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University of Tennessee - Knoxville

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To the Graduate Council:

I am submitting herewith a thesis written by J. K. Underwood entitled "A Study of the Cyperaceae of Tennessee." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Forestry.

H. M. Jennison, Major Professor

We have read this thesis and recommend its acceptance:

L. R. Hesler

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

May 23, 1931.

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To the Committee on Graduate Study:

I submit herewith a thesis by Mr. Judson K. Underwood, "A Study of the Cyperaceae of Tennessee". I recommend that this thesis be accepted for eighteen quarter hours credit in fulfillment of the requirements for the degree of Master of Science.

A. M. Jernison
Major Professor.

At the request of the
Committee on Graduate Study,
I have read this thesis and
recommend its acceptance.

A. J. Heiler

Accepted by the Committee

G. M. James
Chairman

A STUDY OF THE
CYPERACEAE
OF
TENNESSEE

A Thesis Submitted to the
Graduate Committee
of the
University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science

J. K. Underwood

April 15, 1931

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ABBREVIATIONS OF THE NAMES OF AUTHORS

- AIT. — Aiton, William.
- ANDR. — Andrews, Henry C.
- ARN. — Arnott, George Arnold Walker.
- AUBL. — Aublet, Jean Baptiste Christophore Fusee.
- BALDW. — Baldwin, William.
- BOECKL. — Boeckeler, Otto.
- BRITT. — Britton, N. L.
- BUCKL. — Buckley, Samuel Botsford.
- ELL. — Elliott, Stephen.
- ENGELM. — Engelmann, George.
- GOODEN. — Goodenough, Samuel.
- HOOKE. — Hooker, William Jackson.
- H. and A. — Hooker, W. J., and Arnott, George A.
- L. — Linnaeus, Carolus, or Carl von Linne.
- LAM. — Lambert, Arjmer Bourke.
- L. C. RICH. — Richard, Louis Claude Marie.
- LESS. — Lessing, Christian Friedrich.
- MACK. — Mackenzie, Kenneth K.
- MICHX. — Michaux, Andre.
- MUHL. — Muhlenberg, Heinrich Ludwig.
- MURR. — Murray, Johann Andreas.
- NEES. — Nees von Esenbeck, Christian Gottfried.
- PERS. — Persoon, Christian Henrik.
- POIR. — Poiret, Jean Louis Marie.

- R. BR. - Brown, Robert.
- RAF. - Rafinesque-Schmaltz, Constantino Samuel.
- RETZ. - Retzius, Anders Johan.
- ROTTB. - Rottboell, Christen Fries.
- R. and S. - Roemer, J. J., and Schultes, Joseph August.
- SCHK. - Schkuhr, Christian.
- SCHULT. - Schultes, Joseph August.
- SCHWEIN. - Schweinitz, Lewis David von.
- SHUTTLW. - Shuttleworth, Robert.
- STEUD. - Steudel, Ernest Gottlieb.
- SULLIV. - Sullivant, William Starling.
- SVEN. - Svenson, H. K.
- TORR. - Torrey, John.
- TUCKERM. - Tuckerman, Edward.
- WAHL. - Wahlenberg, Georg.
- WALT. - Walter, Thomas.
- WATS. - Watson, Sereno.
- WILLD. - Willdenow.

ACKNOWLEDGMENTS

The author takes this opportunity to express his gratitude to all who have aided in the preparation of this paper. Especially does he thank Dr. H. M. Jennison and Dr. L. R. Hesler for their constructive criticisms and their collections. Those who have helped in the identification of species are Mr. W. A. Anderson, of the Gray Herbarium, Harvard University, Dr. H. K. Svenson of the Brooklyn Botanical Gardens, and Mr. K. K. Mackenzie of New York. The critical work of Mr. A. J. Sharp, Instructor in Botany, University of Tennessee, in testing the keys is also greatly appreciated.



Frontispiece CAREX STRIATULA Michx.

INTRODUCTION

There is a definite field of usefulness for an up-to-date and comprehensive treatment of the species of Cyperaceae found growing without cultivation within the borders of the State of Tennessee. With this in mind, the writer set about gathering material for the studies presented herewith. A large portion of the work done in connection with this thesis was accomplished during the last two years. Field studies and collections were made in many localities in the eastern half of Tennessee. For material collected west of Nashville, reference has been made to specimens deposited in The University of Tennessee herbarium by A. Gattinger, F. Lamson-Scribner, S. M. Bain, and others.

Scope of the Present Work

Of the fourteen cyperaceous genera known to be represented in Tennessee, the writer has himself collected eleven. He has found and collected 63 of the 146 species reported for the State. His own collection and many other sheets are on file at The University of Tennessee Department of Botany. In The University of Tennessee herbarium there are approximately 200 sheets of specimens of the Cyperaceae that have been collected in the State. Over

half of the specimens were collected by A. Gattinger. Additions by the author number sixty-three different species. Four species, namely, Carex eburnea, Carex umbellata, Carex misera, and Cymophyllus Fraseri, have been added to the list of species previously known to occur in Tennessee.

The several manuals, texts and papers cited in the bibliography appended furnished valuable information. The herbarium of The University of Tennessee also has been indispensable to the author.

The keys presented in this paper have their foundations in Gray's Manual ed. 7, 1908, and Britton and Brown, Illustrated Flora Vol. 1, 1913. However, many changes were made in order to simplify identification of difficult specific entities. The keys are designed to assist in the identification of 86 species of *Carex*, 20 species of *Cyperus*, 9 species of *Fleocharis*, 12 species of *Scirpus*, 6 species of *Rynchospora*, 2 of *Eriophorum*, 2 of *Scleria*, 3 of *Fimbristylis*, and one each of *Hemicarpha*, *Kyllinga*, *Dulichium*, *Dichromena*, *Cymophyllus*, and *Stenophyllus*.

Following each of the keys is an annotated list of the species. The annotations include a synonymy of the binomial as well as the valid name, the original citation, the common name (if any), the habitat, the time of fruition, the range, the place and date of collection, and by whom collected.

Previous Investigations

Contributions to our knowledge and collection of Tennessee cyperaceous plants have been made by a number of botanists, namely; Andre Michaux, A. Gattinger, Albert Ruth, F. Lamson-Scribner, T. H. Kearney, S. M. Bain, H. M. Jennison, and W. A. Anderson. Others who have done incidental collecting in this State are Asa Gray and J. K. Small, who, however, studied more intensively the flora of the neighboring states east of Tennessee.

GENERAL DISCUSSION

General Distribution and Occurrence

Plant members of the Cyperaceae growing in a wide variety of habitats are common from equatorial regions north to the Arctic Circle. Species of *Carex* and *Scirpus* are most numerous in cold and temperate climates, and become less numerous toward the equator. Although *Cyperus* is a tropical genus, many species grow naturally in the temperate regions. They confine themselves mostly to acid, swampy areas along the great rivers of the tropics and northward (Warming and Potter, 1920:287).

There are some 75 genera and 3200 species of the Cyperaceae widely distributed over most parts of the world. Of this huge number of species, only about 10 per cent

occur in the United States (Swingle 1928:225). One half of the number occurring in the United States grow in Tennessee. A majority of cyperaceous plants found in Tennessee enjoy a wide distribution. Many found here occur more or less generally through the area extending from Eastern Canada south to Florida and west to the Great Plains. Many of them range into the tropics. On the other hand a few species listed (Cymophyllus Fraseri, Carex misera, Carex Ruthii, and Carex austro-caroliniana) have remained and become peculiar to the mountains in North Carolina, South Carolina, West Virginia, Virginia, and Tennessee. They have become adapted to heavy rainfall and dense woods, and the first three mentioned to high altitudes. Most cyperaceous plants are selective regarding the choice of their environment. One may be reasonably sure of finding certain species in open woods, exposed mountain summits, deeply shaded places, wet meadows, rocky stream beds, moist banks, open fields and dry meadows, stream banks, swamps, and sphagnum bogs.

Economics

Few cyperaceous plants found in Tennessee have much economic value save as ground cover and what it affords in the way of protection against erosion. There are, however, a few species that have some forage value when they are tender; Carex aestivalis, Carex misera, and Carex pennsylvanica, which grow in sod and in open woods such as

found at Beech Gap at the base of Mount LeConte, furnish fair grazing for stock in the mountainous regions of Tennessee. A species of carex called "nut-grass" is reported by H. M. Jennison to be one of the chief forage plants in certain high valley ranges in Southwestern Montana. Many of the Cyperaceae contain a large amount of silica and possess a relatively low carbohydrate content. The leaves of many of them are dry and otherwise unpalatable because of saw-like edges, especially at fruiting time (Swingle 1928: 226). Cyperus esculentus is cultivated in some countries for its tuberous rhizomes which contain a high percentage of oil. Eleocharis tuberosa is used in the manufacture of starch in China and India. Various species of Cyperus of the East Indies and India yield ethereal oils and are used in making perfume (Warming and Potter 1920:287; Henry Kraemer 1916:472-473).

General Ecological Notes

Sedges play an important part in the conversion of ponds and swampy areas into dry land. They exist chiefly in primitive communities or unstable situations which eventually become forest or grassland, where sedges have a very small place. In like manner xerophytic areas support fewer sedges as the climax association enters. The great majority of sedges are marsh-loving plants, but many are xerophytes, and a few are mesophytes. The meso-

phytic sedges are constantly struggling with grasses for existence, in which struggle the latter are ultimately victorious. Meadows originating from raising of the water table are also without sedges, the xerophytic sedges of the more primitive stages disappearing before the meadow stage is reached. A brief ecological discussion of the various genera follows, special emphasis being given to the genus *Carex*.

Kyllinga

This genus is represented in Tennessee by a single species, namely Kyllinga pumila. It is a moisture-loving, low altitude plant, frequenting the open, sandy edges of ponds and lakes.

Cyperus

The majority of the species of this genus occur at the margins of lakes, ponds, and streams, usually in wet, sandy soil or in swampy places which are partially or entirely filled in by vegetation. The most common moisture-loving species are Cyperus atrovirens, C. lineatus, C. speciosus, and C. strigosus, which invariably occur in sandy or loamy shores or in wet, low places. The common xerophytic and mesophytic species, most of which prefer rocky and sandy soil to clay, are C. virens, C. retrofractus, C. rotundus, C. ovularis, C. refractus, C. echinatus, C. lancastriensis,

and C. filliculmis.

Eleocharis

Eleocharis obtusa is the common species bordering lakes, ponds, and swampy margins of streams. It becomes established in almost any soil found along the shore. It does not, however, grow on coarse grained substratum, but in fine sand, clay, or loam. It grows in mats or is caespitose, depending on the stages of advancement. All the species reported in Tennessee grow in wet soils of various kinds. However, some species not reported in this state grow at a distance from the margin of the water and show a mesophytic and even a xerophytic tendency.

Stenophyllus

The only representative of this species in Tennessee is a common roadside plant, namely Stenophyllus capillaris. It is always found in open places in dry or moist, sandy soil which has been washed down from some higher level.

Fimbristylis

The three species of this genus, Fimbristylis autumnalis, F. mucronulata, and F. laxa, are most commonly found in moist soil or mud at low altitudes.

Hemicarpha

This genus is represented in Tennessee by a single species, namely Hemicarpha micrantha. As a rule it is found in moist, sandy soil in open places.

Eriophorum

The two species found in Tennessee, Eriophorum angustifolium and E. virginicum, grow only in bogs.

Scirpus

Members of this genus grow for the most part at low elevations, but a few species such as Scirpus debilis are found in the higher altitudes around shores of natural ponds or shores created dams. On the other hand, Scirpus caespitosus is found along rocky open ledges in the higher regions of the Great Smoky Mountains. Scirpus validus, S. sylvaticus, S. atrovirens, S. georgianus, S. polyphyllus, S. divaricatus, S. lineatus, S. cyperinus, and S. carinatus are all found in bogs and margins of ponds or wet alluvial soil. S. fluviatilis grows primarily on river banks.

Dulichium

The only known species in Tennessee, Dulichium arundinaceum, is always found on wet, sandy or muddy shores. It

is the most common sedge on the shores of Lake Nakanawa, near Mayland, in Cumberland County. This sedge forms a continuous mat reaching its greatest height in the water and gradually diminishing to a few inches in height as it ascends the shore.

Dichromena

The single species, Dichromena latifolia, is found only in wet pine barrens where the soil is distinctly acid.

Rynchospora

Members of this genus grow in bogs. Rynchospora gracilentia generally is found in the wet pine barrens growing with sphagnum.

Scleria

Scleria pauciflora and S. triglomerata, the two representatives of this genus in Tennessee, are mostly mesophytic, but sometimes show a xerophytic tendency. Dry, open woodlands, dry meadows, and dry, sandy open places are the favorite habitats of these two species.

Carex

A great majority of *Carex* species are found in meso-

phytic and xerophytic situations, although some occur in wet places. There are four types of plant communities in which the role of *Carex* is considered: (1) Half-submerged *Carex* Association Type, (2) Sedge Moor Association Type, (3) Meadow Association Type, (4) Xerophytic *Carex* Grassland Association Type.

1. The Half-submerged *Carex* Association Type.

This type of association is too primitive to be found in East Tennessee to any extent, ponds and lakes being comparatively rare, due to the age and good drainage of the country. Therefore, the Half-submerged *Carex* Association Type will not be discussed further.

2. The Sedge Moor Association Type.

In this type of plant community the soil is not covered with water. The term sedge moor includes all communities dominated by *Carices* and often having a carpet of moss, generally sphagnum. It is an early stage in the hydrarch sequence. As the soil is built up through peat formation, or as the pond is lowered so that the water sinks further below the surface, either a willow thicket or a wet meadow develops. If the willow thicket is produced, it will in turn be followed by meadow, and this again in mountain districts may be replaced by coniferous forest, as, for instance, on the Cumberland Plateau.

In all sedge moors, Carices cover from 60 to 90 per cent of the soil surface. Mosses and liverworts are abundant. Grasses are generally present, differing in species with the life zone. Dicotyledonous plants also occur, chiefly representatives of the families Alismaceae, Ranunculaceae, Polygonaceae, and Gentianaceae. The species of *Carex* predominant in the sedge moor are *C. bullata*, *C. crinita*, *C. Frankii*, *C. intumescens*, *C. lurida*, *C. squarrosa*, *C. stipita*, *C. stricta*, *C. verrucosa*, *C. vulpinoidea*.

3. The Meadow Association Type.

The term meadow, as generally understood, comprises all mesophytic grassland, but does not include communities that make sedge moor or marsh. Meadows as here understood include for convenience all mesophytic habitats; that is, it is neither wet nor dry. Fringes of meadow occur along water courses, especially at the bends of streams. Hill-side meadows sometimes occur in the Great Smoky Mountains area. These are more common at middle elevations in the Cumberland Mountains wherever there is underlying limestone. The higher rainfall and lower temperatures of the mountain regions are suitable for meadow development, and the meadow association is often well developed in the low regions. The Great Smoky Mountains region is so steep and well drained that few meadows are found. However, grassy balds occur at the summits of Thunderhead Mountain, Gregory's Bald Moun-

tain, and on other lesser peaks in the Smokies. No sedges are found on these balds although the annual precipitation on them is high. Certain grasses, some of which are introduced, certain species of *Juncus*, some *Potentillas*, and a number of different kinds of shrubs, comprise the bald associations.

