles and lower surface of the midribs prickly; ocrea oblique, not ciliate, fringed at the base by a few bristle-like prickles; flowers in rather dense terminal heads or racemes; calyx greenish or rose-colored; stamens usually 8; style 3-parted to below the middle; achene 3-angled, oblong-pyramidal, thick-pointed, 1½" long, dark red, smooth, shining.

In wet soil, Newfoundland and Nova Scotia to the Northwest Territory, south to Florida and Kansas. Ascends to 3000 ft. in Virginia. July-Sept.

38. *Polygonum arifolium* L. Halberd-leaved Tear-thumb. (Fig. 1355.)


Perennial, stem ridged, reclining, 2'-6' long, the ridges armed with recurved prickles. Peduncles and pedicels glandular or pubescent; leaves broadly hastate, long-petioled, 1'-10' long, pubescent or glabrous beneath, the apex and basal lobes acuminate; petioles and stronger nerves prickly; ocrea oblique, fringed at the summit with short bristles and at the base with slender prickles; flowers in terminal and axillary heads or racemes; calyx rose-color or greenish, 4-parted; stamens 6; style 2-parted. Achene lenticular, broadly obovate, 2½" long, strongly biconvex, dark brown, smooth, shining.

In moist or wet soil, New Brunswick and Ontario to Minnesota, south to South Carolina. July-Sept.

Annual or perennial glabrous herbs, sometimes slightly wooly, with erect branched usually conspicuously jointed stems, alternate narrow leaves articulated to the naked ocreae, and small white or greenish flowers in slender panicled racemes. Calyx unequally 5-parted, persistent, its segments petaloid, loosely investing the achene or its base in fruit, the three inner calyx-segments often winged. Stamens 8, included; filaments filiform, or much dilated or auricled at the base; anthers oblong, small. Style 3-parted, short or almost wanting; stigmas capitate; ovary 1-celled, ovulate solitary. Achene 3-angled, smooth. Embryo slender, nearly straight, situated in one of the angles of the seed. [Diminutive of Polygonum.]

Five or six species, natives of North America.

Annual; inner sepals not winged in fruit; pedicels reflexed.
Perennial; inner sepals winged in fruit; pedicels divergent.

1. Polygonella articulàta (L.) Meisn. Coast Jointweed. (Fig. 1356.)

Annual, glaucous, stem slender, wiry, erect or sometimes diffusely spreading, simple or branched, striate or slightly angled, 4'—10' long. Leaves linear or linear-subulate (apparently filiform from the revolute margins), sessile, 4''—20'' long, jointed to the summits of the ocreae, cylindric, slightly expanded at the summit; racemes numerous, erect, many-flowered, t'—132'' long; ocrealae crowded or imbricated; pedicels reflexed; calyx-segments white with a dark midrib, loosely investing the achene, not winged in fruit; achene narrowly ovoid-pyramidal, pointed, 1'' long, brown, smooth, shining.

In sands of the seashore and sandy soil along the coast, Maine to Florida, and on the shores of the Great Lakes. July—Oct.

2. Polygonella Americàna (F. & M.) Small. Southern Jointweed. (Fig. 1357.)

Perennial by a long slender root, slightly glaucous, stem erect or ascending, wiry, somewhat flexuous, 1½°—4° high, simple or slightly branched, covered with a ridged more or less scaly bark. Leaves linear or linear-spatulate, ½''—1'' long, often fascicled on short branches, sessile, rather fleshy, obtuse and revolute at the apex; ocrea scariosus-margined, split on one side; racemes 1'—3' long, dense, divergent; calyx white or pink, its three inner segments developing orbicular cordate wings, the two outer reflexed in fruit; pedicels divergent, jointed below the middle; achene elliptic-oblong, 1½'' long, chestnut-brown, pointed at both ends, smooth, shining.

In dry soil, Missouri to Texas, east to Georgia and Alabama. Aug.—Oct.

8. BRUNNÍCHIA Banks; Gaertn. Fl. & Sem. 1: 213. pl. 45. f. 2. 1788.

Perennial, glabrous herbs with elongated, grooved much branched stems climbing by tendrils at the ends of the branches, and alternate entire broad cordate petioled leaves, the ocreae obscure or wanting, and small perfect flowers in panicled terminal and axillary racemes, the flowers fascicled in the axils of lanceolate-subulate bracts. Pedicels slender, jointed near the base. Calyx 5-parted, much enlarged, coriaceous and winged on one side in fruit, closely investing the achene, the segments spreading when fresh, converging when dry. Stamens 7—10, mostly 8; filaments filiform, much dilated at the base; anthers ovate-
oblong. Style 3-parted, the stigmas 2-cleft at the summit; ovary imperfectly 2-celled; ovule solitary, pendulous. Achene 3-angled. Seed irregularly 6-grooved, the embryo in one of its angles. [Name in honor of M. T. Brunnich, Norwegian naturalist.]

Two known species, the following of southeastern North America, the other of tropical Africa.

1. Brunnichia cirrhosa Banks. Brunnichia. (Fig. 1358.)

Brunnerichia cirrhosa Banks; Gaertn. Fr. & Sem. i. 213. pl. 45, f. 2. 1788.

Stem 6°-20° long, somewhat woody, rather tough, slender, grooved. Tendrils numerous, filiform; leaves ovate or ovate-lanceolate, acute or acuminate at the apex, truncate or subcordate at the base, 1'-6' long, petioloed, slightly pubescent beneath; ocreae obsolete or represented by a ring of short bristles; racemes 2'-6' long; flowers in fascicles of from 2-5; calyx campanulate, 3'-4' long, greenish, 5-parted, its base strongly winged along one side; stamens exerted; achene oblong-ovoid, 3' long; brown, smooth, closely invested by the persistent and coriaceous calyx which becomes 1' or more in length.

On banks of streams, southern Illinois to Arkansas, east to South Carolina and Florida. May-June. Fruit mature in August.

Family 15. CHENOPODIACEAE Dumort. Anal. Fam. 15. 1829.

GOOSEFOOT FAMILY.

Annual or perennial herbs, rarely shrubs, with angled striate or terete stems. Leaves alternate or sometimes opposite, exstipulate, simple, entire, toothed or lobed, mostly petioloed (in Salicornia reduced to mere ridges). Flowers perfect, pistillate, polygamous, monoecious or dioecious, small, green or greenish, regular or slightly irregular, variously clustered, commonly in panicked spikes, bractless or bracteolate, occasionally solitary in the axils. Petals none. Calyx persistent, 2-5-lobed, 2-5-parted or rarely reduced to a single sepal, wanting in the pistillate flowers of some genera. Stamens as many as the lobes or divisions of the calyx, or fewer, and opposite them; filaments slender; anthers 2-celled, longitudinally dehiscent. Disk usually none. Ovary mostly superior and free from the calyx, 1-celled; ovule solitary, amphitropous; styles 1-3; stigmas capitate, or 2-3-lobed or divided. Fruit a utricle, with a thin or coriaceous pericarp. Seed vertical or horizontal; endosperm mealy, fleshy or wanting; embryo partly or completely annular or conduplicate, or spirally coiled.

About 75 genera and 550 species, of wide geographical distribution.

* Embryo annular or conduplicate, not spirally coiled; endosperm copious (except in Salicornia). Leafy herbs; endosperm copious.

Fruit enclosed by or not longer than the calyx or bractlets.

Flowers perfect or some of them pistillate; calyx herbaceous or fleshy.

Calyx 2-5-lobed or 2-5-parted; stamens 1-5.

Fruiting calyx wingless, its segments often keeled.

Calyx herbaceous or but slightly fleshy in fruit; flowers in panicked spikes.

Fruiting calyx dry, strongly reticulated; leaves pinnatifid.

Calyx very fleshy and bright red in fruit; flowers densely capitate.

Fruiting calyx horizontally winged.

Calyx of 1 sepal; stamen 1.

Flowers monoecious or dioecious; calyx of pistillate flowers none; fruit enclosed by 2 bractlets.

Bractlets flat or convex, not silky.

Bractlets silky-pubescent, conduplicate.

Flowers perfect; calyx membranous; leaves filiform-linear.

Fruit much exerted beyond the calyx.

Leafless fleshy herbs with opposite branches; endosperm none.

** Embryo spirally coiled; endosperm little or none.

Shrub; flowers monoecious, not bracteolate.

Herbs; flowers perfect, bracteolate.

Fruiting calyx wingless; leaves fleshy, not spiny.

Fruiting calyx bordered by a thin horizontal wing; leaves very spiny.

1. Chenocephalis.
2. Roubieva.
5. Monolophis.
6. Atriplex.
7. Eruopotis.
8. Kochia.
10. Salicornia.
11. Sarcobatus.
12. Dondia.
13. Salvola.

Annual or perennial, green and glabrous, white-mealy or glandular-pubescent herbs, with alternate petioled entire subulate-dentate or pinnately lobed leaves. Flowers very small, green, perfect, sessile, bractless, clustered in axillary or terminal, often panicled or compound spikes. Calyx 2-5-parted or 2-5-lobed, embracing or enclosing the utricle, its segments or lobes herbaceous or slightly fleshy, often keeled or ridged. Stamens 1-5; filaments filiform or slender. Styles 2 or 3; seed horizontal or vertical, sometimes in both positions in different flowers of the same species, firmly attached to or readily separable from the pericarp; endosperm mealy, farinaceous; embryo completely or incompletely annular. [Greek, goose-foot, from the shape of the leaves.]

About 60 species, mostly weeds, of wide geographic distribution. Besides the following, some 5 others occur in the western parts of North America.

\* Embryo a complete ring.

Leaves white-mealy on the lower surface.
Leaves or some of them subulate-toothed or lobed.
Sepals strongly keeled in fruit.
Pericarp firmly attached to the seed; stem erect, tall.
Pericarp readily detached from the seed; stem low.
Sepals not keeled in fruit; stem decumbent.
Leaves mostly entire, narrowly linear or oblone.
Leaves green and glabrous or nearly so on both surfaces when mature.
Leaves oblone or ovate-oblong, entire.
Leaves, at least the lower, sinuate, toothed or incised.
Stamens 5; calyx not fleshy.
Pericarp readily separable from the seed.
Leaves oblone or lanceolate; calyx-lobes scarcely keeled.
Pericarp firmly attached to the seed.
Flower-clusters, at least the upper, longer than the leaves.
Leaves oblone, rhombic-ovate or lanceolate, narrowed at the base.
Leaves obtuse or merely acute.
Leaves or some of them cuspidate or bristle-tipped.
Leaves triangular-ovate, truncate or subcordate at base.
Spikes loosely panicled in the axils, the panicles shorter than the leaves.

\*\* Embryo an incomplete ring.

Leaves oblone or oblone, pinnately lobed; flowers in long loose panicles.
Leaves lanceolate; flowers in continuous or interrupted spikes.
Leaves borne in the axils of the numerous small upper leaves.
Spikes in large commonly leafless terminal panicles.

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1. *Chenopodium album* L. Lamb's Quarters. White Goosefoot. Pigweed. (Fig. 1359.)


Annual, pale green, stem usually slender, striate and grooved at least when dry, erect, commonly much branched, 1"-10" tall, the branches ascending. Leaves rhombic-ovate or the upper lanceolate or linear-lanceolate, narrowed at the base, acute or sometimes obtuse at the apex, 3-nerved, white-mealy beneath, dentate, sinuate or lobed, or the upper entire, 1'-4' long; petiole often as long as the blade; spikes terminal and axillary, simple or compound, often panicled; calyx about 1/2" broad in fruit, its segments strongly keeled, usually completely enclosing the utricle; seed horizontal, black, shining, firmly attached to the pericarp; embryo a complete ring.


*Chenopodium album viride* (L.) Moq. in DC. Prodr. 13: Part 2, 71. 1839.

Plant brighter green; leaves green on both sides or but slightly mealy beneath. Range of the type. Perhaps a distinct species.
2. Chenopodium glaucum L. Oak-leaved Goosefoot. (Fig. 1360.)


The plant is annual, succulent, stem usually much branched, decumbent or prostrate, or with erect branches. Leaves oblong, lanceolate or ovate-lanceolate, slender-petioled or the uppermost nearly sessile, obtuse or acute at the apex, mostly narrowed at the base, white-mealy beneath, dark green above, 1'-2' long, the lower or all of them sinuate-dentate or lobed; flowers in small axillary often branched spikes, the clusters usually shorter than the leaves, or the upper panicled; calyx about ½' broad, its segments oblong or obovate, obtuse, neither fleshy nor keeled in fruit; uricle brown, depressed, its summit not completely covered by the calyx; seed of lateral flowers vertical, thick, somewhat exserted, that of terminal flowers commonly horizontal; embryo a complete ring.

A weed in waste places throughout North America except the extreme north. Naturalized from Europe; now found in most cultivated areas of the globe. June-Sept.

3. Chenopodium leptophyllum (Moq.) Nutt. Narrow-leaved Goosefoot. (Fig. 1361.)

Chenopodium album var. leptophyllum Moq. in DC. Prodr. 1:3; Part 2, 71. 1849.
Chenopodium leptophyllum Nutt.; Moq. in DC. Prodr. 1:3; Part 2, 71. As synonym. 1849.

Annual, scarcely succulent, stem slender, usually erect, striate or grooved, at least when dry, branched, 6'-2½' tall, mealy above, the branches erect-ascending. Leaves linear to oblong, white-mealy beneath, green above, acute or acuminate, or the lower obtuse, entire or the lower rarely toothed, short-petioled, ½'-'1½' long, 1'-3'' wide, 1-3-nerved; flowers in continuous or interrupted axillary and terminal simple or branched spikes; calyx about ½' broad, its segments strongly keeled and nearly covering the fruit; seed horizontal, readily detached from the pericarp; embryo a complete ring.

In dry soil, Manitoba and the Northwest Territory to Missouri, New Mexico and Arizona. Also on the shores of Lake Erie and on sands of the seashore, Connecticut to New Jersey. July-Sept.

4. Chenopodium polypérmum L. Many-seeded Goosefoot. (Fig. 1362.)


Annual, glabrous, not mealy, stem stout or slender, erect or decumbent, commonly much branched, striate, 6'-3' high. Leaves oblong, elliptic or ovate, slender-petioled, entire, thin, green on both sides, obtuse at the apex, narrowed rounded or truncate at the base, 1'-2' long, 4''-1½'' wide; flowers in loose axillary and terminal panicles; calyx less than 1'' wide, its segments oblong, subacute or obtuse, somewhat scarious, not keeled, not completely covering the top of the fruit; seed firmly attached to the pericarp, horizontal; embryo a complete ring.

In waste places and ballast, Massachusetts to New Jersey. Adventive from Europe. July-Sept.
5. *Chenopodium Boscianum* Moq. Bosc's Goosefoot. (Fig. 1363.)


Annual, light green, stem slender, erect, striate, usually much branched, 1°–3° tall, the branches very slender, divergent or ascending. Leaves thin, green on both sides, lanceolate or oblong-lanceolate, acute or acuminate at the apex, narrowed at the base, slender-petioled, 1°–2½' long, the lower sinuate-dentate or nearly all of them entire; flowers in slender terminal and axillary spikes; calyx-segments broadly oblong, obtuse, scarious-margined, not at all keeled, or scarcely so in fruit, herbaceous, nearly covering the utricle; seed horizontal, readily separating from the pericarp, black, shining; embryo completely annular.

In woods and thickets, New York and New Jersey to Indiana and Minnesota, south to North Carolina and Texas. July–Sept.

6. *Chenopodium Fremontii* S. Wats. Fremont's Goosefoot. (Fig. 1364.)


Annual, glabrous or very nearly so, light green, stem stout or slender, erect, grooved, branched, 1°–3° tall. Leaves thin, green on both sides, broadly triangular-hastate, sinuate-dentate or the upper entire, mostly obtuse at the apex, truncate or abruptly narrowed at the base, slender-petioled, 1°–4° long and nearly as wide, the uppermost sometimes very small, oblong or lanceolate and acute; spikes slender, axillary to the upper leaves and in terminal panicles; calyx ½" wide, its segments keeled in fruit, and nearly enclosing the utricle; pericarp easily separable from the seed; seed horizontal, shining; embryo completely annular.

In woods and thickets, Nebraska to Colorado and Nevada, south to New Mexico. July–Sept.


Low, stems stout and much branched, the branches and lower surfaces of the leaves densely white-mealy; leaves ¾"–1" long. Range of the type. Possibly a distinct species.

7. *Chenopodium Berlandieri* Moq. Berlandier's Goosefoot. (Fig. 1365.)


Annual, slightly mealy when young, green when old, stem erect, commonly much branched, 1½°–3° tall, the branches slender, ascending. Leaves lanceolate, oblong or rhombic-lanceolate, slender-petioled, thin, some or all of them cuspidate-acuminate at the apex or bristle-tipped, narrowed at the base, sinuate-dentate or entire, ½°–1½° long; flowers in rather loose terminal panicled spikes; calyx nearly 1/4" broad, its segments keeled, completely enclosing the utricle; pericarp firmly attached to the horizontal seed; embryo a complete ring.

In dry soil, southern Missouri to Texas, and in Florida. June–Sept.
8. Chenopodium urbicum L. Upright or City Goosefoot. (Fig. 1366.)


Annual, green or but slightly mealy, stem commonly stout, erect, branched or simple, channeled, 1°-3° tall. Leaves hastate or triangular-ovate, acute at the apex, truncate subcordate or abruptly narrowed at the base, stout-petioled, coarsely and irregularly dentate or the uppermost entire, the larger 3'-5' long; spikes in terminal and axillary narrow erect panicles, the upper longer than the leaves; calyx ½'' broad, its segments oblong, obtuse, herbaceous, not keeled and not entirely enclosing the fruit; seed horizontal, rather firmly attached to the pericarp, its margins rounded; embryo a complete ring.

In waste places, especially in the cities, Nova Scotia and Ontario to southern New York. Adventive from Europe. Much less common than the following species. June–Sept.

9. Chenopodium murale L. Nettle-leaved Goosefoot. Sowbane. (Fig. 1367.)


Annual, scarcely or not at all mealy, somewhat scurfy above, stem erect or decumbent, usually branched, 1½-2½'' high, leafy to the summit. Leaves rhombic-ovate, thin, bright green on both sides, acute or acuminate at the apex, sharply and coarsely sinuate-dentate, broadly cuneate or subtruncate at the base, slender-petioled, 2'-4' long; flowers in loose axillary panicles shorter than the leaves, often not longer than the petioles; calyx-segments not entirely enclosing the utricle; seed sharp-edged, horizontal, firmly attached to the pericarp; embryo completely annular; stamens 5.


10. Chenopodium hybridum L. Maple-leaved Goosefoot. (Fig. 1368.)


Annual, bright green, not mealy, sometimes more or less scurfy; stem slender, erect, usually branched, 2½-4½'' tall. Leaves ovate or rhombic-ovate, long-acuminate at the apex, truncate rounded or subcordate at the base, thin, slender-petioled, sharply dentate with 1-4 large acute teeth on each side, or the upper lanceolate and entire, the lower 4'-7' long; flowers in large axillary and terminal panicles; calyx about ½'' broad, its segments oblong, rather obtuse, herbaceous, slightly keeled, incompletely covering the fruit; stamens 5; seed horizontal, sharp-edged, firmly attached to the pericarp; embryo a complete ring.

In woods and thickets, sometimes in waste places, Quebec to the Northwest Territory and British Columbia, south to southeastern New York, Kentucky, Kansas, Utah and New Mexico. Also in Europe. July–Sept.
II. Chenopodium rubrum L. Red Goosefoot. (Fig. 1369.)


Annual, glabrous, somewhat fleshy, not mealy, stem erect, leafy, $1^\circ-2^\circ$ tall, often much branched, the branches strict or ascending. Leaves thick, $1^\circ-4'$ long, rhombic-ovate or rhombic-lanceolate, petioled, acute acuminate or obtuse at the apex, narrowed at the base, coarsely serrate-dentate or the upper entire; flowers in erect compound leafy-bracted axillary and terminal spikes often exceeding the leaves; calyx 3-5-parted, its segments slightly fleshy, red, not keeled, obtuse, about as long as the utricle; stamens 1 or 2; stigmas short; seed horizontal, shining, rather sharp-edged, separating from the pericarp; embryo annular.

On the seacoast, Newfoundland to New Jersey, and in saline soil in the interior across the continent, south to central New York, Nebraska and British Columbia. Also in Europe and Asia. July–Sept.

12. Chenopodium Bonus-Henricus L. Good King Henry. Perennial Goosefoot. (Fig. 1370.)


Perennial by a thick rootstock, glabrous, dark green, not mealy; stem erect, usually stout, simple or little branched, channelled, $1^\circ-2^\circ$ tall. Leaves broadly triangular-hastate, palmately veined, entire or undulate (rarely with 1 or 2 small teeth), the apex and basal lobes usually acute, the lower long-petioled (petiole often twice as long as the blade), the upper much smaller and short-petioled; flowers in terminal and axillary, simple or panicked, commonly dense spikes sometimes $3'-4'$ long; calyx 4-5-parted, the segments not longer than the fruit; stigmas elongated; seed vertical, or that of terminal flowers horizontal, black, shining, blunt-edged; embryo a complete ring.