The common species of *Carex* found in mesophytic habitats are *C. crinita*, *C. debilis*, *C. digitalis*, *C. granularis*, *C. intumescens*; species of the laxiflora group, *C. Leavenworthii*, *C. mirabilis*, *C. pennsylvanica*; species of the Rosea group, *C. scabrata*, *C. stellulata*. *Carex misera*, *C. aestivalis*, and *C. debilis* are found in the beech and oak orchards in the mountain districts as well as in deforested areas.

4. The Xerophytic *Carex* Grassland Association Type.

There is no extensive Xerophytic Association Type in Tennessee which is truly xerophytic. However, the species found in Tennessee which are capable of living under xerophytic conditions are included. Those most frequently encountered are *C. cephalophora*, *C. eburnea*, *C. foenea*, *C. Muhlenbergii*, and *C. pennsylvanica*.

It is to be noted that sedges of the last two types of communities, namely mesophytic and xerophytic types, may be found in both habitats. The same can be said of the first

two types of communities, namely the half-submerged Carex Association Type and the Sedge Moor Association Type.

The foregoing ecological notes deal with the part played by sedges in the plant communities of East Tennessee, east of Nashville.

Taxonomy

In the construction of the keys the writer has tried to use the most conspicuous characteristics, avoiding, as far as possible, the minute or inconspicuous characters. In our keys we have not only devised ways and means for separating the entities but have described relationships as well as they are understood by arranging the entities in a definite order, the simplest and more primitive being first.

The great number of species, especially in the genus Carex, makes the group a very difficult one. Differences are easily seen by specialists, but to those who are not very familiar with the genus, the different forms seem to make a great array of plants grading into one another and appear so much alike as to be confusing. Many of the "species" are of recent origin. The genus is one in which a few structures as the achene, perigynium, stigma, and scale have undergone small evolutionary changes. The flowers and fruit, especially the latter, exhibit charac-

teristics by which the many groups of species can be distinguished. If the keys are studied, it will be noted that the achenes may be plano-convex, lenticular, or triangular. The perigynia may have long or short beaks, or may be beakless; they may be approximate or distant. Individual species differ in tallness of plants, width of leaves, pubescence, stoutness, time of flowering, and many other details that tend to pile up the possible permutations in their evolutionary development. The genus *Carex*, however, cannot be mistaken for any other genus since evolutionary changes have been restricted to the variation of a few characters. On the contrary certain species of *Scirpus* may be confused with the genera *Eleocharis*, or *Eriophorum*, and others.

With such an array of slightly varying species as found in *Carex*, it is no wonder that even yet some of the groups are in a chaotic state. Numbers 27-29 inclusive in Gray's Manual, seventh edition, *C. stellulata*, *C. sterilis*, *C. scirpoides*, and their varieties, the *Laxiflorae* and *Muhlbergianae*, are examples of groups which are as yet unsettled taxonomically.

The tendency of some taxonomists to split species has been carried to an extreme. This trend appears to some clear thinking botanists as ridiculous, since it complicates the already bewildering field of terminology. The specific

distinctions are so difficult to follow, that only the specialist can carry on the identification. A suggested method by which one may arrive at the solution of many taxonomic problems is to breed those plants in question in their natural habitats and determine the type species and its off-shoots and set up a trinomial with a note as to the origin of the plant. This system has the advantage in that it would show the phylogeny of the group, and helps greatly in understanding it.

SYSTEMATIC TREATMENT

CYPERACEAE

J. St. Hil. Expos. Fam. 1:62. 1805.

The Sedge Family

Herbaceous, annuals or perennials, rarely biennials. Culms solid (rarely hollow) without nodes (rarely with nodes), triangular, quadrangular, terete, flattened or cylindrical. Roots fibrous, fascicled, corm-like, or stoloniferous. Leaves mostly linear, three ranked. Leaf sheaths closed in most species. Ligules wanting or rudimentary. Flowers arranged in solitary spike or clustered spikelets*, a single flower in the axil of each scale. Flowers bisexual or unisexual. Perianth reduced to a few bristles

* Spikelet - diminutive and often secondary spike. See

corresponding to leaves, which may be absent. Stamens usually three; the anthers are attached by their bases to the filament. Pistil with two or three styles or style branches. Ovary 1-celled with 1 ovule forming an achene in fruit which is usually three angled, but in some species lenticular or plano-convex. The embryo is small, and lies at the base of the seed in the central line surrounded on the inner side by the endosperm. On germination the cotyledon does not remain in the seed.

Key to Genera

1. Flowers one or more, perfect; inflorescence capitate or umbellate.
2. Basal empty scale of spikes or spikelets none, or not more than 2 (except in *Eriophorum* where 3-many scales develop).
3. Spikelets flat; bristles none; scales in 2 ranks.
 4. Spikelets 1-flowered 1. Kyllinga
 4. Spikelets 2-many flowered 2. Cyperus
3. Spikelets not flat; scales spirally imbricated.
 5. Base of style persistent as ^a/tubercle on the achene.
 6. Culms not leaf bearing; leaves reduced to only a sheathing base; bristles present; spikelets 1 3. Eleocharis
 6. Culms leaf bearing; leaves short and ciliate; bristles none; spikelets several or many 4. Stenophyllus
 5. Base of style deciduous; no tubercle.
 7. Perianth none (bristles lacking).
 8. Spikelets umbellate 5. Fimbristylis
 8. Spikelets capitate, attached laterally in the involucre 6. Hemicarpha
 7. Perianth present (1-many bristles).
 9. Bristles smooth, soft, white or brown, straight or crisped, exserted much beyond scales (6-many) 7. Eriophorum
 9. Bristles smooth or barbed, short or rarely little exserted 8. Scirpus

- 2. Basal empty scales of spikelets 3 or more.
 - 10. Culms hollow, jointed; spikelets 2-ranked, linear, many-flowered, jointed; scales 2-ranked; achene flattened, linear-oblong, beaked with long persistent style. Bristles 6-9 9. Dulichium
 - 10. Culms not hollow or jointed, rachis of spikelets not jointed; scales spirally imbricated.
 - 11. Bristles none; scales obtuse; achene with decurrent tubercle 10. Dichromena
 - 11. Bristles 1-20, generally 6; scales mostly mucronate; achene capped, not decurrent 11. Rynchospora
- 1. Flowers all imperfect, (plants monoecious or dioecious); spikelets clustered in terminal and axillary fascicles, or spicate.
 - 12. Leaves more than one, with sheath, ligule and midvein
 - 13. Achene naked, bony, smooth or papillose 12. Scleria
 - 13. Achene enclosed by perigynium, smooth 13. Carex
 - 12. Leaves 1, without sheath, ligule or midvein 14. Cymophyllus

1. KYLLINGA Rottb. Descr. and Ic. 12. pl. 4,
f. 3, 4. 1773.

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-cleft, deciduous from the summit of the achene. Achene lenticular.

A single species known to occur in our range:

KYLLINGA PUMILA Michx. Annual, culms densely tufted, filiform, erect or reclined, 3-40 cm. long, mostly longer than the leaves; leaves light green; blades roughish on the margins, usually less than 2 mm. wide; bracts of the involucre 3-5, elongated, spreading or reflexed; head oblong or ovoid-oblong, 6-7 mm. long, simple or commonly with 1 or 2 smaller ones at the base; spikelets about 3 mm. 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; stigmas 2; achene lenticular, obtuse.

Annotations for the Species

KYLLINGA PUMILA Michx. Fl. Bor. Am. 1:28. 1803. Low Kyllinga. Common. Tufted annual. In moist or wet soil. Summer and fall. Delaware to Florida, Illinois, Kansas, Texas, and Mexico; West Indies and tropical America.

In Tennessee, S. M. Bain at Jackson, Madison Co., August, 1892. T. H. Kearney at Knoxville, 1000 ft. elev., September 20, 1891. A. Gattinger at Nashville. J. K. Underwood at Knoxville, 1000 ft. elev., July 3, 1929.

2. CYPERUS (Tourn.) L. Sp. Pl. 44. 1753.

Annual or perennial. Culms mostly triangular, simple, leafy at the base. Inflorescence terminal, umbellate with involucre of leaves, simple, compound or capitate. Spikelets flat, or nearly terete, 2 to many flowered. Scales concave, conduplicate or keeled, 2 ranked. Flowers perfect. Perianth none. Stamens 1-3. Styles 2-3 cleft, deciduous. Achene lenticular or three angled, no tubercle.

Key to Species of Cyperus

1. Styles 2 cleft; stamens 2-3; culms slender and tufted; achene lenticular.
2. Superficial cells of achene oblong; achene black, obtuse, shining (use 16 mm. objective and reflected light) 1. C. flavesceus
2. Superficial cells of achene quadrate.
4. Scales membranous, dull 2. C. diandrus
4. Scales rather coriaceous, shining . . . 3. C. rivularis
1. Styles 3-cleft, stamens 1 or 3; culms slender or stout, tufted or not; achene trigonous.
5. Styles 3 cleft; stamens 1.
6. Leaf-blades 2 mm. wide or less; culms slender.
7. Scales light brown, tip long acuminate . 4. C. inflexus
7. Scales pale green, tip short acuminate 5. C. acuminatus
6. Leaf-blades 2-12 mm. wide; culms stout.
8. Leaves smooth, striate, 6-12 mm. wide . 6. C. virens
8. Leaves smooth, nodulose, midvein prominent, 2-6 mm. wide 7. C. pseudovegetus
5. Styles 3 cleft; stamens 3.
9. Annual.
10. Spikelets flat; leaves rough margined; scales mucronulate.
11. Spikes loose; spikelets 6-25 mm. long; achene 1 mm. long, pointed at both ends 8. C. erythrorhizos
11. Spikes dense, cylindric, spikelets 3-5 mm. long; achene minute 9. C. Halei

- 10. Spikelets subterete; leaves reddish toward base; culms tufted.
- 12. Spikes dull brown; spikelets 8-25 mm. long, less than 2 mm. thick . . . 10. C. speciosus
- 12. Spikes yellow brown or gray brown; spikelets 16-25 mm. long, 2 mm. thick . . . 11. C. ferax
- 9. Perennial by scaly tuber-bearing rootstocks or corms.
- 13. Perennial by scaly tuber-bearing rootstocks; spikelets flat.
- 14. Styles exserted; scales dark purple brown, or with green margins; achene linear oblong . . . 12. C. rotundus
- 14. Styles not exserted, or briefly exserted; scales straw colored; achene obovoid . . . 13. C. esculentus
- 13. Perennial by corms; spikelets subterete except C. strigosus, C. echinatus.
- 15. Achene linear-oblong, 2.5-4 times as long as broad.
- 16. Spikelets strongly flattened, 7-15 flowered, yellow to yellow-brown; scales oppressed . . . 14. C. strigosus
- 16. Spikelets subterete, 1-6 flowered.
- 17. Spikelets loose, spreading, lower reflexed; culm stout, smooth . 15. C. refractus
- 17. Spikelets dense, capitate or spicate.
- 18. Culms slender, rough pulvulent; spikelets all reflexed . . . 16. C. retrofractus
- 18. Culms smooth, spikelets spreading or only lower ones reflexed.
- 19. Heads globose; spikelets radiating . . . 17. C. ovularis
- 19. Heads oblong or short cylindric, lower spikelets reflexed . . . 18. C. Lancastriensis
- 15. Achene oblong or obovoid, not more than twice as long as thick.
- 20. Rachis wingless . . . 19. C. filiculmis
- 20. Rachis broadly winged . . . 20. C. echinatus

Annotations on the Species

1. CYPERUS FLAVESCENS L. Sp. Pl. 46. 1753. Yellow
 Cyperus. Common. Tufted annual. In marshy soil, low ground. Summer and fall. New York to Michigan, Illi-

nois, Florida to Mexico and Costa Rica. Also in Old World and Africa.

In Tennessee, A. Gattinger at Nashville, August, 1885. S. M. Bain at Henderson, Chester Co., August, 1892. S. M. Bain at Knoxville, September 24, 1894. J. K. Underwood at Jamestown, Fentress Co., 1800 ft. elev., July 19, 1930.

2. CYPERUS DIANDRUS Torr. Cat. Pl. N. Y. 90. 1819. Syn.--Cyperus diandrus elongatus Britton, Bull. Torr. Club 19: 226. 1892. Low Cyperus. Common. Tufted annual. Low ground, marshy places. Summer and fall. New Brunswick to Ontario to Nebraska and Kansas south to Florida and Mexico. Also in the Old World.

In Tennessee, A. Gattinger at Tullahoma, Coffee Co., 1867, and Nashville, August, 1885.

3. CYPERUS RIVULARIS Kunth. Enum. 2:6. 1837. Syn.--Cyperus diandrus var. castaneus Torr. Ann. Lyc. N. Y. 3: 252. 1836. Not C. castaneus Willd. 1798. Shining Cyperus. Common. Tufted annual. In wet soil especially along streams and ponds. Summer and fall. Maine to southern Ontario and Michigan, south to Nebraska, Missouri, North Carolina and Kansas.

In Tennessee, reported generally over the State. A. J. Sharp at Postella, Polk Co., September 15, 1930.

4. CYPERUS INFLEXUS Muhl. Gram 16. 1817. Syn.--Cyperus aristatus Boeckl. Linnaea, 35:500, in part. 1868. Not Rottb. 1773. Awned Cyperus. Common but local. Dwarf, tufted annual. Fragrant in drying. Sandy wet soil. July to September. New Brunswick to British Columbia south to Florida, Texas, California and Mexico.

In Tennessee, A. Gattinger at LaVergne, Rutherford Co., August, 1867. S. M. Bain at Eagleville, Rutherford Co., July, 1892. G. G. Ainsle at Nashville, September 28, 1915.

5. CYPERUS ACUMINATUS Torr. and Hook. Ann. Lyc. N. Y. 3: 436. 1836. Short-jointed Cyperus. Common. Tufted annual. Low ground or moist soil. Summer and fall. Illinois to Iowa, Dakotas, Oregon, Louisiana, Kansas, Texas, and California.

In Tennessee, A. Gattinger at LaVergne, Rutherford Co., July, 1881.

6. CYPERUS VIRENS Michx. Small Fl. S. E. U. S. 167. 1903. Common. Perennial, often tufted. In sandy soil. Spring to fall. North Carolina, Tennessee to Florida and west to California. Also Mexico and Central America.

In Tennessee, A. Gattinger at Brownsville, Haywood Co.

7. CYPERUS PSEUDOVEGETUS Steud. Syn. Pl. Cyp. 24. 1855.

Syn.—Cyperus calcaratus Nees S. Wats. in A. Gray Man. Ed. 6, 570. 1890. Marsh Cyperus. Common. Perennial by thickened joints of rootstocks. In marshes. Summer and fall. New Jersey, Delaware to Florida, Kentucky, Missouri, Kansas and Texas.

In Tennessee, reported over the state by A. Gattinger.

8. CYPERUS ERYTHORRHIZOS Muhl. Gram. 20. 1817. Red-rooted Cyperus. Common. Tufted annual. In wet soil, especially along streams. Summer and fall. Ontario, Minnesota, Massachusetts, Nebraska, Kansas, Texas, California, Florida.

In Tennessee, A. Gattinger in Davidson Co., September 18, 1886.

9. CYPERUS HALEI Torr. Britton, Bull. Torr. Club 13:213. 1886. Hale's Cyperus. Not common. Tufted annual. In swamps. Summer and fall. Southern Missouri to Tennessee, Louisiana and Florida.

In Tennessee, A. Gattinger at Nashville.

10. CYPERUS SPECIOSUS Vahl. Enum. 2:364. 1806. Syn.—Cyperus Michauxianus Schult. Mant. 2:123. 1824. Michaux's Cyperus. Common. Tufted annual. Variable in overlapping of scales. In marshes ^{on} and river banks. Summer and fall. Massachusetts to Ohio, Minnesota,

South Dakota, south to Florida, Kansas, Texas and California.

In Tennessee, A. Gattinger at Nashville.

11. CYPERUS FERRAX L. C. Richard Act. Soc. Hist. Nat. Paris 1:106. 1792. Coarse Cyperus. Common. Tufted annual. In wet soil, low ground. Summer and fall. Massachusetts to Florida west to Ontario and Texas and California and widely distributed in tropical America.

In Tennessee, A. Gattinger at Nashville.

12. CYPERUS ROTUNDUS L. Sp. Pl. 45. 1753. Syn.--Cyperus Hydra Michx., Fl. Bor. Am. 1:27. 1803. Nut-grass. Common. A pest in the South. Perennial by tuber bearing stolons. In fields and sandy soil. Summer and fall. Virginia to Florida, Missouri, Kansas and Texas. Also in tropical America and widely distributed in the Old World.

In Tennessee, G. G. Ainsle at Franklin, Williamson Co., August 21, 1914.

13. CYPERUS ESCULENTUS L. Sp. Pl. 45. 1753. Syn.--Cyperus phymatodes Muhl. Gram. 23. 1817. Yellow Nut-grass. Common, sometimes a pest. Perennial by scaly tuber-bearing stolons. Sandy and moist fields, low ground and along streams. Summer and fall. New Brunswick to Minnesota, Nebraska, Florida, Texas, California to Alaska.

Also tropical America and Old World.

In Tennessee, A. Gattinger at Nashville, August, 1885. J. K. Underwood, at Knoxville, 1000 ft. elev., July 25, 1929.

Cyperus esculentus angustispicatus Britt. Bull. Torr. Club 13:211. 1886. A variety very common about Middle and West Tennessee. Massachusetts and Missouri to South Carolina.

14. CYPERUS STRIGOSUS L. Sp. Pl. 47. 1753. Straw-colored Cyperus. Common. Perennial by basal-tuber-like corms. Several races. Along streams, moist meadows and swamps. Maine and Ontario to Minnesota, Nebraska, Texas and Florida.

In Tennessee, A. Gattinger at Nashville. A. Gattinger at Richland Station. Lamson Scribner at Madisonville, Monroe Co., August, 1890. J. K. Underwood at Knoxville, 1000 ft. elev., August 15, 1929.

Var. CAPITATUS Boeckl. Linnaea 36:347. 1869-70. Occurs with type.

Var. COMPOSITUS Britton, Bull. Torr. Club 13:212. 1886. Occurs with type.

Var. ROBUSTIOR Kunth. Enum. 2:88. 1837. Occurs with type.

Var. ELONGATUS (Torr.) Britton. North Carolina and Tennessee, and Texas.

15. CYPERUS REFRACTUS Engelm. Boeckl. Limaea 36:369.

1869-70. Reflexed Cyperus. Common. Perennial by tuber-like corms. In dry fields or woods. Summer and fall. New Jersey, to North Carolina, Georgia, Missouri, and Texas.

In Tennessee, A. Gattinger at Nashville, August, 1888. A. J. Sharp, east of Isabella, Polk Co., September 15, 1930. J. K. Underwood at Clinch Mt., above Lea Lakes, Blaine, Grainger Co., 1200 ft. elev., July 7, 1929.

16. CYPERUS RETROFRACTUS (L.) Torr. A. Gray, Man. 519.

1848. Syn.--Scirpus retrofractus L. Sp. Pl. 50. 1753.

Cyperus dipsaciformis Fernald, Rhodora 8:127. 1906.

Rough Cyperus. Common. Perennial by corms. In dry, sandy or rocky soil. Summer and fall. New Jersey to Florida, west to Kentucky, Missouri and Texas.

In Tennessee, A. Gattinger at Hollow Rock, Carroll Co., July 16, 1886. S. M. Bain at Henderson, Chester Co., July, 1892. J. K. Underwood at Clinch Mt., above Lea ^{Blaine,} Lakes, Grainger Co., 1200 ft. elev., July 7, 1929.

17. CYPERUS OVULARIS (Michx.) Torr. Ann. Lye. N. Y. 3:278.

1836. Syn.--Kyllinga ovularis Michx. Fl. Bor. Am. 1:

29. 1803. Globose Cyperus. Common. Perennial by hard corms. In dry fields and hills, sandy soil. Summer and fall. Southern New York, to Florida, west to Illinois, Kansas, and Texas.

In Tennessee, Lamson Scribner in Madison Co.,
August, 1890. S. M. Bain at Henderson, Chester Co.,
July, 1892. J. K. Underwood at Nashville, in the cedar
barrens, July 21, 1930. J. K. Underwood at Line Springs,
Blount Co., 1500 ft. elev., July 28, 1929.

18. CYPERUS LANCASTRIENSIS Porter A. Gray, Man. Ed. 5, 555.
1867. Lancaster Cyperus. Common. Perennial by ovoid
or oblong corms. In dry fields. Summer and fall. New
Jersey and Pennsylvania to Georgia, Missouri and Alabama.
In Tennessee, A. Gattinger at Nashville, September,
1880.

19. CYPERUS FILICULMIS Vahl. Enum. 2:328. 1806. Syn.--
Cyperus filiculmis macilentus Fernald, Rhodora 8:128.
1906. Cyperus macilentus Bicknell, Bull. Torr. Club 35:
478. 1908. Slender Cyperus. Common; rare northward.
Perennial by hard oblong corms. In dry fields and hills,
sterile soil. Spring and summer. Maine to Ontario,
Minnesota, Florida, Nebraska, Kansas, Texas, Mexico.

In Tennessee, A. Gattinger at Nashville. Lamson -
Scribner at Knoxville, 1000 ft. elev., April 20, 1889.

20. CYPERUS ECHINATUS (Ell.) Wood, Class-book 734. 1863.
Syn.--Cyperus globulosus Aubl. Pl. Guian. 1:47. 1775.
Mariscus echinatus Ell. Bot. S. C. & Ga. 1:75. 1816.
Cyperus Baldwinii Torr. Ann. Lyc. N. Y. 3:270. 1863.

Baldwin's Cyperus. Common, sometimes a weed. Perennial by tuber-like corms. In dry or sandy soil. Summer. Virginia to Florida, west to Missouri and Texas. Also in tropical America.

In Tennessee, A. Roth at Knoxville, 1000 ft. elev.

3. ELEOCHARIS R. Br. Prodr. Fl. Nov. Holl. 1:224. 1810.

Annual or perennial sedges. Culms simple, triangular, quadrangular, 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 involucre. Scales concave, spirally imbricated all around. Perianth of 1-12 bristles, usually retrorsely barbed, wanting in some species. Stamens 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 turgid. Base of the style persistent on the summit of the achene, forming a terminal tubercle.

Key to the Species of Eleocharis

1. Culms conspicuously angled, coarse (2-5 mm. in diam.).
2. Culms 4-angled; achene constricted below the summit into a neck about $\frac{1}{4}$ the width of the achene 1. E. quadrangulata
2. Culms 3-angled; achene not constricted, but gradually prolonged into a cellular beak. Achene yellowish with quadrangular cells 2. E. mutata

1. Culms not conspicuously angled or if so, less than 2 mm. in diam., mostly slender, filiform or setaceous.
3. Tubercle nearly or quite as broad as achene, depressed or deltoid.
4. Tubercle deltoid, compressed, $1/3$ to $1/2$ as long as achene; bristles 6-8, usually longer than achene, deciduous 3. E. obtusa
4. Tubercle depressed (very low), not more than $1/4$ as high as achene; summit of achene truncate; bristles 6 equalling achene or rudimentary 4. E. Engelmanni
3. Tubercle not as broad as achene, conic, conic-pyramidal; achene 3-angled or turgid.
5. Culms filiform or setaceous or obscurely 4-angled.
6. Bristles usually equal or slightly exceeding the tubercle; achene smooth, pyriform, or narrowly obovoid, yellowish-castaneous, 1-14 cm. long 5. E. calva
6. Bristles usually shorter or equalling achene or wanting.
7. Spikelets compressed, narrowly ovate or linear oblong, few flowered (3-10); achene with rib on each angle and 6-9 lower intermediate ribs connected by fine ridges 6. E. acicularis
7. Spikelets not compressed, but terete or nearly so, many-flowered.
8. Achene smooth, white 7. E. Torreyana
8. Achene papillose, yellowish-brown . . . 8. E. capitata
5. Culms flattened, striate, slender . . . 9. E. compressa

Annotations on the Species

1. ELEOCHARIS QUADRANGULATA (Michx.) R. and S. Syst. 2:155. 1817; Torr. Ann. Lyc. N. Y. 3:297. 1835; Fernald, Rhodora 27:38, t. 149. 1905. Syn.--Scirpus quadrangulatus Michx. Fl. Bor.-Am. 1:30. 1803. Scirpus marginatus Muhl. Gram. 28. 1817. Scirpus albomarginatus R. and S. Mant. 2:74. 1824. Eleocharis mutata Britton and Brown, Ill. Fl. ed. 2. 1:311. 1913. Not Scirpus

mutatus L. Am. Acad. 5:391. 1760. Angled Spike-rush.
Rare. Perennial by stout rootstocks. In ponds, streams,
and swamps. Summer and fall. Massachusetts to New Jer-
sey, Ontario, Michigan, Alabama, Missouri, Texas and
south to South America. Also West Indies.

In Tennessee, A. Gattinger at Jones Bend, Davidson
Co.

2. ELEOCHARIS MUTATA (L.) R. & S. Syst. 2:155. 1817.
Kunth, Enum. 2:154. 1837; Britton & Brown, Ill. Fl. ed.
2. 1:311 1913 in part; Fernald, Rhodora, xxvii. 39, t.
149. 1925. Syn.--Scirpus mutatus L. Amer. Acad. V.
391. 1759; Sp. Pl. ed. 2. 1:71. 1762. Limnochloa mu-
tata Nees, Linnaea, 9:294. 1835. Eleocharis scariosa
Steud. Cyp. 80. 1855. Eleocharis spiralis Boeckl.
Linnaea, 36:473. 1869-70, as to American plant. Rare.
Perennial by stout rootstocks. In ponds, bogs, and
streams. Summer and fall. Massachusetts to New Jersey,
Ontario, Michigan, Alabama, Missouri, Texas and Guate-
mala. Also West Indies and South America.

In Tennessee, A. Gattinger at Nashville.

3. ELEOCHARIS OBTUSA (Willd.) Schultes. Mant. 2:89. 1824;
Torr. Ann. Lyc. Nat. Hist. N. Y. 3:302 1836 excl. Syn.
Gron. Fl. Virg. Syn.--Eleocharis ovata C. B. Clarke,
Journ. Bot. 25:268. 1887. Britton, Journ. N. Y. Micr.
Soc. 5:102. 1882. Scirpus obtusus Willd. Enum. Hort.

Berol. 1:76. 1809. Scirpus capitatus Walt. Fl. Car. 70. 1788; Pursh, Fl. Am. Sept. 1:55. 1814. Scirpus ovatus Pursh, Fl. Am. Sept. 1:54. 1814. Not Roth. Scirpus elegantulus Steud. Cyp. 317. 1855. Eleocharis ovata var. obtus Kukenth. in Skottsberg, Medd. Goteborgs Bot. Tradgard, 2:212. 1925-26. Eleocharis obtusa jejuna Fernald, Proc. Am. Acad. 34:492. 1899. Blunt Spike-rush. Common. Tufted annual. In wet soil. Summer and fall. Cape Breton Island to Minnesota, Ontario, British Columbia, Florida and Texas.

In Tennessee, A. Gattinger at Tullahoma, Coffee Co., August, 1879. J. K. Underwood at Knoxville, 1000 ft. elev., June 28, 1929. A. J. Sharp at Postelle, Polk Co., September 15, 1930.

4. ELEOCHARIS ENGELMANNI Steud. Syn. Pl. Cyp. 79. 1855. Syn.--Eleocharis ovata var. Engelmanni Britton, Journ. N. Y. Micros. Soc. 5:103. 1889. Eleocharis monticola Fernald, Proc. Am. Acad. 34:496. 1899. Engelmann's Spike-rush. Local. Annual. In wet soil. Summer and fall. Massachusetts to Indiana, South Dakota, Washington, New Jersey, Virginia, Arkansas, Texas, and California.

In Tennessee, A. Gattinger at Tullahoma, Coffee Co., August, 1879.

5. ELEOCHARIS CALVA Torr. Fl. N. Y. 11. 346 1843. Syn.--Scirpus glaucus Torr. Fl. Nor. and Mid. U. S. 44. 1824.

Not Eleocharis glauca Boeckl. 1871. Eleocharis palustris var. calva (Torr.) Gray, Man. 522. 1848. Eleocharis palustris var. glaucescens of many Am. auth., not Scirpus glaucescens Willd. 1809. Trichophyllum palustre, var. calvum (Torr.) Farwell, Rep. Mich. Acad. Sci. xxi. 358. 1920. Not common. Perennial by loose stolons. Wet shores, bogs or springy spots. Summer and fall. Quebec to Alberta and Washington, south to Florida, Oklahoma and North Mexico. Also Hawaii and Eastern Asia.

In Tennessee, Bicknell, along the Cumberland River, Nashville, June, 1894.

6. ELEOCHARIS ACICULARIS (L.) R. and S. Syst. 2:154. 1817. Syn.--Scirpus acicularis L. Ap. Pl. 48. 1753. Needle or Least, Spike-rush. Common. Tufted, perennial by filiform stolons. In wet soil and muddy shores. Summer and fall. Across the continent from Newfoundland to British Columbia, New Jersey, Missouri, Mexico, California. Also in Europe and Asia.

In Tennessee, A. Gattinger at Nashville, October, 1878.

7. ELEOCHARIS TORREYANA Boeckl. Linnaea 36:440. 1870.

Torrey's Spike-rush. Tufted annual. In wet sandy soil. Summer. Connecticut to Florida and Texas, mostly near the coast. Also in Cuba.

Thought to be in Tennessee, about Tullahoma, Coffee

Co. H. K. Svenson.

8. ELEOCHARIS CAPITATA (L.) Sven. Rhodora 20, p. 23, 1918.

Syn.--Scirpus tenuis Willd. Enum. 1:76. 1809. Eleocharis tenuis Schultes, Mant. 2:92. 1824. Eleocharis nitida Fernald, Rhodora 1:76. 1906. Slender Spike-rush. Common. Tufted. Perennial by rootstocks. In wet soil. Spring and summer. Cape Breton Island to Ontario and Manitoba, south to Florida and Texas.

In Tennessee, reported over the state by A. Gattinger.