13. Chenopodium Botrys L. Feather Geranium. Jerusalem Oak. (Fig. 1371.)


Annual, green, glandular-pubescent and viscid, strong-scented; stem slender, erect, simple or branched, $S'-2^\circ$ tall. Leaves ovate or oblong, deeply and usually irregularly pinnately lobed, acute or obtuse at the apex, petioled, $1'/2-2'$ long, or the uppermost much smaller, the lobes mostly obtuse and dentate; flowers very small, in numerous loose axillary cymeose panicles mostly longer than the leaves; calyx 3-5-parted, the segments lanceolate, acute, thin, very pubescent, rather longer than the utricle; seed horizontal or vertical, firmly attached to the pericarp; embryo an incomplete ring.

14. *Chenopodium ambrosioides* L. Mexican Tea. (Fig. 1372.)


Annual, glabrous or slightly glandular-pubescent, green, not mealy, strong-scented, stem much branched, ascending or erect, leafy, 2°–3° high, angular and grooved. Leaves oblong or oblong-lanceolate, obtuse or subacute at the apex, narrowed to a short petiole, repand-dentate, undulate or the upper entire, 1'/3' long, the upper numerous and much smaller; flowers in small dense axillary spikes, mostly shorter than the subtending leaves; calyx usually 3-parted, completely enclosing the fruit; pericarp readily separable from the seed; seed horizontal or vertical, shining; embryo an incomplete ring.

In waste places, Maine and Ontario to Florida, west across the continent to California. Naturalized from tropical America. Introduced as a weed also into southern Europe and Asia. Aug.–Oct.

15. *Chenopodium anthelminticum* L. Wormseed. (Fig. 1373.)


*Chenopodium ambrosioides* var. *anthelminticum* A. Gray, Man. Ed. 5, 408. 1867.

Annual or sometimes perennial, rather dark green, similar to the preceding species and perhaps intergrading with it, stem somewhat stouter, 2½–3½ long. Leaves lanceolate or ovate-lanceolate, usually acuminate at the apex and narrowed at the base, slender-petioled, coarsely dentate or incised, 2'–5' long, the lower 1' or more wide, the upper gradually smaller, the uppermost commonly linear-lanceolate and entire; flowers in linear usually bractless panicled spikes, or the lower spikes leafy-bracted; seed horizontal or vertical; embryo an incomplete ring.


A perennial herb, glandular-pubescent, strong-scented, prostrate, and diffusely branched, with narrow small short-petioled deeply pinnatifid leaves. Flowers small, green, perfect, or pistillate, solitary, or in small axillary clusters. Calyx urn-shaped, 3-5-toothed, narrowed at the throat, in fruit becoming obovoid, strongly reticulated and closed. Stamens 5. Styles 3, exserted. Wall of the pericarp thin, glandular. Seed vertical. Embryo a complete ring in the mealy endosperm. [Name in honor of G. J. Roubieu, French botanist.]

A monotypic genus of South America, often included in *Chenopodium.*
3. **BLITUM** L. Sp. Pl. 2. 1753.

Annual glabrous or sparingly pubescent succulent branching herbs, with alternate hastate petiolated rather light green leaves. Flowers small, green, or reddish, aggregated in globose axillary sessile heads, or the upper heads forming an interrupted spike. Calyx 2-5-lobed, becoming pulpy and bright red in fruit. Stamens 5. Pericarp separating from the seed. Seed vertical, shining. Embryo a complete ring in the mealy endosperm. [The classical name of orache.]

One or perhaps two species, natives of North America and Europe.

1. **Blitum capitatum** L. Strawberry Blite. (Fig. 1375.)

*Chenopodium capitatum* L. Sp. Pl. 2. 1753.


Stem ascending, erect, or prostrate, 6'-2° long, commonly much branched, the branches ascending. Leaves usually longer than wide, 1½'-3' long, rather thin, sinuate-dentate, or the upper or sometimes all of them entire, cordate or reniform, the apex and basal lobes acute or acuminate; lower petioles often longer that the blades; heads sessile in the axils and on the sides of the upper part of the stem or branches, 2'-3'' in diameter in flower, becoming bright red and 5'-8'' in diameter in fruit, and then somewhat resembling strawberries; seed compressed, ovate, enclosed by the calyx, or when quite mature slightly exerted.

In dry soil, Nova Scotia to Alaska, south to New Jersey, Illinois, Minnesota, in the Rocky Mountains to Colorado and Utah and to Nevada. Also in Europe. June-Aug.


An annual diffusely branched glabrous or cobwebby-pubescent herb, with alternate petiolated irregularly toothed leaves, and small sessile bractless flowers in panicked interrupted spikes. Calyx 5-lobed, the lobes keeled in flower, a thin horizontal irregularly dentate wing developing below them in fruit. Stamens 5. Styles 2-3. Fruit (except its summit) enclosed by the calyx, depressed. Seed horizontal; embryo a complete ring in the mealy endosperm. [Greek, circle-border, alluding to the calyx-wing.]

A monotypic genus of north central North America.
1. *Cycloloma atriplicifolium* (Spreng.) Coult. *Cycloloma.* (Fig. 1376.)


Pale green or becoming dark purple, bushy-branched, 6'-20' high, the stem and branches angular and striate. Leaves lanceolate, mostly acuminate at the apex, narrowed into slender petioles, irregularly sinuate-dentate with acute teeth, 1'-3' long or the upper much smaller; spikes numerous in terminal panicles, loosely flowered, 1'-3' long, slender; fruit, including the winged calyx, 2'/2' broad; calyx-lobes not completely covering the summit of the utricle, which appears as a 5-rayed area.

Along streams and on banks, Manitoba to Indiana and Illinois, west to the Northwest Territory, Nebraska and Arizona. Summer.

5. **MONÔLEPS** Schrad. Ind. Sem. Gott. 4. 1830.

Low annual branching herbs, with small narrow alternate entire toothed or lobed leaves, and polygamous or perfect flowers in small axillary clusters. Calyx of a single persistent herbaceous sepal. Stamen 1. Styles 2, slender. Utricle flat, the pericarp adherent to the smooth vertical seed. Embryo a very nearly complete ring in the mealy endosperm, its radicle turned downward. [Greek, single-scale, from the solitary sepal.]

Three known species, natives of western North America, the following one reaching our limits.

1. *Monolepis Nuttalliana* (R. & S.) Greene. *Monolepis.* (Fig. 1377.)


Slightly mealy when young, pale green, glabrous or nearly so when old; stem 3'-12' high; branches many, ascending. Leaves lanceolate in outline, short-petioled, or the upper sessile, 3'/2'-2'/2' long, narrowed at the base, 3-lobed, the middle lobe linear or linear-oblong, acute or acuminate, 2-4 times as long as the ascending lateral ones; flowers clustered in the axils; sepal obovate or spatulate, acute or subsacute; pericarp minutely pitted, about 3'/2' broad; margins of the seed acute.

In alkaline or dry soil, Manitoba and the Northwest Territory to Minnesota, Nebraska, New Mexico and southern California. June-Sept.


Annual or perennial herbs or low shrubs, often scurfy-canescent or silvery. Leaves alternate, petioled or sessile, or some of them opposite. Flowers dioecious or monoecious, small, green, in panicked spikes or capitate-clustered in the axils. Staminate flowers bractless, consisting of a 3-5-parted calyx and an equal number of stamens; filaments separate or united by their bases; a rudimentary ovary sometimes present. Pistillate flowers subtended by 2 bractlets which enlarge in fruit and are more or less united, sometimes quite to their summits, their margins entire or toothed, their sides smooth, crested, tubercled or winged; perianth none; ovary globose or ovoid; stigmas 2. Utricle completely or partially enclosed by the fruiting bractlets. Seed vertical or rarely horizontal; embryo annular, the radicle pointing upward or downward; endosperm mealy. [From a Greek name of orache.]

About 130 species, of very wide geographic distribution. Besides the following, some 45 others occur in the western parts of North America.

Annual herbs; stems or branches erect, diffuse or ascending.

Leaves hastate, ovate, rhombic-lanceolate or linear-lanceolate.

Plants green, glabrous or sparingly scurfy, not silvery; leaves slender-petioled. Leaves lanceolate, several times longer than wide.

Leaves triangular-hastate, the lower only 1-2 times as long as wide. 1. *A. patula.*

Leaves triangular-hastate, the lower only 1-2 times as long as wide. 2. *A. hastata.*
CHENOPODIACEAE.

Plant very scurfy; leaves rhombic-ovate, short-petiolate.
Plants densely silvery; leaves hastate, entire or little toothed.
Staminate spikes dense, short; leaves petioted.
Staminate spikes elongated; upper leaves sessile.
Leaves oblong, densely silvery, entire; plant of sea beaches.
Perennial herbs or shrubs; leaves oblong or oblanceolate, entire; plants of the western plains.
Fruiting bracts suborbicular, wingless, their sides crenated or tubercled.
Fruiting bracts appended by 3 vertical reticulatd wings.

1. Atriplex pâtula L. Spreading Orache. (Fig. 1378.)

Annual, dark green, glabrous or somewhat scurfy above; stem much branched, diffuse, ascending or sometimes erect, 1°-3° long. Leaves lanceolate or linear-lanceolate, slender-petiolate, or the uppermost nearly sessile, entire, sparingly toothed, or 3-lobed below the middle, acuminate at the apex, narrowed or cuneate at the base, 1'-3' long, 2'-1½' wide; flowers in panicled interrupted slender mostly leafless spikes, and usually also capitate in the upper axils; fruiting bracts united only at the base, fleshy, triangular or rhombic, 3'-4' wide, their sides often tubercled; radicle of the embryo ascending.

In waste places and ballast, Nova Scotia and Ontario to southern New York and New Jersey. Naturalized from Europe, or perhaps indigenous northward. Native also of Asia. Much less common than the following species. July-Aug.

2. Atriplex hastâtâ L. Halberd-leaved Orache. (Fig. 1379.)

Annual, pale green, or purple, somewhat scurfy, at least when young; stem erect or ascending, branched, 1°-2½° tall. Leaves slender-petiolate, acuminate, the lower broadly triangular-hastate, seldom more than twice as long as wide, entire or sparingly toothed, 1'-4' long, truncate or narrowed at the base, the basal lobes divergent, acute or acuminate; upper leaves sometimes triangular-lanceolate; inflorescence as in the preceding species; the fruiting bracts sometimes broader.

In salt meadows and waste places mostly near the coast, New Brunswick to South Carolina, and in saline soil, Manitoba to British Columbia, Nebraska and Utah. Also in Europe. The western plant is more scurfy than the eastern. Aug.-Oct.