9. ELEOCHARIS COMPRESSA Sulliv. Am. Journ. Sci. 42:50.

1842. Syn.--Eleocharis acuminata (Muhl.) Nees, Linnaea 9:294. 1835. Scirpus acuminatus Muhl. Gram. 27. 1817. Flat-stemmed Spike-rush. Common. Perennial by stout rootstocks. In wet soil, more often in calcereous soil. Summer. Anticosti to Manitoba, Washington, Georgia, Louisiana, Missouri and Nebraska.

In Tennessee, George G. Ainsle at Nashville.

4. STENOPHYLLUS Raf. Neog. 4. 1825.

Mostly annual sedges, with slender erect culms, leafy below, the leaves narrowly linear or filiform, with ciliate or pubescent sheaths. Spikelets umbellate, capitate 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.

A single species known to occur in our range:

STENOPHYLLUS CAPILLARIS (L.) Britton. Annual, roots fibrous, culms filiform; densely tufted, erect, grooved, smooth, 5-25 cm. tall. Leaves filiform, roughish, much shorter than the culm, their sheaths more or less pubescent with long hairs; involucre bracts 1-3, setaceous; spikelets narrowly oblong, somewhat 4-sided, 5-8 mm. long, less than 2 mm. thick, several in a terminal umbel, or in depauperate forms solitary; scales oblong, obtuse or emarginate, puberulent, dark brown with green keels; stigmas 3; achenes yellow-brown, narrowed at the base, very obtuse or truncate at the summit, nearly 1 mm. long, transversely wrinkled; tubercle minute, depressed.

Annotations for the Species

STENOPHYLLUS CAPILLARIS (L.) Britton. Bull. Torr. Club 21: 30. 1894. Syn.--*Fimbristylis capillaris* A. Gray, Man. 530. 1848. *Scirpus capillaris* L. Sp. Pl. 49. 1753. Hair-like *Stenophyllus*. Common. Tufted annual. In dry or moist soil. Summer and fall. Throughout North America,

except far north. Also tropical America.

In Tennessee, A. Gattinger at Tullahoma, Coffee Co., August, 1807. G. G. Ainsle, at Nashville, October, 1917.

5. *FIMBRISTYLIS* Vahl, Enum. 2:235. 1806.

Annual scapose herbs. Culms slender, compressed, tufted. Spikelets umbellate, 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 pubescent or glabrous, its base usually much enlarged, but falling away from the summit of the achene at maturity. Stigmas 2-3. Achenes lenticular, biconvex or 3-angled, their surface finely reticulated; tubercle conic-subulate, about 1/2 as long as the achene or shorter, capping its summit, partly or entirely falling away at maturity.

Key to Species of Fimbristylis

1. Achene lenticular; umbel simple or slightly compound, style 2 cleft; central spikelets sessile 1. *F. laxa*
1. Achene 3-angled, style 3 cleft.
 2. Culm longer than leaves or sometimes equalled by leaves; achene distinctly reticulated; spikelets ovoid or oval, blunt 2. *F. autumnalis*
 2. Culm usually much exceeding the leaves; achene smooth or indistinctly reticulated; spikelets linear-oblong, acute 3. *F. mucronulata*

Annotations on the Species

1. FIMBRISTYLIS LAXA Wahl. Small, Fl. S. E. U. S. 187.

1903. Robinson and Fernald in Gray, Man. ed. 7, 187.

1908. Annual. In moist soil. Summer and fall.

Southern Pennsylvania to Missouri, Florida and Texas.

Also in tropical America.

In Tennessee, A. Gattinger at LaVergne, Rutherford Co.

2. FIMBRISTYLIS AUTUMNALIS (L.) R. and S. Mant. 2:180.

1771. Also Rhodora 20:25. 1918. Syn.--Fimbristylis Frankii Steud. Syn. Pl. Cyp. 3:1885. Fimbristylis Brachyactis Fernald, Rhodora 2:180. 1909. Fimbristylis geminata (nees) Kunth. Britton and Brown Ill. Fl. ed.

2. 1:322. 1913. Low Fimbristylis. Common. Tufted annual. In moist soil. Summer and fall. Maine to Ontario, Tennessee and Louisiana.

In Tennessee, reported by Britton and Brown, Ill. Fl.

3. FIMBRISTYLIS MUCRONULATA (Michx.) Blake, Rhodora 20:25.

1918. Syn.--Fimbristylis autumnalis (L.) R. and S.

Britton and Brown, Ill. Fl. ed. 2. 1:322. 1913; Small, Fl. S. E. U. S. 188. 1903; Gray Man. ed. 7. 187. 1908. Slender Fimbristylis. Common. Tufted annual. In moist soil. Summer and fall. Connecticut to Illinois,

Florida and Texas. Also tropical America.

In Tennessee, S. M. Bain at Henderson, Chester Co., August, 1892. T. H. Kearney at Knoxville, September 6, 1891. F. Lamson Scribner at Madisonville, Monroe Co., August, 1890. A. Gattinger at Tullahoma, Coffee Co., and Nashville. J. K. Underwood at Knoxville, 1000 ft. elev., July 3, 1929.

6. *HEMICARPHA* Nees and Arn. Edinb. New Phil.

Journ. 17:263. 1834.

Low, tufted, mostly annuals, 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, a single hyaline inner scale between the flower and the rachis of the spikelet, bristles none. Stamens 1. Style 2-cleft, deciduous, not swollen at the base. Achene oblong, turgid or lenticular.

A single species known to occur in our range:

HEMICARPHA MICRANTHA (Vahl.) Pax. Annual, glabrous, culms densely tufted, compressed, grooved, diffuse or ascending, 2-10 cm. long, mostly longer than the setaceous smooth leaves. Spikelets ovoid, many-flowered, obtuse, about 2 mm. long, capitate in 2's-4's or solitary; involucral leaves, or one of them, usually much exceeding the

spikelets; scales brown, obovate, with a short blunt tip; achene obovate to oblong, obtuse, mucronulate, little compressed, light brown, its surface minutely cellular-reticulated.

Annotations for the Species

HEMICARPHA MICRANTHA (Vahl) Pax. E. and P. Nat. Pflf. 22: 105. 1887. Syn.--Hemicarpha subsquarrosa Nees in Mart. Fl. Bras. 2: Part 1, 61. 1842. Hemicarpha Drummondii Nees, in Mart. Fl. Bras. 2¹:61. 1842. Scirpus micranthus Vahl, Enum. 2:254. 1806. Common Hemicarpha. Tufted annual. In moist, sandy soil. Summer and fall. New Hampshire to Ontario, Washington, Florida, Texas, Mexico and South America.

In Tennessee, A. Gattinger at Nashville.

7. ERIOPHORUM L. Sp. Pl. 52. 1753.

Bog sedges, perennial by rootstocks. Culms erect, triangular. Leaves linear. Spikelets terminal umbel or dense terminal capitate cluster, subtended by an involucre of 2-4 bracts. Scales spirally imbricated. Flowers perfect. Perianth bristles numerous and exerted much beyond scales at maturity. Stamens 1 or 3. Style deciduous. Stigmas 3. Achene oblong or obovoid, acute or obtuse, light brown.

Key to Species of Eriophorum

- Spikelets 3-12, drooping in a terminal umbel;
perianth bristles bright white, 4-5 times
longer than scale, achene obovoid, obtuse
. 1. E. angustifolium
- Spikelets several or numerous in a dense
terminal capitate cluster; perianth bristles
dingy brown, about 3 times longer than
scale; achene linear-oblong, acute . . . 2. E. virginicum

Annotations on the Species

1. ERIOPHORUM ANGUSTIFOLIUM Roth, Tent. 1:24. 1788. Syn.
--Eriophorum polystachyon L. Sp. Pl. 52, in part. 1753.
Tall Cotton-grass. Local. Perennial by rootstocks. In
bogs. Summer. Newfoundland to Alaska, Maine, Illinois,
Colorado, Oregon, New Jersey south through mountains of
Georgia.

In Tennessee, reported in mountain bogs of East
Tennessee by A. Gattinger.

2. ERIOPHORUM VIRGINICUM L. Sp. Pl. 53. 1753. Syn.--Erio-
phorum virginicum album A. Gray, Man. ed. 5. 566. 1867.
Virginia Cotton-grass. Local. Perennial by rootstocks.
In bogs. Summer and fall. Newfoundland to Manitoba,
south to Florida and Nebraska.

In Tennessee, A. Gattinger in mountain bogs of
Cumberlands, and at Sewanee, Franklin Co., July, 1878.

8. SCIRPUS L. Sp. Pl. 47. 1753.

Annual or perennial very small or very large sedges, with leafy culms or 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 or 2 lower sometimes empty. Flowers usually all perfect. Perianth of 1-6, slender or rigid, short or elongated, barbed, pubescent, or smooth bristles, or none in some species. Stamens 2 or 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.

Key to species of Scirpus

1. Inflorescence solitary or capitate in clusters; basal leaves none or solitary and bristle-like at the base of each culm.
2. Achene 3-angled; spikelets solitary; styles 3-cleft.
 3. Achene smooth, oblong; bristles 6, smooth; perennial 1. S. caespitosus
 3. Achene granular, oval; bristles none; annual 2. S. carinatus
2. Achene plano-convex; spikelets in capitate clusters of 1-12, appearing lateral; styles 2-cleft, rarely 3-cleft 3. S. debilis
1. Inflorescence in simple or compound terminal umbels.
 4. Achene plano-convex; style 2-cleft 4. S. validus
 4. Achene 3-angled; style 3-cleft.

- 5.Spikelets large, 17-25 mm. long; culm sharp-triangular 5. S. fluviatilis
- 5.Spikelets small, 3-12 mm. long, numerous.
- 6.Bristles barbed downwardly, if present.
- 7.Lower sheaths red-tinged; bristles as long as, or slightly exceeding, the achene; culms triangular 6. S. sylvaticus
- 7.Lower sheaths green throughout, not red-tinged.
- 8.Bristles shorter than, or about equaling the achene.
- 9.Culms triangular; bristles nearly equaling or equalling the achene; sheaths and lower leaves nodulose-reticulate; scales mucronate, 1.5-2 mm. long; bristles smooth below 7. S. atrovirens
- 9.Culms terete or nearly so; bristles shorter than the achene, often wanting; sheaths and lower leaves smooth, hardly nodulose 8. S. georgianus
- 8.Bristles about twice as long as the achene; scales bright brown, mucronulate 9. S. polyphyllus
- 6.Bristles pubescent or smooth.
- 10.Bristles shorter than, or scarcely exceeding the scales.
- 11.Bristles pubescent, longer than the achene; scales greenish-brown; achene nearly white 10. S. divaricatus
- 11.Bristles smooth, longer than the achene, equalling the reddish-brown scales with green midvein; achene pale brown 11. S. lineatus
- 10.Bristles much exerted beyond the scales when mature; entangled, smooth, gray-brown; involucre bracts with bases often brown or black 12. S. cyperinus

Annotations on the Species

1. SCIRPUS CAESPITOSUS L. Sp. Pl. 4. 1753. Tufted Club-rush or Deer-hair. Not common. Tufted perennial. In bogs and on moist rocks. Summer. Greenland to Alaska, south to the mountains of New England, the Adirondacks, Western New York, Illinois, Minnesota, and British

Columbia, in the Rocky Mountains to Colorado and on the higher summits of the southern Alleghanies. Also in Europe and Asia.

In Tennessee, Chickering at Roane Mt., North Carolina. J. K. Underwood at summit of Mt. LeConte, Sevier Co.

2. SCIRPUS CARINATUS (H. & A.) A. Gray, in Small, Fl. S. E. U. S. 178. 1903. Syn.--Isolepis carinata H. and A., in Small, Fl. S. E. U. S. 178. 1903. Tufted annual. Low ground. Spring. Tennessee to Oklahoma, California, Alabama, and Texas.

In Tennessee, S. M. Bain at Madison and Chester Cos., 1892.

3. SCIRPUS DEBILIS Pursh, Fl. Am. Sept. 55. 1814. Syn.--Scirpus Smithii A. Gray Man. ed. 5, 503. 1867. Weak-stalked Club-rush. Common in West Tennessee. Tufted annual. In wet soil and bogs. Summer. Maine to Ontario, Minnesota, Georgia, Alabama, and Nebraska.

In Tennessee, S. M. Bain near Jacks Creek, Chester Co., August, 1892. A. Gattinger at Nashville, May, 1886.

4. SCIRPUS VALIDUS Vahl. Enum. 2:268. 1806. Syn.--Scirpus lacustris L. mostly of American authors, not Linnaeus. American Great Bullrush. Common. Perennial by stout root-stocks. In ponds and swamps. Summer and fall.

Throughout North America except far north. Also in West Indies.

In Tennessee, A. Gattinger at Cleveland, July, 1878. E. E. Gayle in Carter Co. T. H. Kearney at Fountain City, Knox Co., June 10, 1893. J. K. Underwood at Knoxville, 1000 ft. elev., June 22, 1929.

5. SCIRPUS FLUVIATILIS (Torr.) A. Gray, Man. 527. 1848. Syn.--Scirpus maritimus var. fluviatilis Torr. Am. Lyc. N. Y. 3:324. 1836. River Bullrush. Not common. Perennial by large rootstocks. In shallow water along lakes and streams. Summer. Quebec to Minnesota, New Jersey, Nebraska, and Kansas. Range extended further south.

In Tennessee, A. Gattinger in bogs along Ocoee River, Polk Co., East Tennessee.

6. SCIRPUS SYLVATICUS L. Sp. Pl. 51. 1753. Wood Bullrush. Common. Perennial by long rootstocks. In swamps. Summer. Maine to Michigan south to North Carolina, Tennessee, and Georgia. Also in Europe and Asia.

Reported in Tennessee by J. K. Small and A. Gattinger.

7. SCIRPUS ATROVIRENS Muhl. Gram. 43. 1817. Syn.--Scirpus georgianus Harper, Bull. Torr. Club 27:331. 1900. Dark green Bullrush. Common. Perennial by

slender rootstocks. In swamps. Summer. Nova Scotia to Saskatchewan south to Georgia and Louisiana.

In Tennessee, T. H. Kearney at Fountain City, Knox Co., June, 1893. S. M. Bain at Eagleville, Rutherford Co. A. Gattinger at Nashville, June, 1878.

8. SCIRPUS GEORGIANUS Harper, Bull. Torr. Club 27:331.

1900. Syn.—Scirpus atrovirens Muhl. Gram. 43. 1817. Common. Perennial by slender rootstocks, occasionally proliferous. In wet alluvial soil. Spring and summer. Quebec to Michigan, Georgia, and Arkansas,

In Tennessee, J. K. Underwood at Fountain City, Knox Co., June 15, 1929.

9. SCIRPUS POLYPHYLIUS Vahl. Enum. 2:274. 1806. Leafy

Bullrush. Perennial by slender rootstocks. In swamps, wet woods, and meadows. Summer. Massachusetts to Minnesota, south to Georgia, Tennessee, Alabama, and Arkansas.

In Tennessee, T. H. Kearney at Knoxville, September, 1891. A. Gattinger at Nashville.

10. SCIRPUS DIVARICATUS Ell. Bot. S. C. and Ga. 1:88. pl. 2.

f. 4. 1816. Spreading Bullrush. Perennial. In swamps. Summer. Virginia to Kentucky, Missouri, Florida, and Louisiana.

In Tennessee, S. M. Bain in Jackson, Madison Co., October 30, 1892.