3. Atriplex roseâ L. Red Orache. (Fig. 1380.)

Annual, pale green and very scurfy, stem erect or decumbent, usually much branched, 1°-2½° high. Leaves ovate or rhombic-ovate, short-petiolate or the upper sessile, coarsely sinuate-dentate, obtuse or acute at the apex, narrowed or subtruncate at the base, ½'-3½' long, ½'-3½' wide, often turning red; flowers mostly in axillary capitate clusters, often dense, or some in few terminal spikes; fruiting bracts broadly ovate or triangular-hastate, strongly veined, mealy-white, dry, about 3' broad, united only at their bases, their margins toothed or lacerate and sides tubercled.

4. *Atriplex argentea* Nutt. Silvery Orache. (Fig. 1381.)


Annual, pale, densely silvery-scurfy or becoming smooth, stem erect or ascending, bushy-branched, 6'-20' high, angular. Leaves firm, triangular-hastate or rhombic-ovate, mostly acute at the apex, narrowed or subtruncate at the base, petioled or the upper sessile, entire or sparingly dentate, $\frac{1}{2}'-2'$ long, the basal lobes short; flowers in capitate axillary clusters, or the staminate in short dense spikes; fruiting bractlets suborbicular, rhombic or broader than high, 2''-4'' wide, united nearly to their summits, the margins sharply toothed, the sides sometimes tubercled or crested; radicle of the embryo pointing downward.

In dry or saline soil, Minnesota to the Northwest Territory, south to Nebraska, Colorado and Utah. June-Sept.

5. *Atriplex expansa* S. Wats. Sessile-leaved Orache. (Fig. 1382.)


Annual, densely silvery-scurfy, similar to the preceding species, but stouter, the stem erect, widely branched, sometimes 6' tall. Leaves thin, triangular-hastate or rhombic-ovate, toothed or entire, sessile or the lower very short-petioled, $\frac{1}{2}'-1\frac{1}{2}'$ long and nearly as wide at the base; pistillate flowers in axillary clusters, the staminate mostly in slender interrupted solitary or panicked spikes sometimes 4' long; fruiting bractlets broad, united nearly to their summits, tubercled, their margins strongly toothed.

Western Kansas (according to A. S. Hitchcock) to Chihuahua and New Mexico, west to California. July-Oct.

6. *Atriplex arenaria* Nutt. Sea-beach Atriplex. (Fig. 1383.)


Annual, pale, densely silvery-scurfy, stem bushy-branched, 6'-18' high, the branches ascending or decumbent, angular, slender. Leaves oblong, entire, acute or obtuse and mucronulate at the apex, narrowed or rounded at the base, very short-petioled or sessile, $\frac{1}{2}'-1\frac{1}{2}'$ long, 2$\frac{1}{2}''$-10'' wide, the midvein rather prominent, the lateral veins few and obscure; flowers in axillary clusters much shorter than the leaves; fruiting bractlets triangular wedge-shaped, broadest above, 2''-3'' wide, united nearly to the several-toothed summits, their margins entire, their sides reticulated, or sometimes crested or tubercled; radicle of the embryo pointing downward.

7. **Atriplex Nuttallii** S. Wats. Nuttall's Atriplex. (Fig. 1384.)


A finely scurfy pale green shrub, 1°-2½° tall, the branches erect or ascending, rather stiff, striate or terete, leafy, the bark nearly white. Leaves oblong, linear-oblong or oblanceolate, obtuse or subacute at the apex, narrowed at the base, sessile, entire, ½'-2' long, 2''-5'' wide; flowers in terminal spikes and capitulate clustered in the axils, often strictly dioecious; fruiting bractlets ovate or suborbicular, united to above the middle, 1½''-2½'' broad, the margins toothed, the sides crested, tubercled or spiny.

In dry or saline soil, Manitoba to the Northwest Territory, south to Nebraska, Colorado and Nevada. Aug.-Oct.

8. **Atriplex canescens** (Pursh) James. Bushy Atriplex. (Fig. 1385.)


A pale densely scurfy shrub, 1°-3° high, resembling the preceding species and with similar foliage. Flowers in short terminal spikes and in axillary clusters, commonly dioecious, sometimes monoecious; bractlets ovate in flower, united nearly to their summits; in fruit appended by 4 broad thin distinct wings, which are 2''-4'' broad at the middle and usually about twice as high, strongly reticulate-veined, not tubercled nor crested, toothed near their summits or entire.

In dry or saline soil, South Dakota and Nebraska to New Mexico and Mexico, west to Nevada and California. July-Sept.


Pubescent perennial herbs or low shrubs, with alternate entire narrow leaves and monoecious or dioecious flowers, capitulate or spicate in the axils. Staminate flowers not bracteolate, consisting of a 4-parted calyx and as many exserted stamens. Pistillate flowers 2-bracteolate, the bractlets united nearly or quite to their summits, densely covered with long silky hairs, 2-horned; calyx none; ovary ovoid, sessile, pubescent; styles 2, exserted. Seed vertical; embryo nearly annular in the mealy endosperm, its radicle pointing downward. [From the Greek for hoariness or mould.]

Two known species, the following of western North America, the other of western Asia and eastern Europe.
1. *Eurotia lanāta* (Pursh) Moq. American *Eurotia*. White Sage. (Fig. 1386.)


*Eurotia lanata* Moq, Enum. Chenop. 8t. 1840.

A stellate-pubescent erect much-branched shrub 1°-3° high, the hairs long, white when young, becoming reddish brown, the branches ascending, very leafy. Leaves linear or linear-lanceolate, short-petioled or the upper sessile, obtuse at the apex, narrowed at the base, \(\frac{1}{2}''-2''\) long, \(2''-4\frac{1}{2}''\) wide, their margins revolute, the midvein prominent, the lateral veins few; flowers densely capitate in the upper axils, forming terminal leafy spikes; bracts lanceolate, \(2''-4''\) long in fruit, appended by 4 tufts of spreading hairs; calyx-lobes acute, pubescent; utricle loose, the pericarp readily separating from the large seed.

In dry soil. Northwest Territory to western Nebraska and New Mexico, Nevada and California. June-Sept.


Perennial or annual herbs or low shrubs, with alternate sessile narrow entire leaves, and perfect or pistillate flowers, sometimes bracteolate, clustered in the axils. *Calyx* 5-lobed, herbaceous or membranous, wingless, or sometimes developing a horizontal wing, enclosing the fruit. *Ovary* ovoid, narrowed upward into the style; *stigmas* 2. *Utricle* pear-shaped or oblong, the pericarp membranous, not adherent to the seed. *Seed* inverted; the testa thin; *embryo* annular; *endosperm* little or none. [Name in honor of W. D. J. Koch, 1777-1849, Director of the Botanical Garden at Erlangen.]

About 35 species, mostly natives of the Old World, the following introduced from Europe. An indigenous species, *K. Americana*, occurs in the western United States.

1. *Kochia Scoparia* (L.) Roth. *Kochia*. (Fig. 1387.)

*Chenopodium Scoparia* L. Sp. Pl. 221. 1753.


Annual, pubescent or becoming glabrate, stem erect, slender, rather strict, branched, leafy, \(1°-2°\) tall. Leaves linear-lanceolate or linear, ciliate, acuminate at the apex, \(1''-2''\) long, \(1''-2''\) wide, the upper gradually smaller; flowers sessile, solitary in the axils of the upper leaves, forming short dense bracted spikes; fruiting calyx-segments each with a short triangular horizontal wing.


Annual herbs, with alternate narrow entire 1-nerved leaves, and perfect bractless small green flowers, solitary in the upper axils, forming terminal narrow leafy spikes, the upper leaves shorter and broader than the lower. *Calyx* of a solitary thin broad sepal, or rarely 2. *Stamens* 1-3, rarely more, and one of them longer. *Ovary* ovoid; *styles* 2. *Utricle* ellipsoid, mostly plano-convex, the pericarp firmly adherent to the vertical seed, its margins acute or winged. *Embryo* annular in the somewhat fleshy endosperm, its radicle pointing downward. [Greek, bug-seed.]

About 10 species, natives of the north temperate and subarctic zones. Only the following is known to occur in North America.
1. Corispermum hyssopifolium L. Bug-seed. (Fig. 1388.)

Corispermum hyssopifolium L. Sp. Pl. 4. 1753.

Glabrous or pubescent, rather pale green, somewhat fleshy, stem striate, erect, sometimes zigzag, usually much branched, 6'-2° tall, the branches slender, ascending or divergent, sparingly leafy. Leaves narrowly linear, sessile, \( \frac{1}{2}'-2' \) long, \( \frac{1}{2}'-2' \) wide, cuspidate at the apex; upper leaves ovate or lanceolate, appressed-ascending, or at length spreading, acute or acuminate at the apex, \( \frac{1}{2}'-\frac{1}{2}' \) long, scarious-margined; utricle 1'-2'' long, \( \frac{1}{2}''-1'' \) thick, narrowly winged, obtuse, subacute or mucronate by the persistent styles.

In sandy soil, shores of the Great Lakes to the Northwest Territory, Arctic America and British Columbia, south to Kansas, Texas and Arizona. Also in Europe and Asia. The small-fruited form (var. microcarpum S. Wats.) occurs from Kansas southward. July-Sept.

10. SALICORNIA L. Sp. Pl. 3. 1753.

Fleshy glabrous annual or perennial herbs, with opposite terete branches, the leaves reduced to mere opposite scales at the nodes, the flowers sunken 3-7 together in the axils of the upper ones, forming narrow terminal spikes, perfect or the lateral ones staminate. Calyx obpyramidal or rhomboid, fleshy, 3-4-toothed or truncate, becoming spongy in fruit, deciduous. Stamens 2, or sometimes solitary, exserted; filaments cylindric, short; anthers oblong, large; ovary ovoid; styles or stigmas 2. Utricles enclosed by the spongy fruiting calyx, the pericarp membranous. Seed erect, compressed; embryo conuplicate; endosperm none. [Name Greek, salt-horn; from the saline habitat, and horn-like branches.]

About 10 species, natives of saline soil, widely distributed in both the Old World and the New. Only the following are known to inhabit North America.

Annuals; stem erect.

Scales very short, acute or blunt; spikes 1''-1\( \frac{1}{2}'' \) in diameter.

Scales mucronate-tipped; spikes 2'-3' in diameter.

Perennial by a woody rootstock; stems trailing or decumbent.

1. S. herbacea.
2. S. Bigelowii.
3. S. ambigu a.

1. Salicornia herbacea L. Slender Glasswort. (Fig. 1389.)

Salicornia Europaea var. herbacea L. Sp. Pl. 3. 1753.

Salicornia herbacea L. Sp. Pl. Ed. 2. 5. 1762.

Annual, 6'-2° tall, stem erect, much branched, the branches slender, ascending or nearly upright, their joints 2-4 times as long as thick. Scales acute or rather obtuse, 1'' long or less, broadly ovate or wider than long; fruiting spikes 1'-3' long, about 1\( \frac{1}{2}'' \) in diameter; middle flower of the 3 at each joint twice as high as the lateral ones, reaching nearly to the top of the joint; utricle pubescent.

In salt marshes, Anticosti to Georgia; about salt springs in central New York; in saline soil from Manitoba to British Columbia, south to Kansas and Utah. Also in Europe and Asia. The plant often turns bright red in autumn, forming vividly colored areas in the salt marshes, hence called Marsh Samphire. July-Sept.
2. *Salicornia Bigelovii* Torr. Bigelow's Glasswort. (Fig. 1390.)


Annual, stem and branches stout, erect or nearly so, 2'-12' tall. Scales ovate or triangular-ovate, sharply mucronate, 1'/4-1'/2 long, at length spreading; fruiting spikes 1'/4-2'/2 long, 2''-3'' in diameter, their joints not longer than thick; middle flower slightly higher than the lateral ones, reaching very nearly to the end of the joint; utricle pubescent.


3. *Salicornia ambiguα* Michx. Woody Glasswort. (Fig. 1391.)


Perennial by a woody rootstock, stem trailing or decumbent, 6'-2° long, the branches ascending or erect, slender, nearly or quite simple, rather long-jointed, 3'-8' long. Scales broadly ovate or wider than high; acute or obtuse, appressed or slightly divergent; fruiting spikes 1'/4-1'/2 long, about 2'' in diameter, their joints not longer than thick; flowers all about equally high and about equalling the joints.

On sea beaches and salt meadows, Massachusetts to Florida and Texas, and on the Pacific Coast. Perhaps identical with *S. fruticosa* L., of Europe. Aug.-Sept.

11. SARCÓBATUS Nees in Max. Reise N. A. i: 510. 1839.

An erect much branched shrub, with spiny branches, alternate linear fleshy entire sessile leaves. Flowers monoeccious or dioecious, the staminate in terminal ament-like spikes, the pistillate solitary in the axils, or rarely several together. Staminate flowers without a calyx; stamens 2-5 together under peltate rhombic-ovate acute spirally arranged scales; filaments short. Pistillate flowers sessile or very nearly so; calyx compressed, ovoid or oblong, slightly 2-lipped, adnate to the bases of the 2 subulate exserted papillose stigmas, appended by a narrow border which expands into a membranous horizontal wing in fruit. Seed vertical, the testa translucent, double; embryo coiled into a flat spiral, green; endosperm none. [Name Greek, flesh-thorn, from the fleshy leaves and thorny stems.]

A monotypic genus of western North America.
CHENOPODIACEAE.

1. *Sarcobatus vermiculatus* (Hook.) Torr. Grease-wood. (Fig. 1392.)


Glabrous or the young foliage somewhat pubescent, much branched, 2°-10° high, the branches slightly augled, leafy, nearly white, some of them leafless and spine-like. Stems 1'-3' in diameter; wood yellow, very hard; leaves obtuse or subacute, ½'-1½' long, 1½'-1½'' wide, narrowed at the base; spikes of staminate flowers ½'-1' long, 1½''-2'' in diameter, cyllindric, short-peduncled or sessile; wing of the calyx 4'''-6'' broad when mature, conspicuously veined.

In dry alkaline and saline soil, western Nebraska, Wyoming to Nevada and New Mexico. Wood extensively used for fuel. For want of better, in the regions where it occurs. June-July. Fruit mature Sept.-Oct.


[Suaeda Forsk. Fl. Aeg. Arab. 69. pl. 18b. 1775.]

Fleshy annual or perenniai herbs, or low shrubs, with alternate narrowly linear thick or nearly terete entire sessile leaves, and perfect or polygamous bracteolate flowers, solitary or clustered in the upper axils. Calyx 5-parted or 5-cleft, the segments sometimes keeled or even slightly winged in fruit, enclosing the utricle. Stamens 5. Styles usually 2, short. Pericarp separating from the vertical or horizontal seed. Embryo coiled into a flat spiral. Endosperm wanting or very little. [In honor of Jacopodi Dondi, Italian naturalist of the fourteenth century.]

About 50 species, of wide geographic distribution. Besides the following, some 6 others occur in the western and southern parts of North America.

Annuals of the Atlantic sea coast.

Dark green, not glaucous; sepals acutely keeled; seed black.
Light green, glaucous; sepals scarcely keeled; seed dark red.
Perennial of the western plains.

1. **Dondia Americana** (Pers.) Britton. Tall Sea-Blite. (Fig. 1395.)


Annual, dark green or purplish green, not glaucous, stem erect, strict, 1°-3° tall, pale green or nearly white, branched, the branches slender, very leafy, erect-ascending or sometimes recurved, more or less secund. Leaves of the stem linear-subulate, ½'-1½' long, those of the branches much shorter, somewhat 3-angled, lanceolate-subulate, widest just above the base, the upper surface flat; sepals purple-green, glaucous, acutely keeled or almost winged; seed orbicular, black, shining, ½'' broad.

On salt marshes and along salt water ditches, Nova Scotia to New Jersey and probably further south. Aug.-Sept.
2. Dondia maritima (L.) Druce. Low Sea-Blite. (Fig. 1394.)

Chenopodium maritimum L. Sp. Pl. 221. 1753.
Suaeda maritima Dumort. Fl. Belg. 22. 1827.

Annual, pale green and somewhat glaucons, stem erect or decumbent, bushy-branched, 5'-15' high, becoming brownish, the branches ascending. Leaves 5''-12'' long, those of the branches not conspicuously shorter than the upper ones of the stem, 3-angled, broadest at the base; sepals pale green, rounded or very obtusely keeled, somewhat roughened; seed orbicular, dark brownish red, shining, about 1'' in diameter.

On sea beaches, stony and muddy shores, and in salt marshes, Maine to southern New York. Also on the coasts of Europe. Our plant is, perhaps, specifically different from the European. July-Sept.

3. Dondia dépréssa (Pursh) Britton. Western Blite. (Fig. 1395.)


Perennial by a deep slender woody root or sometimes annual, branched from the base and usually also above, 6'-2'' tall, the branches decumbent or ascending, usually very leafy. Leaves narrowly linear, 3'/-1' long, broadest at or just above the base, or the upper lanceolate or ovate-lanceolate and commonly much shorter; sepals acute, one or more of them strongly keeled in fruit; seed about 1/4'' in diameter, rather dull, minutely reticulated.

In saline soil, Minnesota to the Northwest Territory, south to Nebraska, Colorado and Nevada. June-Aug.


Annual or perennial bushy-branched herbs, with rigid subulate prickly-pointed leaves, and sessile perfect 2-bracteolate flowers, solitary in the axils, or sometimes several together. Calyx 5-parted, its segments appressed by a broad membranous horizontal wing in fruit and enclosing the utricle. Stamens 5. Ovary depressed; styles 2. Utricle flattened. Seed horizontal; embryo coiled into a conic spiral; endosperm none. [Name Latin, a diminutive of salus, salty.]

About 50 species, of wide geographic distribution on seashores and in saline districts, occasionally pernicious weeds in cultivated grounds.

Calyx coriaceous, not conspicuously veined; plant maritime.
Calyx membranous, very strongly veined; plant an inland weed.

1. S. Kali.
2. S. Tragus.
1. Salsola Ḳāli L. Saltwort. (Fig. 1396.)

*Salsola Ḳāli* L. Sp. Pl. 222. 1753.

Annual, glabrous or often pubescent, loosely much branched, 10–20 high, the branches ascending or spreading, mostly stout, somewhat ridged. Leaves dull green or grayish, 3'/4–10'/4 long, succulent, lanceolate-subulate, swollen at the base, the midvein excurrent into a stout yellowish green prickle; flowers solitary in the axis; wing of the persistent calyx nearly orbicular, lobed, becoming lacerate, not conspicuously veined, 2'/4–4'/4 in diameter; calyx coriaceous, not conspicuously veined, its wing not longer than the ascending lobe.


2. Salsola Trāgus L. Russian Thistle. (Fig. 1397.)


Similar to the preceding species, but bushy branched, the branches usually slender. Leaves and outer branches usually bright red at maturity; leaves not noticeably swollen at the base, linear, prickle-tipped, less fleshy; calyx membranous, conspicuously veiny, its wing longer than the ascending lobe.

In cultivated fields and waste places, New Jersey to Ontario, the Northwest Territory and Kansas. A very troublesome weed in many parts of the Central and Western States. Naturalized from northern Europe or Asia. July–Sept.


**Amaranth Family.**

Herbs, some exotic genera low shrubs, with alternate or opposite simple mostly entire thin leaves. Flowers small, green or white, perfect, monoecious, polygamous, or dioecious, bracteolate, variously clustered, usually in terminal spikes or axillary heads. Petals none. Calyx herbaceous or membranous, 2–5-parted, the segments distinct or united at the base, equal, or the inner ones smaller. Stamens 1–5, mostly opposite the calyx-segments, hypogynous; filaments distinct, united at the base, or into a tube; anthers 1-celled or 2-celled. Ovary ovoid or subglobose, 1-celled; ovule solitary in the following genera, amphiropous (several in some tropical genera); style short, elongated or none; stigmas 1–3. Fruit a utricle, circumsissile, bursting irregularly or indehiscent, 1-seeded in our genera. Seed mostly smooth; embryo annular; endosperm mealy, usually copious.

About 40 genera and 125 species, widely distributed, most abundant in warm regions.

Anthers 2-celled; leaves alternate.

- Calyx 5 parted or of 5 sepals.
- Calyx of the pistillate flowers wanting.
- Anthers 1-celled; leaves opposite.
- Flowers in small axillary clusters.
- Flowers variously spicate or paniculate.
- Calyx 5-cleft; filaments united into a tube.
- Calyx 5-parted; filaments united at the base.

1. *Amaranthus*.
2. *Acnida*.
3. *Cladothrix*.
4. *Forstichia*.
5. *Iresine*.

Annual branched erect or diffusely spreading glabrous or pubescent herbs, most of the species weeds, with alternate, petioled pinnately veined entire, undulate or crisped leaves and small monoeocious polygamous or dioecious green or purplish mostly 3-bracteolate flowers in dense terminal spikes or axillary clusters. Calyx of 2–5 distinct sepals. Stamine 2–5; anthers 2-celled, longitudinally dehiscent. Styles or stigmas 2 or 3. Fruit an ovoid or oblong utricle, circumscissile, bursting irregularly or indehiscent, 2–3 beaked by the persistent styles. Embryo annular. [Greek, unfading flower, from the dry, uawithering bracts.]

About 50 species of wide geographic distribution. Besides the following some 22 others occur in the southern and western United States.

Utricle circumscissile, the top falling away as a lid.