11. SCIRPUS LINEATUS Michx. Fl. Bor. Am. 1:32. 1803. Reddish Ballrush. Common. Perennial by stout rootstocks. In swamps and wet meadows. Summer. New Hampshire to Ontario, Kansas, Oregon, Georgia, and Texas.

In Tennessee, T. H. Kearney at Fountain City, Knox Co., June 10, 1893. J. K. Underwood, at Fountain City, Knox Co., 1000 ft. elev., June 19, 1929.

12. SCIRPUS CYPERINUS (L.) Kunth, Enum. 2:170. 1837. Syn.

--Scirpus Eriophorum Michx. Fl. Bor. Am. 1:33. 1803.

Eriophorum cyperinum L. Sp. Pl. Ed. 2, 77. 1762.

Scirpus pedicellatus Fernald, Rhodora 2:16. 1900.

Wool-grass. Common. Perennial by stout rootstocks. In swamps. Summer and fall. Newfoundland to Ontario, Saskatchewan, Virginia, and Tennessee.

In Tennessee, G. G. Ainsle at Knoxville, October 17, 1929.

9. DULICHNUM L. C. Richard; Pers. Syn. 1:65.
1805.

Tall perennial herbs, with terete, hollow, conspicuously jointed stems, 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 bris-

ties. Stamens 3. Style persistent as a beak on the summit of the achene. Stigmas 2. Achenes linear-oblong.

A single species known to occur in our range:

DULICHIMUM ARUNDINACEUM (L.) Britton. Stems stout, 3-10 dm. tall, erect; leaves numerous; blades flat, 2-8 cm. long, 4-8 mm. wide, spreading or ascending, the lower sheaths bladeless, brown toward their summits; peduncles 4-25 mm. long; spikelets narrowly linear, spreading, 1-2.5 cm. long, about 2 mm. wide, 6-12-flowered; scale lanceolate, acuminate, strongly several-nerved, oppressed, brownish; bristles rigid, longer than the achene; style long-exserted, persistent.

Annotations for the Species

DULICHIMUM ARUNDINACEUM (L.) Britton, Bull. Torr. Club 21: 29. 1894. Syn.--Dulichium spathaceum Pers. Syn. 1:65. 1805. Cyperus spathaceus L. Syst. Ed. 12, 2:753. 1767. Cyperus arundinaceus L. Sp. Pl. 44. 1753. Dulichium. Common. Perennial. In wet or muddy places. Summer and fall. Newfoundland to Ontario, Minnesota, Washington, Florida and Texas, south to Costa Rica.

In Tennessee, T. H. Kearney at Knoxville, August 29, 1891. A. Gattinger at Jones Bend, Davidson Co., September, 1881. A. Gattinger at Nashville. H. M. Jennison at Maryland, Cumberland Co., July 12, 1930. J. K. Underwood at

Mayland, Cumberland Co., 1800 ft. elev., Aug. 19, 1930.

10. *DICHROMENA* Michx. Fl. Bor. Am. 1:37. 1803.

Leafy-stemmed sedges, perennial by rootstocks, the spikelets crowded in a terminal head involucre by several bracts, 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 subulate. Stigmas 2, very slender. Achene lenticular, transversely rugose, crowned with the broad persistent base of the style. Plants blooming from spring to fall.

A single species known to occur in our range:

DICHROMENA LATIFOLIA Baldw. Stem stout, obtusely triangular or nearly terete. Leaf-blades lanceolate or linear-lanceolate, tapering gradually to a long acuminate apex from a broad base, 3-8 mm. wide, sometimes overtopping the stem, but the lowest much shorter; bracts of the involucre 7-10, strongly reflexed when old; head globose, 1-2 cm. in diameter; spikelets oblong, subacute; scales ovate-lanceolate, nearly white, rather obtuse; achenes nearly orbicular in outline, a little over 1 mm. long, excluding the tubercle, pale brown, faintly wrinkled transversely and longitudinally so as to appear reticulated; the tubercle decurrent on its margins.

Annotations for the Species

DICHROMENA LATIFOLIA Baldw. Ell. Bot. S. C. and Ga. 1:90. 1816. Broad-leaved Dichromena. Not common. Perennial by rootstocks. In wet pine barrens. Summer. Virginia to Florida and Texas.

In Tennessee, A. Gattinger at Tullahoma, Coffee Co.

11. RYNCHOSPORA Vahl, Enum. 2:229. 1806.

Leafy, mostly perennial by rootstocks, with erect 3-angled or terete culms, narrow, flat, or involute leaf-blades, 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 1-24 (mostly 6) upwardly or downwardly barbed or scabrous bristles, or wanting in some species. Stamens commonly 3. Stigmas 2, rarely wholly united. Achene lenticular or swollen, not 3-angled, smooth, cancellate or transversely wrinkled, capped with the persistent base of the style, or in some species by the whole style.

Key to Species of Rynchospora

1. Leaves wide (6-16 mm.); spikelets much over 1 cm. long; style entire or minutely two-cleft, 2-4 times longer than achene; inflorescence umbellate, terminal and axillary, broad 1. R. corniculata

1. Leaves narrower (0.5-4.0 mm. wide); spikelets less than 1 cm. long (3-6 mm.). Style deeply 2-cleft, short; inflorescence small, corymbose or cymose in terminal or axillary clusters.
2. Achene smooth.
3. Scales white or pale green, bristles 9-15 2. R. alba
3. Scales brown or dark brown, bristles 6, about equal or slightly longer than the achene; Leaves shorter than the smooth culm.
4. Leaves 2 mm. or less wide.
5. Leaves setaceous scarcely 1 mm. wide, channeled; achene shining 3. R. fusca
5. Leaves flat or involute in drying, 2 mm. or less, achene dull 4. R. gracilentia
4. Leaves 2-4 mm. wide, flat 5. R. capitellata
2. Achene transversely wrinkled, bristles shorter than the achene 6. R. cymosa

Annotations on the Species

1. RYNCHOSPORA CORNICULATA (Lam.) A. Gray. Ann. Lyc. N. Y. 3:205. 1835. Syn.--Rynchospora corniculata macrostachya Britton, Trans. N. Y. Acad. Sci. II:84. 1892. Rynchospora macrostachya Torr. Ann. Lyc. N. Y. 3:206. 1835. Schoenus corniculatus Lam. Tabl. Encycl. 1:137. 1791. Horned Rush. Common. Perennial by rootstock. In swamps over the State. Summer and fall. Massachusetts to Florida, west to Ohio, Missouri, Kansas, and Texas.

In Tennessee, A. Gattinger at Pond Station, near Guthrie, Todd Co., Kentucky, and Tullahoma, Coffee Co., July, 1886. S. M. Bain at Henderson, Chester Co., August, 1892.

2. RYNCHOSPORA ALBA (L.) Vahl, Enum. 2:236. 1806. Syn.--

Rynchospora alba marca Clarke; Britton, Trans. N. Y.

Acad. Sci. 11:88. 1892. Schoenus albus L. Sp. Pl. 44.

1753. White Beaked-rush. Local. Perennial by short rootstock. In bogs. Summer. Newfoundland to Alaska, south to Florida, Kentucky, Minnesota, Idaho, Oregon, and California. Also in northern Europe and Asia.

In Tennessee, A. Gattinger, in bogs in the Cumberland Mountains.

3. RYNCHOSPORA FUSCA (L.) Ait. Hort. Kew., ed. 2, 1:127.

1810. Syn.--Schoenus fuscus L. Sp. Pl. ed. 2, 1664.

1763. Brown Beaked-rush. Not common. Perennial by rootstocks. Tufted. In bogs. Summer. Newfoundland to Delaware and Florida, west along St. Lawrence River and Great Lakes to Michigan. Also in Europe.

In Tennessee, A. Gattinger, in the Cumberlands.

4. RYNCHOSPORA GRACILENTA A. Gray, Ann. Lyc. N. Y. 3:216.

1835. Slender Beaked-rush. Not common. Swampy pine barrens and low ground. Summer. Southern New York to Florida and Texas, near the coast.

In Tennessee, A. Gattinger, at Sewanee, Franklin Co., August, 1878.

5. RYNCHOSPORA CAPITELLATA (Michx.) Vahl, Enum. 2:235.

1806. Syn.--Rynchospora glomerata Vahl, Enum. 2:234.

1806. Schoenus glomeratus L. Sp. Pl. 44. 1753. Clustered Beaked-rush. Common. Perennial by slender rootstocks. In moist soil and boggy places. Summer and fall. New Brunswick to Ontario, Michigan, Arkansas, Florida, and Texas.

In Tennessee, Lamson Scribner, at White Cliff Springs, Monroe Co., June, 1890. S. M. Bain, at Henderson, Chester Co., August, 1892. A. Gattinger, at Nashville, J. K. Underwood, at Gatlinburg, Sevier Co., 1200 ft. elev., August, 9, 1929. J. K. Underwood, at Jamestown, Fentress Co., 1500 ft. elev., July 19, 1930.

6. RYNCHOSPORA CYMOSA Ell. Bot. S. C. and Ga. 1:58. 1816. Syn.--Schoenus cymosus Muhl. Gram. 8. 1817. Grass-like Beaked-rush. Common. Perennial by rootstocks. Tufted. Moist soil, bogs. Summer. New Jersey to Illinois, Arkansas, Florida, and Texas.

In Tennessee, A. Gattinger, at Tullahoma, Coffee Co., July 8, 1880.

12. SCLERIA Berg, Kongl. Acad. Sv. Handl. 142. pl. 4, 5. 1765.

Leafy, 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. Stamens 1-3. Achene globose or ovoid, obtuse, crustaceous or bony, white.

Key to Species of Scleria

Leaves 3-9 mm. wide; achene ovoid or ovoid-globose, smooth, bony, white, shining . 1. S. triglomerata

Leaves 2 mm. wide or less; achene oblong or globose, papillose, crustaceous . . . 2. S. pauciflora

Annotations on the Species

1. SCLERIA TRIGLOMERATA Michx. Fl. Bor. Am. 2:168. 1803.

Syn.--Scleria triglomerata var. gracilis Britton, Ann.

N. Y. Acad. Sci. 3:230. 1885. Not S. gracilis Ell.

1824. Tall Nut-rush. Frequent. Perennial by stout clustered rootstocks. In meadows, thickets, and dry sand. Summer and fall. Vermont to Ontario, Wisconsin, Florida, Arkansas, and Texas.

In Tennessee, A. Gattinger, at Tullahoma, Coffee Co., and Lookout Mountain, Hamilton Co. Lamson-Scribner, at Knoxville, May, 1890. S. M. Bain, at Jackson, Madison Co., May, 1893. H. M. Jennison, at Chilhowee Mt., Blount Co., June 29, 1930. G. G. Ainsle, at Elkmont, Sevier

Co., July 15, 1919.

2. *SCLERIA PAUCIFLORA* Muhl.; Willd. Sp. Pl. 4:318. 1805.

Papillose Nut-rush. Frequent. Perennial by thick clustered rootstocks. In dry soil. Summer and fall. New Hampshire to Ohio, Missouri, Kansas, Florida, and Texas.

In Tennessee, S. M. Bain, at Henderson, Chester Co., May, 1893. A. Gattinger, at LaVergne, Rutherford Co.

13. *CAREX* L. Sp. Pl. 972. 1753.

Perennial by rootstocks. Grass-like. Culms mostly triangular. Leaves three-ranked. Spikes in the axils of leafy or scale-like bracts, often aggregated into heads. Flowers monoecious, or dioecious, solitary in the axils of scales. Staminate and pistillate flowers borne in different parts of the spike, or in separate spikes on the same culm, or rarely the plant dioecious. Perianth none. Stamens 3. Stigmas 2 or 3. Achene surrounded by the perigynium. Achene lenticular or plano-convex, or trigonous.

Key to Species of Carex

1. Staminate flowers scattered or at the base or apex of spike; spikes sessile; stigmas 2 and achenes lenticular, plano-convex or ellipsoid, compressed.
2. Staminate flowers at the apex of the spike.

3. Spikes green or reddish-brown tinged; the sheaths loose, or if tight, not red-dotted or cross-puckered.
4. Perigynia more or less conspicuously spongy below the middle, the margins more or less inflexed, smooth or rough.
5. Leaves 1-4.5 mm. wide.
6. Perigynia with fine serrulate margins, scales blunt.
7. Perigynia tapering or but little contracted into a beak, inconspicuously white hyaline at the orifice, stigma not twisted, elongated, light brownish-red; spikes with 3-12 perigynia; leaves averaging 1.5 mm. in width . . . 1. C. rosea
7. Perigynia contracted into a beak, conspicuously white-hyaline at the orifice; stigma twisted, short, deep brownish-red.
8. Perigynia 3.25-4.5 mm. long, widely radiating, leaves averaging 2.5 mm. wide; spikes with 9-12 perigynia . . . 2. C. convoluta
8. Perigynia 2.5-3 mm. long, more ascending; leaves averaging about 1 mm. wide; spikes with 2-6 perigynia; bract of lowest spike very conspicuous . . . 3. C. radiata
6. Perigynia with smooth margins; scales acuminate, spikes mostly approximate.
9. Perigynia ovoid; scales 1/2 as long as perigynia . . . 4. C. retroflexa
9. Perigynia lance-subulate; scales less than 1/2 as long as perigynia . . . 4(a). C. retroflexa
var. texensis
5. Leaves 5-10 mm. wide . . . 5. C. conjuncta
4. Perigynia not spongy below the middle, the margins slightly if at all inflexed.
10. Scales tinged with reddish-purple; Perigynia 4-6 mm. long; scales shorter than the spreading perigynia . . . 6. C. muricata
10. Scales not tinged with reddish-purple.
11. Leaves not more than 4.5 mm. wide.
12. Leaves and culms stiff and wiry; heads 1.5-4 cm. long (rarely 1.5 cm. long).
13. Perigynia nerved, 3 mm. long; scales short awned, about as long as, and narrower than, the perigynia . . . 7. C. Muhlenbergii

13. Perigynia nerveless. 7(a). C. Muhlenbergii
var. enervis
12. Leaves and culms soft; heads 0.7-1.8
cm. long (rarely 1.8 cm. long).
14. Perigynia elliptic-ovate, 2 mm. long;
scales equal or a little shorter
than the perigynia 8. C. cephalophora
14. Perigynia cordate-deltoid, less than
2 mm. long; scales shorter and nar-
rower than the perigynia 9. C. Leavenworthii
11. Leaves 5 mm. or more wide; perigynia
deep green, longer than the whitish
sharp pointed scale, narrowly margined,
sometimes slightly inflexed 10. C. sparganioides
3. Spikes yellow or brown; sheaths tight,
either red-dotted or cross-puckered.
15. Beak not longer than the body of the
perigynia.
16. Perigynia plano-convex, yellowish when
ripe 11. C. vulpinoidea
16. Perigynia plump, biconvex, blackish
and shining when ripe 12. C. diandra
15. Beak much elongated, twice to 3-4 times
the length of the body of the strongly
several nerved, spongy at the base
perigynia.
17. Perigynia 4-5 mm. long, rounded at the
base, tapering into a rough flattened
beak 1-2 times as long as the body of
the perigynia 13. C. stipata
17. Perigynia 8 mm. long with a short hard
disk-like base and subulate rough
beak, 3-4 times longer than the body
of the perigynia 14. C. crus-corvi
2. Staminate flowers at the base of the spike
or scattered.
18. Perigynia wingless, plano-convex, as-
cending or appressed; leaves soft, 2
mm. wide or less; plants slender and
lax.
19. Perigynia oval to ovate-oval, 2-2.7 mm.
long; spikes subglobose or short-ob-
long, rarely over 5 mm. long 15. C. brunescens
19. Perigynia linear lanceolate, 4-5 mm.
long; spikes narrowly oblong cylindric,
8-16 mm. long 16. C. bromoides
18. Perigynia with narrow or broad marginal
wings.
20. Perigynia with narrow marginal wings,
spongy at the base; spreading or re-
flexed.
21. Perigynia ovate; culms 1-4 dm.
tall 17. C. stellulata