1. Amaranthus retroflexus L. Rough Pigweed. (Fig. 1398.)


Roughish-puberulent, rather light green, stem stout, erect or ascending, commonly branched, 10–100 tall. Leaves ovate, rhombic-ovate or the upper lanceolate, slender-petioled, acute or acuminate at the apex, narrowed or cuneate at the base, the larger 3–6 long, their margins undulate or entire; flowers green, densely aggregated in terminal and axillary spikes, which are sessile, stout, obtuse or subacute, ovoid-cylindric, erect or ascending, 2–5½ long, 4½–7 thick; bracts subulate, twice as long as the 5 scarious narrowly oblong or slightly spatulate mucronate-tipped and often crenate sepal; stamens 5; utricle slightly wrinkled, thin, circumcisissile, rather shorter than the sepal.


2. Amaranthus hýbridus L. Slender Pigweed. (Fig. 1399.)


Similar to the preceding species but darker green, or purple, pubescent or nearly glabrous; stem usually slender, erect, usually branched, 20–80 tall. Leaves bright green on both sides or paler beneath, usually smaller, slender-petioled; spikes linear-cylindric, axillary and forming dense terminal panicles, ascending, somewhat spreading or drooping; bracts subulate, twice as long as the 5 oblong acute or cuspitate sepal; stamens 5; utricle scarcely wrinkled, circumcisissile.

AMARANTHACEAE.

Flowers and foliage more or less deeply tinged with red or purple; leaves sometimes lanceolate and bracts shorter. Range of the type, but less abundant.

3. Amaranthus spinósus L. Spiny Amaranth. (Fig. 1400.)
Rather dark green, glabrous or somewhat pubescent above, stem stout, erect or ascending, ridged, usually much branched, sometimes red, 1°-4° high. Leaves ovate, rhombic-ovate or the upper lanceolate, slender-petiöled, acute at both ends, 1°-3° long, with a pair of rigid stipular spines ½'-1' long at each node, the midvein excurrent; flowers in numerous capitulate axillary clusters, mostly shorter than the petioles and in dense terminal linear-cylindric spreading or drooping spikes 1°-6° long; bracts lanceolate-subulate about as long as the 5 scarious oblong mucronate-tipped 1-nerved sepal, and the thin imperfectly circumscissile utricle; stamens 5.

Prostrate Amaranth. (Fig. 1401.)
Nearly or quite glabrous, rather pale green, stem diffusely branched, prostrate and spreading on the ground, ridged, 6°-2° long, often forming mats. Leaves obovate or spatulate, ½'-1' long, obtuse or acute at the apex, narrowed into slender petioles, sometimes longer than the blades; flowers in small axillary clusters mostly shorter than the petioles; bracts lanceolate-subulate, little longer than the 4 or 5 oblong-lanceolate acute or cuspidate sepal; stamens 5; utricle nearly smooth, circumscissile, equaling or slightly longer than the sepal.
In waste places, especially along the principal routes of travel, Maine to southern Ontario and Minnesota, south to New Jersey, Missouri and Kansas. Naturalized from west of the Rocky Mountains, where it appears to be indigenous from Utah and Colorado to Mexico. June-Oct.

5. Amaranthus graecizans L. Tumble-weed. (Fig. 1402.)
Glabrous, pale green, stem erect, bushy-branched, whitish, 6°-2° tall, the branches slender, ascending. Leaves oblong, spatulate or obovate, ½'-1½' long, slender-petiöled, papillose, the midvein excurrent; flowers polygamous, several together in small axillary clusters shorter than the leaves, commonly not longer than the petioles; bracts subulate, pungent-pointed, spreading, much longer than the 3 membranous sepal; stamens 5; utricle wrinkled, circumscissile, longer than the sepal.
In waste and cultivated soil, throughout North America. Naturalized from tropical America. The leaves fall away in autumn, and on the western plains the plant, thus denuded, is freely uprooted and blown before the wind, whence the popular name. June-Sept.
(Fig. 1403.)

1861.

1880.

Glabrous or nearly so, stem stout or slender,  
erect, grooved, usually much branched above, 2°-  
3° tall. Leaves lanceolate or rhombic-lanceolate,  
thin, narrowed above to a rather blunt apex, mostly  
cuneate at the base, ½'-4' long, ¼'-1' wide, slender-petioled; flowers dioecious, borne in terminal  
slender sometimes panicked spikes and in small ax- 
illary clusters; bracts shorter than or about equal- 
ling the 5 sepals, cuspidate; sepals of the pistillate  
flowers obovate or broadly spatulate, clawed, obtuse  
or emarginate, those of the stamine flowers narrower  
and subacute; utricle dry, indehiscent.

In dry soil, western Nebraska to Nevada, south to  

(Fig. 1404.)

Amaranthus Palmeri S. Wats. Proc. Am. Acad. 12:  
274. 1876.

Somewhat similar to the preceding species, stem  
erect, slender, branched, 2°-3° tall, usually pubes- 
cent above. Leaves ovate, rhombic-ovate or the  
upper lanceolate, blunt at the apex, narrowed at  
the base, prominently veined, slender-petioled, the  
lower petiole often longer than the blades; flowers  
dioecious, borne in elongated erect or drooping  
spikes often 1' long or more, and some of them  
commonly in small clusters in the upper axils;  
bracts subulate, spiny-awned, spreading, twice as  
long as the sepals; sepals 5, spatulate, clawed;  
utricle dry, indehiscent.

In dry soil, western Kansas (according to A. S.  
Hitchcock) to Texas and Mexico, west to California.  
June-Sept.

8. Amaranthus lividus L. Purplish  
Amaranth.  (Fig. 1405.)


1849.

Glabrous, rather succulent, purplish-green, stem  
erect, slender, branched, 1°-3° tall. Leaves ovate,  
entire, ½'-3' long, strongly emarginate at the apex,  
narrowed at the base, slender-petioled; flowers  
monoecious or polygamous, in dense terminal  
spikes and in capitate axillary clusters usually much  
shorter than the petioles; bracts shorter than the  
2 or 3 oblong or spatulate sepals; utricle dry, scar- 
ious, smooth, indehiscent, longer than the sepals.

In waste places, eastern Massachusetts to southern  
New York. Adventive from tropical America. July-  
Sept.
9. **Amaranthus deflexus** L. Low Amaranth. (Fig. 1406.)

*Amaranthus deflexus* L. Mant. 2: 295. 1771.

*Euxolus deflexus* Raf. Fl. Tell. 3: 42. 1836.

Glabrous, purplish-green, rather succulent, stem usually much branched, erect, stout or slender, 1°-3° tall. Leaves ovate or oval obtuse retuse or emarginate at the apex, mostly narrowed at the base, 1/4-1 1/2 wide, slender-petioled, the petioles often as long as the blades or the lower ones longer; flowers polygamous in dense, mostly short and thick terminal spikes and capitulate in the axils; bracts shorter than the 2 or 3 oblong or spatulate sepals usually very short; utricle fleshy, 3-5-nerved, smooth, indehiscent, rather shorter than the sepals.

In waste places and ballast along the coast, Massachusetts to southern New York. Also in California. Probably adventive from tropical America. July-Sept.

10. **Amaranthus crispus** (Lesp. & Thev.) Braun. Crisp-leaved Amaranth. (Fig. 1407.)


*Amaranthus crispus* Braun; A. Gray, Man. Ed. 6, 428. 1890.

Pubescent, stem copiously branched, slender, spreading on the ground, prostrate, forming mats 8'-2 1/2' in diameter. Leaves oblong or lanceolate, mostly acute at the apex and narrowed at the base, petioled, 4'-1' long, their margins remarkably crisped; petioles shorter than or exceeding the blades; flowers all in small axillary clusters shorter than the petioles; bracts lanceolate, cuspidate, shorter than the 5 spatulate spreading sepals; stamens (always?) 3; utricle wrinkled, indehiscent, about as long as the sepals.


11. **Amaranthus pumilus** Raf. Coast Amaranth. (Fig. 1408.)


*Euxolus pumilus* Chapm. Fl. S. States, 381. 1860.

Glabrous, fleshy, branched, the branches prostrate or ascending, 3'-8' long. Leaves ovate, rhombic-ovate or suborbicular, most of them clustered toward the ends of the branches, obtuse or emarginate at the apex, narrowed or rounded at the base, prominently veined, petioled, 3'-10' long, the veins often purple; flowers few together in small axillary clusters; bracts lanceolate, subacute, shorter than the 5 oblong obtuse sepals; stamens 5; anthers yellow; utricle fleshy, indehiscent, faintly 5-ribbed, slightly wrinkled, nearly twice as long as the sepals when mature; seed very large for the genus.

AMARANTH FAMILY.

2. ACNIDA L. Sp. 1027. 1753.

Annual, erect or decumbent, glabrous branching herbs, similar to the dioecious Amaranthaceae, with alternate petioled thin pinnately veined leaves. Flowers small, green, 1-3-bracted, in terminal and axillary, continuous or interrupted spikes, or clustered in the axils. Staminate flowers consisting of 5 scarious erect 1-nerved mucronate sepals longer than the bracts, and as many stamens; filaments subulate, distinct; anthers 2-celled. Pistillate flowers without a calyx; ovary ovoid or subglobose; stigmas 2-5, papillose or plumose, short or elongated. Utricle fleshy and indehiscent, or membranous and bursting irregularly or circumscissile; seed erect, smooth and shining. [Greek, without nettle.]

About 4 species, natives of eastern North America and the West Indies.

Utricle fleshy, angulated, indehiscent; salt-marsh plant.
Utricle membranous, deciduous or indehiscent, not angled; plants of fresh water swamps.

1. Acnida cannabina L. Salt-marsh Water-hemp. (Fig. 1409.)


Succulent, stem stout or slender (sometimes 1' in diameter at the base), usually much branched, 1°-10° tall, the branches ascending. Leaves lanceolate, acuminate but generally blunt-pointed and apiculate at the apex, 2'°-6' long, 1/2'-1 1/2' wide, narrowed at the base, entire or slightly undulate; petiole usually shorter than the blade; staminate spikes 1'-5' long, usually dense; sepals oblong-lanceolate or ovate-oblong, acute, acuminate or obtuse, cuspidate or mucronate; fertile spikes denser or loose; stigmas slender, papillose-fusiform, 1/2' long; utricle fleshy, indehiscent, 3-5-angled, subglobose or obvoid, 1/2'-2' long when mature, becoming black, much longer than the bracts.

In salt and brackish marshes, and up the rivers to fresh water, Massachusetts to Florida. July-Aug.

Acnida Floridana S. Wats. Proc. Am. Acad. 10: 376, a more slender plant, of the southern Atlantic coast, with narrower slender-petioled leaves, the flowers in elongated interrupted spikes, and a smaller utricle, may occur in southern Virginia.

2. Acnida tamariscina (Nutt.) Wood.

Western Water-hemp. (Fig. 1410.)


Acnida tamariscina Wood, Bot. & Fl. 289. 1873.

Similar to the preceding species, much branched, erect, the branches usually slender, erect-ascending. Leaves lanceolate or ovate-lanceolate, 2'°-6' long, mostly long-acuminate, but sometimes obtuse at the apex and mucronate or cuspidate-tipped, narrowed at the base, the petioles commonly shorter than the blades; spikes mostly loose or interrupted, often 5' long; sepals lanceolate, subulate-acuminate; stigmas plumose, rather short; utricle membranous, not angled, 1/2'°-1'° long, circumscissile; bractlets lanceolate, cuspidate.

In swamps, Illinois to South Dakota, Louisana and New Mexico. July-Sept.


Acnida tuberculata Moq. in DC. Prodr. 13: Part 2, 278. 1840.

Acnida tamariscina var. subnuda S. Wats. in A. Gray, Man. Ed. 6, 429. 1890.

Tall, erect, sometimes 10' high, with flexuous branches; inflorescence spicate; utricle ovoid, tubercled, indehiscent. Vermont to Manitoba, Tennessee and Nebraska. This and the following varieties perhaps constitute a distinct species.

Acnida tamariscina concatenata (Moq.) Uline & Bray, Bot. Gaz. 20: 158. 1895.

Acnida cannabina var. concatenata Moq. in DC. Prodr. 13: Part 2, 278. 1849.

Montelia tamariscina var. concatenata A. Gray, Man. Ed. 5: 415. 1867.

Stem often decumbent; flowers larger, in separated glomerules. Range of preceding variety.
Amaranthaceae.


Annual or perennial diffusely branched stellate-pubescent herbs, with opposite entire or slightly undulate petioled leaves, and very small perfect 3-bracted flowers, solitary or clustered in the axils. Calyx of 5 equal pilose erect dry oblong 1-nerved sepals. Stamens 5, hypogynous, their filaments united at the base, their anthers 1-celled. Ovary subglobose; style short; stigma capitate or 2-lobed. Utricle globose, indehiscent. [Greek, branch-hair, from the stellate pubescence.]

About 4 species, natives of southwestern North America and Mexico.


(Fig. 1411.)


Perennial, somewhat woody at the base, or sometimes annual, stem terete, much branched, sometimes thickened at the nodes, the branches prostrate or ascending, 4'-12' long. Leaves orbicular, broadly ovate or rhombic-ovate, obtuse or acute, usually narrowed at the base, entire, inconspicuously veined, rather firm, 2'-12' wide, the petioles shorter than or equalling the blades; flowers ½' broad or less, mostly clustered in the axils of small upper leaves toward the ends of the branches.

In dry soil, Kansas to Texas, Arizona and Mexico. June-Sept.

4. Froelichia Moench, Meth. 50. 1794.

Annual, erect woolly or silky, branching or simple herbs, with opposite sessile entire or slightly undulate narrow leaves, or the lower and basal ones contracted into petioles. Flowers perfect, 3-bracted, often bracteolate, in paniced dense spikes. Calyx tubular, nearly terete, 5-cleft or 5-toothed, very woolly, its tube longitudinally crested and sometimes tubercled in fruit. Stamens 5, their filaments united into a tube, which is 5-cleft at the summit and bears the 1-celled anthers between its lobes. Ovary ovoid; style slender or wanting; stigma capitate or penicillate. Utricle indehiscent, enclosed by the tube of united filaments. [Name in honor of J. A. Froelich, a German botanist.]

About 12 species, all American. Besides the following, 2 others occur in the Southwestern States.

Stout. 2°-4° tall; crests of fruitsing calyx continuous, dentate. Slender, 10'-20' tall; crests of fruitsing calyx interrupted.

1. Froelichia Floridana (Nutt.) Moq. Florida Froelichia. (Fig. 1412.)


Stem stout, 2°-4° tall, the branches slender, erect-ascending, leafless above. Upper leaves linear or linear-oblong, sessile, acute or acuminate at both ends, 1'-3' long; the lower spatulate or oblanceolate, obtuse or acute at the apex, 3'-6' long, ½'-1' wide, narrowed into margined petioles; spikes mostly opposite, narrowly ovoid or oblong, obtuse or subacute, ½'-1' long; fruiting calyx with prominent longitudinal wing-like toothed crests.

In dry soil, Illinois and Minnesota to Nebraska and Colorado, south to Tennessee, Florida, Kansas and Texas. June-Sept.
2. Froelichia gracilis Moq. Slender Froelichia. (Fig. 1413.)


Similar to the preceding species but the stem slender, branched, especially from the base, or sometimes simple, 10'-20' tall. Leaves all linear or linear-oblong, acute at both ends, 9'-2' long, sessile or the lower commonly spatulate, obtusish and narrowed into very short petioles; spikes alternate or opposite, oblong, mostly obtuse, 1/2'-1' long; fruiting calyx with 5 longitudinal rows of processes or these confluent into interrupted crests.

In dry soil, western Nebraska and Colorado to Texas. Perhaps intergrades with the preceding species. June-Sept.


Annual or perennial tall herbs, with opposite broad petioled thin leaves and very small polygamous perfect or dioecious 3-bracted white flowers, in large terminal panicles or pinnate spikes. Calyx 5-parted, the pistillate usually woolly-pubescent. Stamens 5, rarely less; filaments united by their bases, filiform; anthers 1-celled. Utricle very small, subglobose, indehiscent. [Greek, in allusion to the woolly pubescence.]

About 20 species, natives of warm and temperate regions. Besides the following another occurs in the southwestern United States.

1. Iresine paniculata (L.) Kuntze. Blood-leaf. Juba's Bush. (Fig. 1414.)


Annual, stem erect, usually branched, slender, 2'-5' tall, glabrous or nearly so. Leaves ovate, ovate-lanceolate or the upper lanceolate, 2'-6' long, slender-petioled, pinnately veined, nearly or quite glabrous; flowers very numerous, 1/2' broad or less, in large terminal much branched panicles; calyx and bracts silvery, dry; pistillate flowers white-villous at the base, about twice as long as the bracts.

In dry soil, Ohio to Kansas, south to Florida and Texas. Widely distributed in tropical America. Aug.-Sept.


POKEWEED FAMILY.

Herbs (some tropical species shrubs or trees) with alternate entire mostly exstipulate leaves, and perfect regular polygamous or monoeocious usually racemose flowers. Calyx 4-5-parted or of 4 or 5 distinct sepalas, its segments or sepalas imbricated in the bud. Petals wanting. Stamens as many as the calyx-segments or sepalas and alternate with them, or more numerous, hypogynous; filaments subulate or filiform, distinct or united at the base; anthers 2-celled, the sacs longitudinally dehiscent, often nearly separated. Ovary superior, several-celled in most of the genera; ovules solitary in the cavities, amphitropous. Styles as many as the carpels, short or none; stigmas linear or filiform. Fruit a berry in the following genus, capsular or samaroid in some tropical genera. Endosperm of the seed mealy or fleshy.

About 22 genera and 85 species, mostly in the tropics.
1. **PHYTOLACCA** L. Sp. Pl. 41. 1753.

Tall perennial herbs (some tropical species woody), with ample petioled exstipulate leaves, and small flowers in terminal racemuses, which by the further growth of the stem become opposite the leaves. Pedicels bracted at the base and often 1-3 bracted above. Calyx of 4 or 5 persistent rounded sepals. Stamens 5-15, inserted at the base of the calyx; anthers mostly oblong. Ovary subglobose, composed of 5-15 distinct or somewhat united carpels. Fruit a depressed-globose 5-15-celled fleshy berry. Seeds 1 in each cavity, erect, compressed; embryo annular in the mealy endosperm. [Name Greek and French, referring to the crimson juice of the berries.]

About 10 species, the following of eastern North America, the others of tropical distribution.

1. **Phytolacca decandra** L. Poke. Scocke. Pigeon-berry. Garget. (Fig. 1415.)

A glabrous strong-smelling succulent erect branching herb, 4°-12° tall, the root perennial, large, poisonous, the stem stout, its pith divided into disks separated by lens-shaped cavities. Leaves oblong-lanceolate or ovate-lanceolate, pinnately veined, acute or acuminate at both ends, 8'-12' long; petioles ½'-4' long; racemes peduncled, 2'-8' long; pedicels divergent, 2'-6'' long, each with a subulate-lanceolate bractlet at its base and usually 2 similar ones above; flowers perfect; calyx white, 2''-3'' broad, its sepal suborbicular, or oval; stamens 10, slightly shorter than the sepals; ovary green, 10-celled; styles recurved; berry dark purple, 5''-6'' in diameter, 3''-4'' high, very juicy, its 10 carpels conspicuous when dry.


**Four-o'clock Family.**

Herbs (some tropical genera trees or shrubs) with simple entire leaves, and regular flowers in terminal or axillary clusters, in the following genera sub-tended by involucres of distinct or united bracts. Petals none. Calyx inferior, usually corolla-like, its limb campanulate, tubular or salverform, 4-5-lobed or 4-5-toothed. Stamens hypogynous; filaments filiform; anthers 2-celled, dehiscent by lateral slits. Ovary enclosed by the tube of the perianth, sessile or stipitate, 1-celled, 1-ovuled; ovule campylotropous; style short or elongated; stigma capitate. Fruit a ribbed, grooved or winged anthocarp.

About 17 genera and 250 species, of wide geographic distribution, most abundant in America. Involucre of united bracts; pairs of leaves equal.

Involucre of separate bracts; pairs of leaves mostly unequal.

1. **Allionia** L. 1762.

1. **Allionia** Loebl. Iter Hisp. 181. 1758.


Forking herbs, with opposite equal leaves, and involucres in loose terminal panicles. Involucre 5-lobed (of 5 partially united bracts) 3-5-flowered, becoming enlarged and reticulate-leaved after flowering. Perianth campanulate, its tube constricted above the ovary, its limb corolla-like, deciduous. Stamens 3-5, generally 3, unequal, hypogynous. Fruit obovoid or clavate, strongly ribbed, pubescent in our species. [Name in honor of Chas. Allioni, 1725-1804, a botanist of Turin.]

About 20 species, natives of North and South America, one Asiatic.

Leaves broadly ovate, cordate or oblong-ovate, all petioled.

Leaves oblanceolate or oblong, only the lower petioled.

Plant glabrous or nearly so except the inflorescence.

Plant densely pubescent all over.

Leaves linear, sessile.

Plant tall, 1°-2° high; branches erect-ascending.

Plants low, 4'-16' high, diffusely branched; branches divergent.

Involucres axillary, their lobes ovate-oblong, acute.

Involucres clustered at the ends of branches, lobes semicircular, obtuse.

1. **A. nyctaginea**.

2. **A. albida**.

3. **A. hirsuta**.

4. **A. linearis**.

5. **A. Bodini**.