- 21. Perigynia rounded-cordate at the base,
tapering gradually; culms 1-2 m.
tall 18. C. Ruthii
- 20. Perigynia with broad marginal wings,
not spongy at the base, ascending.
- 22. Perigynia less than 2 mm. wide.
- 23. Perigynia 5 mm. or more long.
- 24. Spikes bright-brown, pointed;
scales brown, acuminate or cus-
pidate 19. C. scoparia
- 24. Spikes green-brown, blunt; scales
whitish, acute 20. C. tribuloides
- 23. Perigynia less than 5 mm. long.
- 25. Scales shorter than the perigynia
and nearly as wide; perigynia con-
spicuously nerved on the outer
face, few nerved or nerveless on
the inner face; beak long 21. C. mirabilis
- 25. Scales about equalling the perigynia
and concealing them; perigynia
strongly nerved on both faces; beak
short. 22. C. foenea
- 22. Perigynia 2 mm. or more broad.
- 26. Scales shorter than the perigynia;
perigynia tapering to a longish beak.
- 27. Leaves 3 mm. wide or less; perigynia
nerved on both faces, or few nerved
or nerveless on inner face.
- 28. Spikes approximate, ovoid pointed;
inflorescence not flexuous . . . 19. C. scoparia
- 28. Spikes distant or upper approximate,
ovoid, obtuse; inflorescence
flexuous 23. C. tenera
- 27. Leaves 2.5-6 mm. wide; spikes sub-
globose or ovoid, mostly approxi-
mate; perigynia nerved on outer
face, fewer nerved or nerveless on
inner face 21. C. mirabilis
- 26. Scales about equal to the perigynia . 22. C. foenea
- 1. Staminate flowers in one or more terminal
spikes; achenes triangular, lenticular,
or plano-convex; if trigonous, stigmas
3; if achenes lenticular, stigmas 2 and
some of spikes peduncled.
- 2. Achenes trigonous; stigmas 3.
- 3. Spikes solitary and terminal.
- 4. Scales bract-like; perigynia long-
beaked 25. C. Jamesii
- 4. Scales not bract-like; perigynia
rounded and beakless at the apex . . 26. C. leptalea
- 3. Spikes not solitary.

5. Perigynia little or not at all inflated, short-beaked or beakless, not rigidly bidentate, teeth if present soft and thin.
6. Terminal spike entirely staminate.
7. Lowest foliaceous bracts of the inflorescence sheathless, or with short colored sheaths or colored auricles, sometimes wanting or reduced to mere colored sheaths.
8. Perigynia pubescent; leaves narrow, up to 8.5 mm. wide.
9. Culms naked or with short reduced leaves; leaves mostly basal.
10. At least some of culms longer than the leaves.
11. Staminate spike prominent, 1-2.5 cm. long; perigynium oval, its beak $\frac{1}{4}$ length, to as long as, the body 27. C. pennsylvanica
11. Staminate spike not so prominent, 4-8 mm. long; perigynium oblong, its beak $\frac{1}{2}$ length of body 28. C. varia
10. At least most of the culms shorter than the leaves, some hidden by the bases of the leaves.
12. Scales light green with black or broad black-purple margins; perigynia oblong-fusiform or narrowed at the base into a short stipe 29. C. nigro-marginata
12. Scales green with lighter scarious margins; perigynia oval; beak nearly as long as the body of the perigynium 30. C. umbellata
9. Culms leafy; the leaves elongate, 3-5 mm. wide 31. C. vestita
8. Perigynia glabrous, or rough.
13. Leaves involute filiform, basal; perigynia 1.5-2 mm. long, black, shiny; leaves reduced to sheaths . . 32. C. eburnea
13. Leaves revolute or flat.
14. Leaves 1.5-3 cm. broad. culms slender, bearing tubular sheaths and remote slender spikes.
- 14a. Leaf sheaths pale or white . . 33. C. platyphylla
- 14b. Leaf sheaths colored 33. C. plantaginea
14. Leaves less than 1.5 cm. broad.
15. Leaves flat, ribbon-like, dark green, 6-18 mm. wide; bracts exceeding the inflorescence 34. C. scabrata
15. Leaves revolute, 2-6 mm. wide.

- 16. Spikes erect, perigynia faintly
nerved or nerveless 35. C. verrucosa
- 16. Spikes drooping, filiform stalked;
perigynia strongly many-ribbed . 36. C. macrokolea
- 7. Lowest foliaceous bract of the inflores-
cence with a prominent closed green
sheath.
- 17. Perigynia few-nerved or nerveless.
- 18. Perigynia with long slender beaks;
basal sheaths reddish-purple or
castaneous.
- 19. Perigynia glabrous.
- 20. Perigynia 6-9 mm. long, twice as long
as the white scales 37. C. debilis
- 20. Perigynia 4.5-6.5 mm. long; scales
straw color or greenish brown;
perigynia twice as long as the
scales; leaves 2-4 mm. wide . . . 37(a). C. debilis
var. Rudgel
- 19. Perigynia pubescent or slightly so.
- 21. Beak of perigynium 2-cleft 37 (b). C. debilis
var. pubera
- 21. Beak of perigynium entire or slightly
1-toothed 38. C. misera
- 18. Perigynia with short or abrupt beaks or
beakless.
- 22. Leaves less than 4.5 mm. wide; peri-
gynia faintly or somewhat nerved, 1/2
as broad as long.
- 23. Perigynia resinous or granulose
dotted; spikes remote, sessile or
short-stalked in nearly all leaf
axils 39. C. Crawl
- 23. Perigynia not granulose; spikes mostly borne
only toward summit of culm.
- 24. Spikes mostly close flowered; peri-
gynia overlapping 40. C. tetanica
- 24. Spikes loosely flowered; most of
perigynia remote and alternate
flowered 40(a). C. tetanica
var. Woodii
- 22. Leaves 0.5-1 cm. wide; perigynia
faintly nerved or nerveless; peri-
gynia over twice as long as
broad 50. C. leptonervia
- 17. Perigynia with numerous uniform nerves
from base to orifice; plants low, or
if tall with thick cylindric to globose
spikes.
- 25. Perigynia sharp-angled with plane faces;
spikes on long capillary peduncles.
- 26. 1-3 minute scales at the tip of the
pistillate spikes; spikes drooping or
spreading.

27. Basal leaves 6-12 mm. wide; 1-3
staminate flowers at the base of pistillate spikes; scales at the tip of pistillate spikes empty 41. C. laxiculmis
27. Basal leaves 2-5 mm. wide; scales at the tip of pistillate spikes sometimes contain stamen 42. C. digitalis
28. Minute scales at the tip of pistillate spikes none; spikes erect or nearly so 43. C. austro-caroliniana
25. Perigynia obtusely angled, or plump and scarcely if at all angled, tapering at the base, strongly ascending, beakless or with broadly conic-oblique tips; spikes mostly scattered; bracts strongly ascending.
28. Perigynia fusiform to fusiform-obovoid, tapering to conic tip; base long gradually contracted, obtusely trigonous.
29. Perigynia with distinct elevated nerves.
30. Perigynia 21-25-nerved.
31. Perigynia obovoid, beak abruptly bent, minute.
32. Spikes alternately flowered, pistillate scales truncate; staminate spike very slender, inconspicuous, equalled or exceeded and often hidden by the aggregated pistillate spikes; culms almost winged; bracts erect, widest 8-20 mm.; basal leaves coarse, widest 10-40 mm. 49. C. alburnina
32. Spikes denser flowered, perigynia much overlapping; scales subtruncate, rounded or acute, usually cuspidate; staminate spike conspicuous or inconspicuous; culms narrower, slightly margined, leaves and bracts narrower or sometimes rather broad.
33. Basal sheaths brown; bracts usually overtopping the culm; staminate spike sessile or short-stalked; rachis of the pistillate spikes sharply angled, usually smooth; the scales pale; tip of perigynia slightly or abruptly bent 45. C. blanda
33. Basal sheaths purple, but sometimes weathering away; leaves narrower; bracts rarely overtopping the culm; staminate spike usually long-stalked; pistillate spikes more scattered; the scales more often colored; rachis usually narrower, less sharply

- angled; perigynia paler, tips usually more strongly bent; plants generally more slender 46. C. laxiflora
31. Perigynia obovoid or fusiform with straight or oblique conspicuous beak; basal sheaths brown or white; angles of culms smooth serrulate; spikes scattered; the staminate spike prominent; bracts shorter than or scarcely exceeding the apex of the staminate spike.
34. Perigynia slightly or not at all overlapping, strongly ascending, usually abruptly contracted into a slender beak; bracts generally equalling or projecting beyond the staminate spike; angles of culm smooth, rarely slightly erose; leaves soft 47. C. anceps
34. Perigynia more overlapping, more spreading, and more gradually acute, also averaging longer; bracts generally ending below the apex of the staminate spike; angles of the culm generally minutely-erose-granulose; basal leaves less broad.
35. Pistillate spikes often loosely flowered, the larger on each plant 15-35 mm. long; scales abruptly cuspidate; perigynia ascending-spreading; staminate spike stout, pale, with firm scales; leaves firm, pale 48. C. striatula
35. Pistillate spikes short and densely flowered, the larger 10-15 mm. long; scales acute, not cuspidate; staminate spike narrower, often brown; scales less firm; leaves narrower, softer, deeper green and often shorter; perigynia spreading, curved outward, broadly ellipsoidal 49. C. styloflexa
30. Perigynia obscurely 15-21 nerved, ellipsoidal thin and fragile walled, the tip rather slender and straight or slightly oblique, often abrupt; foliage deep green; bracts generally surpassing the staminate spike; culms retrorsely scabrous, rarely almost smooth 50. C. leptonervia
29. Perigynia closely and finely many striate (or impressed-nerved); scales rough awned.
36. Sheaths pubescent; perigynia 4-5 mm. long; leaves 3-7 mm. broad . . 51. C. Hitchcockiana
36. Sheaths glabrous; perigynia 3.5-4 mm. long; leaves 2-4.5 mm. wide . . . 52. C. oligocarpa

- 28. Perigynia oblong-ovoid to obovoid or globose, rounded to the sessile or abruptly short stipitate base.
- 37. Culms caespitose, not stoloniferous; upper bracts much overtopping the staminate spike.
- 38. Perigynia impressed-nerved.
- 39. Style jointed below the middle; perigynia less than 2-3 times longer than scales.
- 40. Leaves thin and soft, slightly if at all glaucous; larger spikes less than 12-flowered.
- 41. Leaves erect, 2-4 mm. wide; spikes widely scattered, the lower nearly basal 53. C. amphibola
- 41. Leaves spreading 3-7 mm. wide, lower spikes not nearly basal . . . 54. C. grisea
- 40. Leaves thick and firm, very glaucous 55. C. glaucodes
- 39. Style jointless; perigynia 2-3 times longer than the scales . 56. C. flaccosperma
- 38. Perigynia with elevated ribs; leaves 4-10 mm. wide, basal, shorter than culm; bracts much exceeding the spikes 57. C. granularis
- 37. Culms not caespitose, but solitary from slender stolons 39. C. Crawei
- 6. Terminal spike bearing some pistillate flowers.
- 45. Perigynia ascending.
- 43. Scales brown to purple-black; spikes thick, cylindric, ascending or pendulous on long peduncles; scales shorter than or about equalling the perigynia, rough-awned 35. C. verrucosa
- 43. Scales white or greenish or if very brownish the spikes linear cylindric.
- 44. Spikes mostly sessile, or subsessile and erect.
- 45. Spikes mostly remote; leaves glabrous, shorter than culm and 4-10 mm. wide 57. C. granularis
- 45. Spikes approximate or overlapping, leaves long and slender, sometimes hairy, 1-4 mm. wide; sheaths hairy.
- 46. Perigynia smooth or slightly hairy when young.
- 47. Perigynia imbricated, flattened; top of the achene not bent; leaves pubescent 58. C. complanata
- 47. Perigynia not imbricated, swollen;

- top of achene bent or tipped with
a bent style; leaves glabrous;
sheaths pubescent 59. C. caroliniana
46. Perigynia very hairy.
48. Spikes linear-cylindric, 2-4 mm.
thick 60. C. virescens
48. Spikes thick cylindric to subglo-
bose, 3-5 mm. thick 61. C. Swanii
44. Spikes mostly peduncled, spreading or
drooping.
49. Perigynia 2 mm. or more thick; scales
long-awned, usually equalling or
longer than the spreading, inflated,
strongly nerved perigynia; leaves
3-6 mm. wide, pubescent 62. C. Davisii
49. Perigynia less than 2 mm. thick.
50. Bracts with long sheaths; perigynia
obtusely angled.
51. Perigynia less than 4 mm. long,
beakless.
52. Sheaths glabrous; leaves shorter
than culm, 3-6 mm. wide; peri-
gynia obtuse 63. C. gracillima
52. Sheaths pubescent; leaves elon-
gated, 2-3 mm. wide; perigynia
acutish 64. C. aestivalis
51. Perigynia 4 mm. or more long.
53. Leaves hairy; perigynia beakless
. 65. C. oxylepis
53. Leaves smooth; perigynia beaked;
perigynia with long tapering
beaks; scales white or nearly
so 37. C. debilis
and its varieties
50. Bracts sheathless; perigynia
sharply angled, nearly nerveless,
tapering into a short but slender
minute entire or toothed beak;
leaves 3-5 mm. wide 66. C. prasina
42. Perigynia wide-spreading or reflexed;
spikes evenly cylindrical, very
densely flowered; perigynia orbi-
cular; to broadly elliptic, compressed,
nerveless, with a tiny short point . 67. C. Shortiana
5. Perigynia usually more or less inflated,
mostly long-beaked; beak of perigynium
sharply bidentate, the teeth acerose.
54. Perigynia not inflated, tough, closely
investing the achene.
55. Leaves 3-5 mm. wide, pubescent; peri-
gynia glabrous, more than 5 mm. long,
becoming lustrous 68. C. lacustris