6. **A. Bushi**.
1. **Allionia nyctaginea** Michx. Heart-leaved Umbrella-wort. (Fig. 1416.)

*Allionia nyctaginea* Michx. Fl. Bor. Am. 1: 100. 1803.


Stem angled, often 4-sided below, rather slender, glabrous or but slightly pubescent, 1°-3° tall. Leaves broadly ovate, 2'-4' long, 1'-3' wide, acute at the apex, cordate, rounded or truncate at the base, all petioled except the small bract-like uppermost ones, glabrous or nearly so; peduncles and pedicels commonly somewhat pubescent; involucre shorter than the flowers; perianth red; stamens 3-5, exserted; style exserted; fruit oblong or narrowly obvoid, very pubescent.

In dry soil, Minnesota to the Northwest Territory, Illinois, Louisiana, Texas and New Mexico. May-Aug.


*Allionia ovata* Pursh, Fl. Am. Sept. 67. 1814.


Leaves oblong, lanceolate, oblanceolate or obovate, not at all cordate at the base; inflorescence very pubescent. Nebraska to Texas and New Mexico.

2. **Allionia albida** Walt. Pale Umbrella-wort. (Fig. 1417.)

*Allionia albida* Walt. Fl. Car. 84. 1788.


Stem erect, furrowed or striate, 4-sided below, 1°-3° tall, glabrous or pubescent above, the peduncles and branches commonly more or less glandular and viscid. Leaves lanceolate or oblong-lanceolate, 3-veined from the base, glabrous, pubescent or ciliate, the upper sessile, the lower short-petioled; involucre much enlarged in fruit, pubescent, ciliate, becoming whitish and purple-veined; perianth pink or lilac; stamens and style often exserted; fruit with 3 or 6 obtuse hispid ribs, roughened in the furrows.

South Carolina to South Dakota and Colorado, south to Florida, Missouri and Texas. May-Aug.

3. **Allionia hirsuta** Pursh. Hairy Umbrella-wort. (Fig. 1418.)


Stem slender, 1°-3° tall, erect, angled and striate, glandular-pubescent, especially at the nodes, occasionally glabrate toward the base. Leaves lanceolate or linear-lanceolate, obtuse at the apex, sessile or the lowest sometimes short-petioled, pubescent, 1'-3' long; branches and petioles very pubescent; inflorescence usually contracted; stamens often 5; fruit narrowly obvoid, the ribs obtuse, sometimes with low intermediate ribs in the furrows.

In dry soil, Minnesota to the Northwest Territory, south to Wisconsin, Colorado and Texas. July-Aug.
4. **Allionia lineāris** Pursh. Narrow-leaved Umbrella-wort. (Fig. 1419.)

*Allionia lineāris* Pursh, Fl. Am. Sept. 728. 1814.
*Calvmenia angustifolia* Nutt. Fraser's Cat. Name only. 1813.

Stem slender, terete or somewhat 4-angular below, glabrous, glaucous, 1⁰-4¼⁰ tall, erect, the branches and pedicules sometimes puberulent. Leaves linear, thick, 1-nerved, 1⁰-2½⁰ long, 1½⁰-4¼⁰ wide, obtuse or acute at the apex, sessile or the lower occasionally short-petiolate; involucres about 3-flowered, green before flowering; perianth purple, longer than the involucres; stamens and style exserted; fruit commonly roughened in the furrows between the 5 prominent ribs.

In dry soil, Minnesota to Utah, south to Texas and Mexico. June-Aug.

5. **Allionia Bōdini** (Holzinger) Morong. Bodin's Umbrella-wort. (Fig. 1420.)


Low, glabrous or minutely pubescent, stem whitish, diffusely branched, slender, 2′-5′ high, the branches divergent. Leaves narrowly linear, sessile, 3½-1½′ long, 1′ wide or less, slightly narrowed at both ends, fleshy; involucres solitary and short-peduncled in the upper axils, finely pubescent, about 3′ broad when mature, 5-lobed to about the middle, the lobes ovate-oblong, acute; fruit narrowly obovoid, obtusely 5-ribbed, very pubescent, 2½′ high.

In dry soil, eastern Colorado and western Kansas. June-July.

6. **Allionia Būshi** Britton. Bush's Umbrella-wort. (Fig. 1421.)


Low, glabrous, somewhat fleshy, stem nearly white, diffusely branched, about 8′ high, the branches slender, widely divergent. Leaves narrowly linear, sessile, 1′-3′ long, 1½′-1½′ wide, blunt, their width almost uniform from base to apex; involucres clustered at the ends of the branches, at first campanulate and longer than the flowers, at length rotate and becoming 10′ broad, membranous, pubescent, finely reticulate-veined, their short lobes semicircular, rounded, the midveins prominent.

In dry ground; Jackson Co., Missouri. Aug.


Annual or perennial herbs, with opposite petioled thick entire leaves, one of each pair somewhat larger than the other. Stems ascending, erect or prostrate, branching, mostly glandular-pubescent, with clustered or solitary numerous-flowered involucres on long axillary pedicules. Flowers sessile, usually conspicuous. Perianth-tube elongated, tubular or funnelform, the limb spreading, 5-lobed, the lobes obcordate or emarginate. Stamina 3-5,
equal, inserted on the tube of the perianth; anthers linear-oblong, included. Style filiform.

Fruit dry, 1-5-winged, the wings broad or narrow, reticulate-veined. Seed cylindric, smooth, shining. [Name from the Greek, graceful.]

About 15 species, all American. Besides the following, some 10 others occur in western North America.

Perennial; flowers white; wings of the fruit 1/"' broad or less.
Annual; flowers pink; wings thin, 4'-7"' broad, very conspicuous.

1. Abronia fragrans Nutt. White Abronia. (Fig. 1422.)


Perennial, viscid-pubescent, stem erect or ascending, usually much branched, 1'-2' high. Leaves ovate, ovate or oblong-elliptic, petioloed, obtuse at the apex, cuneate, truncate or rounded at the base, 1'-2' long; bracts of the involucre 5 or 6, large, ovate or ovobate, white; flowers white, very numerous in the involucres, 5'-10' long, fragrant, opening at night; fruit 4'-5' high, coriaceous with 5 or sometimes fewer, undulate coarsely reticulated wings about 1/"' wide, which do not close over its summit.

In dry soil, Iowa to Nebraska and Montana, south to Texas and Mexico. June-Aug.

2. Abronia micrantha. (Torr.) Chois.

Pink Abronia. (Fig. 1423.)


Annual, glabrous below, more or less glandular-pubescent above, stem ascending, branched, 1'-2' high. Leaves similar to those of the preceding species in size and outline; involucral bracts ovate or ovate-lanceolate, acute or acuminate; flowers several or numerous, about 9' long, bright pink; calyx-limb 4'-8' broad; fruit nearly 1' high, its 2-4 membranous wings 4'-7' broad, entire-margined, shining, very conspicuous, glabrous, united over the body of the fruit, beautifully reticulate-veined.

In dry soil, western Nebraska to Wyoming and Nevada, south to Texas and New Mexico. June-Aug.


CARPET-WEED FAMILY.

Herbs, rarely somewhat woody, mostly prostrate and branching, with (in our species) opposite or verticillate leaves and solitary cymose or glomerate perfect, small regular flowers. Stipules none or scarious, or the petiole-bases dilated. Calyx 4-5-cleft or 4-5-parted. Petals small or none in our species. Stamens perigonous, equal in number to the sepals, fewer, or more numerous. Ovary usually free from the calyx, 3-5-celled, and ovules numerous in each cell in our species. Fruit a capsule with loculicidal or circumscissile dehiscence. Seeds amphitropous; seed-coat crustaceous or membranous; endosperm scanty or copious; embryo slender, curved.

22 genera and about 500 species, mostly of warm regions, a few in the temperate zones.

Fleshy, sea-coast herbs; leaves opposite; capsule circumscissile. Not fleshy; leaves verticillate; capsule 3-valved.

1. Sesuvium.

AIZOACEAE.

1. SESUVIUM L. Syst. Ed. 10, 1058. 1759.

Fleshy decumbent or prostrate herbs, with opposite leaves and solitary or clustered axillary pink or purplish flowers. Stipules none, but the petioles often dilated and connate at the base. Calyx-tube top-shaped, 5-lobed, the lobes oblong, obtuse. Petals none. Stamens 5, inserted on the tube of the calyx. Filaments filiform, sometimes united at the base. Ovary 3-5-celled. Styles 3-5, papillose along the inner side. Capsule membranous, oblong, 3-5-celled, circumscissile. Seeds round-reniform, smooth; embryo annular.

About 4 species, natives of sea-coasts and saline regions. Besides the following, another occurs in the Southern States and in the alkaline areas of the Far West.

1. Sesuvium maritimum (Walt.) B.S.P. Sea Purslane. (Fig. 1424.)

Phanacem maritimum Walt. Fl. Car. 117. 1788.

Annual, glabrous, decumbent or ascending, rarely erect, branches 2'-12' long. Leaves obovate or spatulate, entire, rounded or slightly emarginate at the apex, narrowed into a petiole or the upper ones sessile, 4'-12' long; flowers sessile or very nearly so, about 1" broad, mostly solitary in the axils; stamens 5, alternate with the calyx-lobes; capsule ovoid, about 2" high, scarcely longer than the calyx.


2. MOLLUGO L. Sp. Pl. 89. 1753.

Herbs, mostly annual, much branched, with verticillate, or in some species basal or alternate leaves, and small cymose or axillary whitish flowers. Stipules scarious, membranous, deciduous. Calyx 5-parted. Sepals persistent, scarious-margined. Petals none. Stamens 5-5, when 3 alternate with the cells of the ovary, when 5 alternate with the sepals. Ovary ovoid or globose, usually 3-celled. Capsule usually 3-celled, 3-valved, loculicidally dehiscent. Seeds small, the testa smooth, granular or sculptured.

About 12 species, most of them of tropical distribution. Besides the following, another occurs in the Southwestern States.

1. Mollugo verticillata L. Carpetweed. (Fig. 1425.)

Mollugo verticillata L. Sp. Pl. 89. 1753.

Prostrate, glabrous, not fleshy, much branched, spreading on the ground and forming patches sometimes 20' in diameter. Leaves verticillate, in 5's or 6's, spatulate, obovate or linear, entire, obtuse, 6'-12' long, narrowed into a petiole; flowers axillary, less than 1" broad; pedicels filiform; sepals oblong, slightly shorter than the ovoid capsule, which appears roughened by the projecting seeds; seeds reniform, usually smooth and shining.

In waste places and cultivated grounds, New Brunswick and Ontario to Minnesota, south to Florida, Texas and Mexico. Native of the warmer parts of America, now widely distributed as a weed. Also called Indian Chickweed. May-Sept.
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