55. Leaves 0.5-1.5 cm. wide, not pubescent; perigynia densely pubescent, 4 mm. long . 69. C. hirta
54. Perigynia thin, papery, more or less inflated.
56. Staminate spike solitary or none, or the terminal only partly staminate.
57. Perigynia obconic or obovoid, truncate or abruptly rounded to long beaks, closely squarrose; terminal spike often mostly pistillate.
58. Perigynia shorter than the rough-awned scales 70. C. Frankii
58. Perigynia longer than the scales; pistillate scales lanceolate-acuminate or awn tipped 71. C. squarrosa
57. Perigynia subulate to ovoid or globose; terminal spike staminate if perigynia are abruptly beaked.
59. Pistillate spikes oblong-cylindric or narrower; perigynia inflated.
60. Perigynia less than 12 mm. long; pistillate scales mostly with thin serrulate awns; staminate scales with rough awns.
61. Perigynia slightly inflated, narrowly conic, ascending 72. C. hystericina
61. Perigynia bladdery-inflated, subglobose.
62. Perigynia 7-10 mm. long; pistillate spikes 1.5-2 cm. thick 73. C. lurida
62. Perigynia 5-7 mm. long; pistillate spikes 1-1.3 cm. thick 74. C. Baileyi
60. Perigynia more than 12 mm. long; achene narrowly ellipsoid-ovoid, the angles scarcely nipple-tipped; pistillate spikes mostly crowded, sessile or subsessile 75. C. lupulina
59. Pistillate spikes globose or subglobose.
63. Staminate scales elongated into rough thin awns 73. C. lurida
63. Staminate scales smooth; mature perigynia green.
64. Culms slender; basal leaves shorter, sometimes overtopping the culms.
65. Perigynia much inflated, 1-1.5 cm. long, 5-8 mm. thick; pistillate scales 1/2 as long as perigynia 76. C. intumescens
65. Perigynia less inflated, 1.2-1.7 cm. long, 3-5 mm. thick . . 76(a). C. intumescens
var. Fernaldii

64. Culms stout; basal leaves overtopping the culm; pistillate spikes densely 6-30 flowered; perigynia 1.5-2 cm. long; pistillate scales $\frac{1}{3}$ as long as perigynia 77. C. Asa Grayi
56. Staminate spikes 2 or more.
66. Achene short, broader than long, its faces very concave; leaves 0.7-1.5 cm. wide 78. C. gigantea
66. Achene longer than broad, its faces flat or slightly convex 79. C. bullata
2. Achenes lenticular or plano-convex; stigmas 2.
67. Scales rough awned, 2-3 times as long as the perigynia; scales spreading; spikes flexuous or drooping, basal leafless sheaths fibrillose 80. C. crinita
67. Scales obtuse to acuminate, shorter or somewhat exceeding the perigynia.
68. Lower sheaths prominently filamentous; perigynia 2 mm. long or less, ascending, not tortuous; scales purple-brown with green margins and midvein 81. C. stricta
68. Lower sheaths not filamentose; perigynia 2-3 mm. long; more or less tortuous; scales purple-margined with green midvein 82. C. torta

Annotations on the Species

1. CAREX ROSEA Schk.; Willdenow, in Linnaeus, Sp. Pl. ed. 4, 4:237. 1805. Riedgr. Nachtr. 15. pl. zzz, f. 179. 1806. Syn.-Carex rosea var. minor Boott, Ill. Car. 2: 81. pl. 244. 1860. Carex rosea var. staminata Peck; E. C. Howe, Rep. New York State Mus. Nat. Hist. 48:132. 1895. Carex rosea var. radiata Dewey, Am. Journ. Sci. 10:276. 1826. Stellate Sedge. Common. In woods and thickets. Spring and summer. Newfoundland to Manitoba, south to Georgia, and Louisiana.

In Tennessee, A. Gattinger, at Greenhill, Wilson

Co., and Mitchellville, Sumner Co. J. K. Underwood, at Gregory's Bald, Cades Cove, Blount Co., 3500 ft. elev., June 28, 1930.

2. CAREX CONVOLUTA Sp. Nov. K. K. MacKenzie in Bull. Torr. Bot. Club 43:423. 1916. Syn.--Carex rosea Schk.; Boott, Ill. Car. 2:81 pl. 223. 1860. Carex rosea var. pusilla Peck; E. C. Howe, Rep. N. Y. Mus. Nat. Hist. 48:132. 1895. Not common. In woods and thickets. Spring and summer. Maine to Manitoba southward to Alabama, Tennessee, and Missouri.

In Tennessee, J. K. Underwood, at Pidgeon Forge, above Henderson Springs, Sevier Co., 1200 ft. elev., April 27, 1930.

3. CAREX RADIATA (Wahl.) Small; Mackenzie in Bull. Torr. Bot. Club 43:423. 1916. Small Fl. S. E. U. S. 218. 1903. Syn.--Carex stellulata var. radiata Wahl. Kongl. Vet. Akad. Handl. (II.) 24:147. 1803. Carex rosea var. radiata Dewey, Am. Journ. Sci. 10:276. 1826. Carex neglecta Tuckerm Enum. Method. 19. 1843. Carex disperma Dewey; Kunze, Riedgr. Suppl. 131. pl. 33. 1840-50. Stellate Sedge. Not common. In woods. Summer. Ontario to Maine, North Carolina, Tennessee, and Georgia.

In Tennessee, A. Ruth, in East Tennessee. A. Gattinger, at LaVergne, Rutherford Co., and Nashville. J. K. Underwood, at Clift Branch, Gatlinburg, Sevier Co., 1300

ft. elev., June 14, 1930.

4. CAREX RETROFLEXA Muhl.; Willd. Sp. Pl. 4:235. 1805.

Syn.--Carex rosea var. retroflexa Torr. Am. Lyc. N. Y. 3:389. 1836. Reflexed Sedge. Common. In woods and thickets. Spring and summer. Massachusetts to Ontario, Michigan, Florida, and Texas.

In Tennessee, A. Gattinger, at Nashville. H. M. Jennison, at Knoxville, 1000 ft. elev., July 2, 1930.

4(a). CAREX RETROFLEXA Muhl. var. TEXENSIS (Torr.) Fernald.

Gray Man. ed. 7. 226. 1908. Syn.--Carex texensis Bailey, Mem. Torr. Club 5:97. 1894. Carex rosea var. texensis Torr.; Ann. Lyc. N. Y. 3:389, hyponym. 1836. Kentucky to Missouri and southward. Spring.

In Tennessee, W. A. Anderson, at Knoxville, May 8, 1928. H. M. Jennison, on Signal Mt., Chattanooga, Hamilton Co., April 13, 1930. J. K. Underwood, at Fountain City, Knox Co., 1000 ft. elev., April 23, 1930.

5. CAREX CONJUNCTA Boott, Ill. 3:122. 1862. Syn.--Carex

vulpina Carey, in A. Gray, Man. 541. 1848. Not L. 1753. Soft Fox Sedge. Not common. Local. In swales and glades. Spring and summer. New York to District of Columbia, west to Minnesota and eastern Kansas.

In Tennessee, J. K. Underwood, at Henderson Springs, Pidgeon Forge, Sevier Co., 1200 ft. elev., May 2, 1930.

6. CAREX MURICATA L. Sp. Pl. 974 (in part). 1753. Syn.--

Carex contigua Hoppe, Sturm, Deutschl. Fl. Heft. 61.

1835. Lesser Prickley Sedge. Common. In meadows and fields. Summer. Southern Maine to Ohio and Virginia.

In Tennessee, W. A. Anderson, on University Campus, Knoxville, 1000 ft. elev., May 8, 1928.

7. CAREX MUHLENBERGII Schk., Willd. Sp. Pl. 4:231. 1806.

Syn.--Carex Muhlenbergii var. enervis Boott, Ill. 124.

1862. Muhlenberg's Sedge. Common. In dry fields and hills, Spring and summer. Maine to Ontario and Minnesota, south to Florida and Texas.

In Tennessee, A. Gattinger, at Nashville.

- 7(a). CAREX MUHLENBERGII Schk. var. ENERVIS Boott. In Ten-

nessee, J. K. Underwood, at Hendersons Springs, Pidgeon Forge, Sevier Co., 1200 ft. elev., May 2, 1930.

8. CAREX CEPHALOPHORA Muhl., Willd. Sp. Pl. 4:220. 1806.

Oval-headed Sedge. Common. In dry fields and on hills. Spring and summer. Maine and Ontario to Manitoba, south to Florida and Texas.

In Tennessee, A. Gattinger, at Nashville and Kingston Springs. J. K. Underwood, on Clinch Mt., above Lea Lakes, Blaine, Grainger Co., 1300 ft. elev., July 6, 1929.

9. CAREX LEAVENWORTHII Dewey, Am. Journ. Sci. (II) 2:246.

1846. Syn.--Carex cephalophora var. angustifolia Boott, Ill. 123. 1862. Leavenworth's Sedge. Common. Perennial by rootstocks. In meadows. Spring. Ontario to District of Columbia, Iowa, Arkansas, Louisiana, and Texas.

In Tennessee, A. Ruth, at Knoxville. J. K. Underwood, at Knoxville, 1000 ft. elev., June 12, 1930.

10. CAREX SPARGANIOIDES Muhl., Willd. Sp. Pl. 4:237. 1806. Bur-reed Sedge. Not common. In woods and thickets. Summer. New Hampshire to Ontario and Michigan, south to Virginia, Kentucky, and Kansas.

Reported by A. Gattinger in rich woods over the State of Tennessee.

11. CAREX VULPINOIDEA Michx. Fl. Bor. Am. 2:169. 1803. Fox Sedge. Very common. In swamps, wet meadows, and along streams. Summer. New Brunswick to Manitoba, south to Florida, Louisiana, Nebraska, and Texas.

In Tennessee, A. Gattinger, at Kingston Springs, Nashville. S. M. Bain, in Haywood Co., June 12, 1893. E. E. Gayle, in Carter Co., June, 1891. Lamson-Scribner, at Knoxville, May 10, 1890. H. M. Jermison, at Harriman, Morgan Co., July 7, 1928. J. K. Underwood, at Fountain City, Knox Co., elev. 1000 ft., June 19, 1929.

12. CAREX DIANDRA Schrank, in Acta Acad. Mogunt. 49. 1782.
Syn.--Carex teretiuscula Gooden. Trans. Linn. Soc. 2:163.
pl. 19. 1794. Lesser Panicked Sedge. Rare. In swamps
and wet meadows. Spring and summer. Nova Scotia to
Alaska, south to Rhode Island, Pennsylvania, Nebraska,
and British Columbia.

In Tennessee, A. Gattinger, in mountains about Duck-
town, Polk Co. , 1878.

13. CAREX STIPATA Kuhl., Willd. Sp. Pl. 4:233. 1805. Awl-
fruited Sedge. Common. Variable. In swamps and wet
meadows. Spring and summer. Newfoundland to British
Columbia, Florida, Tennessee, Missouri, New Mexico, and
California.

In Tennessee, J. K. Small, on White Top Mountain.
H. M. Jennison, at New Found Gap, Sevier Co., 5000 ft.
elev., June 15, 1930.

14. CAREX CRUS-CORVI Shuttlw.; Kunze, Riedg. Suppl. 128. pl.
32. 1844. Syn.--Carex sicaeformis Boott, Journ. Bost.
Nat. Hist. Soc. 5:113. 1845. Raven's-foot Sedge. Not
common. In swamps. Spring and summer. Indiana to
southern Minnesota, Nebraska, Florida, Louisiana, and
Texas.

In Tennessee, S. M. Bain, in Haywood Co., June, 1890.
S. M. Bain, near Reelfoot Lake, Obion Co., June 21, 1893.

15. CAREX BRUNNESCENS (Pers.) Poir. In Lam. Encycl. Suppl. 3:286. 1813. Syn.--Carex brunnescens gracilior Britton, Brit. and Br. Ill. Fl. 1:351. 1896. Carex canescens var. vulgaris Bailey, Bot. Gaz. 13:86. 1888. Carex curta var. brunnescens Pers. Syn. 2:539. 1807. Brownish Sedge. Not common. In wet or even dry places. Summer. Mostly at high altitudes, Labrador to British Columbia, New York and New England on the Southern Alleghanies, and the Rocky Mountains. Also in Europe.

In Tennessee, A. Gattinger, on Summit of White Top. J. K. Underwood, on Mt. LeConte, Sevier Co., 6000 ft. elev., July 12, 1930.

CAREX BRUNNESCENS var. GRACILIOR Britton reported in East Tennessee by J. K. Small. Found with the former.

16. CAREX BROMOIDES Schk., Willd. Sp. Pl. 4:258. 1805. Brome-like Sedge. Rare. In bogs and swamps. Summer. Nova Scotia to Ontario and Michigan, south to Florida and Louisiana.

In Tennessee, A. J. Sharp, at Gatlinburg, Sevier Co., 1500 ft. elev., June 14, 1930.

17. CAREX STELLULATA Good. Trans. Linn. Soc. 2:144. 1794. Syn.--Carex echinata Murr.; Bailey, Proc. Am. Acad. 22:142. 1889. Carex Leersii Willd. Prodr. Fl. Berol. 28.

1787. Carex cephalantha Bicknell, Bull. Torr. Club 35: 493. 1908. Little Prickly Sedge. Common. Open low ground. Spring and summer. Throughout continent north of Mexico. Europe and Africa. Often locally absent.

Reported by A. Gattinger in Tennessee.

18. CAREX RUTHII Mackenzie ined. Not published at this writing, but will be in a forthcoming number of North American Flora. Syn.--C. sterilis cephalantha, C. echinata cephalantha, C. echinata var. excelsior Fernald. Densely caespitose, dark green, culms 0.3-2 meters tall and naked save for the rare presence of short setaceous leaves a decimeter or so below the lower spike; the 4-8 short-cylindric sessile spikes 15-40-flowered, upper aggregate, lower distant, head 2-8 cm. long, perigynia flat, spreading, about 3.5 mm. long, almost 2 mm. wide at the rounded cordate base, tapering gradually into a long subulate finely 2-toothed beak. Scales membranous hyaline edged, blunt to acute pointed; stigmas 2. Very rare. Open moist rocky glades, or near streams in open places at high altitudes. Spring and summer. Mountains of eastern Tennessee, western North Carolina, and Georgia.

In Tennessee, J. K. Underwood, at Grassy Patch, New Found Gap Road, Sevier Co., 4000 ft. elev., August 12, 1930.

19. CAREX SCOPARIA Schk.; Willd. Sp. Pl. 4:230. 1805. Syn.
--Carex scoparia var. condensa Fernald. Proc. Am. Acad.
37:468. 1902. Carex scoparia var. moniliformis Tuckerm.
Enum. Method. 8:17. 1843. Pointed Broom Sedge. Not
common. In moist soil, low ground, or even dry open
soil. Rarely in woods. Summer. Newfoundland to Wash-
ington, Florida, and Colorado.

Reported by A. Gattinger in the mountains of East
Tennessee.

20. CAREX TRIBULOIDES Wahl. Kongl. Vet. Acad. Handl. (II)
24:145. 1803. Syn.--Carex lagopodioides Schk.; Willd.
Sp. Pl. 4:230. 1805. Carex tribuloides var. turbata
Bailey, Mem. Torr. Club 1:55. 1889. Blunt Broom Sedge.
Common. In meadows, swales, and rich open woods. Sum-
mer and fall. New Brunswick to Saskatchewan, Florida,
and Arizona.

In Tennessee, S. M. Bain, at Henderson, Chester Co.,
May 13, 1893. A. Ruth, in East Tennessee. A. J. Sharp,
at Gatlinburg, Sevier Co., 1200 ft. elev., April 14,
1930.

21. CAREX MIRABILIS Dewey, Am. Journ. Sci. 30:63, pl. Bb. p.
92. 1836. Not Host, 1809. Syn.--Carex straminea var.
mirabilis Tuckerm. Enum. Method. 18:1843. Carex mira-
bilis var. perlonga Fernald, Proc. Am. Acad. 37:473.

1902. Larger Straw Sedge. Common. Dry banks, open woods. Summer. Quebec. Manitoba, south to North Carolina and Kansas and western mountains.

In Tennessee, J. K. Underwood, on Gregory's Bald, Cades Cove, Blount Co., 1600 ft. elev., June 28, 1930.

22. CAREX FOENEA Willd. Enum. 957. 1809. Syn.--Carex foenea var. perplexa Bailey, Mem. Torr. Club I:27. 1889. Carex argyrantha Tuckerm.; Wood, Classbook, 753. 1860. Hay Sedge. Not common. In dry woods and rocks. Spring and summer. Newfoundland to British Columbia, south to Virginia and Iowa.

In Tennessee, S. M. Bain, at Henderson, Chester Co.

23. CAREX TENERA Dewey (in part), Bull. Torr. Bot. Club 42: 603. Syn.--Carex straminea, Willd.; Schk. Riedgr. 49, f. 34. 1861. Straw Sedge. Common. In woods. Summer. New Brunswick to British Columbia, Kentucky, Arkansas, and California.

Reported over the state by A. Gattinger. 1859.

24. (Arabic 24 was not used in the key.)

25. CAREX JAMESII Schwein. Ann. Lyc. N. Y. 1:67. 1824. Syn. --Carex Steudelii Kunth, Enum. 2:480. 1837. James' Sedge. Frequent. In dry woods and thickets. Spring. Southern Ontario and New York to Michigan and Iowa,

south to West Virginia, Tennessee, Missouri, and Kansas.

Reported in Tennessee by A. Gattinger.

26. CAREX LEPTALEA Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 139. 1803. Syn.--Carex Harperi Fernald, Rhodora 8:181. 1906. Carex polytrichoides Muhl.; Willd. Sp. Pl. 4:213. 1805. Bristle-stalked Sedge. Not common. Perennial by rootstocks. In bogs and swamps. Summer. Newfoundland to Alaska, Florida, Louisiana, Texas, Colorado, and Oregon.

In Tennessee, A. Gattinger, in East Tennessee mountain bogs.

27. CAREX PENNSYLVANICA Lam. Encycl. 3:388. 1789. Pennsylvania Sedge. Common. In dry soil. Spring. New Brunswick to North Dakota, North Carolina, and Tennessee.

In Tennessee, A. Gattinger, at Nashville, April, 1887. T. H. Kearney, at Knoxville, 1000 ft. elev., April 15, 1892, and Lamson-Scribner, April 21, 1889. H. M. Jernison, on Clingman's Dome, Sevier Co., August 2, 1929. J. K. Underwood, at Beech Gap, Sevier Co., 4000 ft. elev., July 13, 1930.

28. CAREX VARIA Muhl.; Wahl. Kongl. Vet. Acad. Handl. (II.) 24:159. 1803. Syn.--Carex Emmonsii Dewey, Torr. Am. Lyc. N. Y. 3:411. 1836. Carex varia var. colorata Bailey, Mem. Torr. Club 1:41. 1889. Emmon's Sedge.

Common. In dry soil. Spring and summer. Nova Scotia to western Ontario and Manitoba, south to Georgia, and Texas.

In Tennessee, A. Gattinger, at Nashville. A. Ruth, at Knoxville.

29. CAREX NIGRO-MARGINATA Schwein. Ann. Lyc. N. Y. 1:68. 1824. Black-edged Sedge. Common. Dry soil. Spring and summer. Connecticut, New York to South Carolina.

In Tennessee, A. Gattinger, at Nashville. T. H. Kearney, at Knoxville, 1000 ft. elev., 1893. S. M. Bain, at Jackson, Madison Co., 1890. J. K. Underwood, at Morristown, Hamblen Co., 1000 ft. elev., April 5, 1930.

30. CAREX UMBELLATA Schk.; Willd. Sp. Pl. 4:290. 1805. Syn. --Carex umbellata var. vicina Dewey, Am. Journ. Sci. II: 317. pl. D. f. 13. 1828. Umbel-like Sedge. Common. Dry sandy or rocky soil. Spring and summer. Nova Scotia to Michigan and Pennsylvania, Oklahoma, and Oregon.

In Tennessee, J. K. Underwood, at Cherokee Bluffs, Knoxville, 1000 ft. elev., April 9, 1930.

31. CAREX VESTITA Willd. Sp. Pl. 4:263. 1805. Syn. --Carex vestita var. Kennedyi Fernald, Rhodora 2:170. 1900. Velvet Sedge. Common. In sandy woods. Spring and summer. Southern Maine to eastern New York and Pennsylvania, south to Georgia.

Reported generally distributed by A. Gettinger.

32. CAREX EBURNEA Boott; Hook. Fl. Bor. Am. 2:226. pl. 225.

1840. Syn.--Carex setifolia Britton and Brown, Ill. Fl.

1:332. 1896. Carex alba var. setifolia Dewey, Am.

Journ. Sci. II:316. 1826. Bristle-leaved Sedge. Com-

mon. In dry sandy or rocky soil, preferring limestone

rocks. Spring and summer. New Brunswick to Alberta,

south to Virginia, Tennessee, Missouri, and Nebraska.

In Tennessee, J. K. Underwood, at Knoxville, 1000
ft. elev., June 22, 1929.

33. CAREX PLANTAGINEA Lam. Encycl. 3:392. 1789. Plantain-

leaved Sedge. Common. In woods. Spring and summer.

New Brunswick and Ontario to Manitoba, south to North
Carolina and Illinois.

In Tennessee, J. K. Small, at Ducktown, Polk Co.
H. M. Jennison, at Kinzel Springs, Blount Co., April 23,
1927. W. A. Anderson, at Gatlinburg, Sevier Co., April
1, 1928. J. K. Underwood, at Gatlinburg, Sevier Co.,
1100 ft. elev., April 27, 1930.

34. CAREX SCABRATA Schwein. Ann. Lyc. N. Y. 1:69. 1824.

Rough Sedge. Common. In moist woods and thickets.

Spring and summer. Eastern Quebec to Ontario, Michigan,
South Carolina, and Tennessee.

In Tennessee, Curtiss, in East Tennessee. H. M. Jennison, at Indian Grave Flats, Sevier Co., 1600 ft. elev. J. K. Underwood, at Knoxville, Knox Co., 1000 ft. elev., June 12, 1930.

35. CAREX VERRUCOSA Muhl.; Fernald and Robinson in Gray Man. ed. 7. 247. 1908. Small, Fl. S. E. U. S. 210. 1903. Syn.--Carex macrokolea Steud. Syn. Pl. Cyp. 223. 1855. Southern Glaucous Sedge. Common. In wet soil and swamps. Summer. Southeastern Virginia to Florida, Missouri, and Mississippi.

In Tennessee, S. M. Bain, at Henderson, Chester Co., and Jackson, Madison Co., 1892.

36. CAREX MACROKOLEA Steud.; Small Fl. S. E. U. S. 210. 1903. Robinson and Fernald in Gray, Man. ed. 7, 247. 1908. Syn.--Carex Joorii Bailey, Proc. Am. Acad. 22:12. 1886. Cypress-swamp Sedge. Not common. In swamps and wet shores. Summer. Missouri to Florida and Texas.

In Tennessee, S. M. Bain, in Madison Co.

37. CAREX DEBILIS Michx. Fl. Bor. Am. 2:172. 1803. Syn.--Carex debilis var. prolixa Bailey, Proc. Am. Acad. Sci. 22:105. 1886. Carex debilis var. pubera H. Gray, Man. ed. 5, 593. 1867. White-edged Sedge. Common. Woods and copses. Summer. New Jersey to Tennessee, south to Florida and Texas.

In Tennessee, J. K. Underwood, on State Line Ridge, Sevier Co., 5000 ft. elev., June 15, 1930.

37(a). CAREX DEBILIS Michx. var. RUDGEI Bailey. J. K. Underwood, at The Chimneys, Sevier Co., 3500 ft. elev., July 12, 1930.

37(b). CAREX DEBILIS Michx. var. PUBERA Gray. H. W. Jennison, on Chilhowee Mt., June 29, 1930.

38. CAREX MISERA Buckley. Am. Journ. of Sci. 45:173. 1843. Syn.--Carex juncea Willd.; Mackenzie in Small Fl. S. E. U. S. 212. 1903. Rare. On exposed mountain summits at very high altitudes. Summer. Tennessee and North Carolina.

In Tennessee, J. K. Underwood, on top of Mt. LeConte, Sevier Co., 6500 ft. elev., July 12, 1930.

39. CAREX CRAWEI Dewey, Am. Journ. Sci (II.) 2:246. 1846. Syn.--Carex heterostachya Torr. Am. Journ. Sci. (II.) 2:248. 1846. Crawe's Sedge. Local. In moist meadows and banks. Spring and summer. Cape Breton Island to Manitoba, south to northern Maine, Pennsylvania, Tennessee, and Kansas.

In Tennessee, A. Gattinger, in cedar glades, La Vergne, Rutherford Co. Also reported by Britton and Brown, Ill. Fl. ed. 2.

40. CAREX TETANICA Schk. Riedgr. Nachtr. 68. figs. 100, 207. 1806. Wood's Sedge. Not common. In meadows and wet woods. Summer. Massachusetts to Manitoba, south to District of Columbia, Missouri, North Carolina, and Louisiana.

In Tennessee, J. K. Underwood, in Great Smoky Mts., Sevier Co., July, 1929.

- 40(a). CAREX TETANICA var. WOODII (Dewey) Bailey, Mem. Torr. Club 1:53. 1889. Meadows and bogs. Spring and Summer. Massachusetts to Ontario, Michigan, and Washington, D. C. Local.

In Tennessee, A. J. Sharp, on Mt. Guyot, Cocke Co., 3000 ft. elev., May 4, 1930.

41. CAREX LAXICULMIS Schwein. Ann. Lyc. N. Y. 1:70. 1824. Syn.--Carex retrocurva Dewey, Wood's Bot. 423. 1845. Carex digitalis copulata Bailey, Mem. Torr. Club 1:47. 1889. Spreading Sedge. Rare. Perennial by rootstocks. In woods and thickets. Spring. Maine to southern Ontario, Michigan, Virginia, North Carolina, and Missouri.

J. K. Small reports that in all probability its range extends into Tennessee.

42. CAREX DIGITALIS Willd. Sp. Pl. 4:298. 1805. Slender Wood Sedge. Common. In woods and thickets. Spring and

summer. Maine and southern Ontario to Minnesota, south to Florida and Texas.

In Tennessee, A. Gattinger, in oak barrens, Middle Tennessee. J. K. Underwood, at Knoxville, 1000 ft. elev., June 22, 1929.

43. CAREX AUSTRO-CAROLINIANA Bailey, Bull. Torr. Club 20: 428. 1893. Syn.--Carex Caroliniana Buckl. Rare. On damp cliffs on rocky slopes. Spring. In mountains of South Carolina and Tennessee.

In Tennessee, T. H. Kearney, at Hiwassee River Gorge, Polk Co., April, 1893. J. K. Underwood, at Henderson Springs, Pidgeon Forge, Sevier Co., 1200 ft. elev., May 2, 1930.

44. CAREX ALBURSINA Sheldon, Bull. Torr. Club 20:284. 1893. Syn.--Carex laxiflora var. latifolia Boott, Ill. 38. 1858. Not C. latifolia Moench, 1794. White Bear Sedge. Common. In woods. Spring and summer. Quebec to Minnesota, south to Virginia, Tennessee, and southern Missouri.

In Tennessee, reported by K. K. Mackenzie. J. K. Underwood, Cherokee Bluffs, Knoxville, 1000 ft. elev., April 29, 1930.

45. CAREX BLANDA Dewey, Am. Journ. Sci. 10:45. 1826. Syn.--

Carex laxiflora var. varians Bailey, Mem. Torr. Club
1:32. 1889. Woodland Sedge. Common. Woods and thick-
ets. Spring and summer. Maine and Ontario to Virginia,
Arkansas, and Kansas.

In Tennessee, S. M. Bain, at Jackson, Madison Co.,
May, 1893.

46. CAREX LAXIFLORA Lam. Encycl. 3:392. 1789. Syn.--Carex
laxiflora var. gracillima Boott, Ill. Car. 1:37. 1858.
Loose-flowered Sedge. Common. In meadows and thickets.
Spring and summer. Eastern Quebec and Ontario to Minne-
sota, south to Florida, Alabama, and Texas.

In Tennessee, A. Gattinger, in East Tennessee, 1859.
Lamson-Scribner, at Knoxville, May 14, 1889. J. K. Under-
wood, at Rich Mountain, Blount Co., 2000 ft. elev., May
20, 1928.

47. CAREX ANCEPS Muhl.; Willd. Sp. Pl. 4:278. 1805. Syn.--
Carex laxiflora var. patulifolia Carey, in A. Gray, Man.
ed. 2, 524. 1856. Carex laxiflora var. leptonervia
Fernald, Rhodora 8:184. 1906. Carex anceps var. patuli-
folia Dewey, Wood's Bot. 423. 1845. Two-edged Sedge.
Common. Woods, meadows, and thickets. Spring and sum-
mer. Newfoundland to Michigan, North Carolina, and
Tennessee.

In Tennessee, W. A. Anderson, at Knoxville, May 8,
1928. S. M. Bain, at Jackson, Madison Co., May, 1892.

J. K. Underwood, at Pidgeon Forge, above Henderson Springs, Sevier Co., 1200 ft. elev., April 27, 1930.

48. CAREX STRIATULA Michx. Fl. Bor. Am. 2:173. 1803. Syn.

--Carex laxiflora var. divaricata Bailey, Mem. Torr.

Club I:33. 1889. Striate Sedge. Common. In woods, thickets, and meadows. Spring and summer. Ontario to Florida, Ohio, Tennessee, Mississippi, and Texas.

Reported in Tennessee by Mackenzie in Britton and Brown, Ill. Fl. I:403. 1913. J. K. Underwood, on Mt. LeConte, Sevier Co., 4000 ft., elev., July 12, 1930.

49. CAREX STYLOFLEXA Buekley, Am. Journ. Sci. 45:174. 1843.

Syn.--Carex laxiflora var. styloflexa Boott, Ill. 37.

1858. Bent Sedge. Common. In woods and thickets.

Spring and summer. Connecticut to Florida and Texas.

In Tennessee, J. K. Underwood, at Gatlinburg, Sevier Co., 1100 ft. elev., April 27, 1930.

50. CAREX LEPTONERVIA Fernald, Rhodora 16:214. 1914. Syn.

--Carex laxiflora var. varians Bailey, Mem. Torr. Bot.

Club I:32. 1889., and Gray Man. ed. 6. Carex laxiflora

var. leptonervia Fernald, Rhodora 8:184. 1906., and

Gray Man. ed. 7. Carex anceps Dewey in Wood's Class Book

and Dewey Herb. in large part. Not Muhl.; Britton and

Brown, Ill. Fl. ed. 2, in part. Carex laxiflora var. in-

termedia Boott. Ill. Car. 37. 1858, in part, especially

as to (a). Not common. In low woods in mucky or peaty soil, rarely in drier places. Spring and summer.

Labrador to Connecticut, and in the mountains of North Carolina and Tennessee. West through Ontario and New York and Maine to Manitoba.

In Tennessee, H. M. Jennison, in swamps above Elkmont, Sevier Co., 1500 ft. elev., July 28, 1929.

51. CAREX HITCHCOCKIANA Dewey, Am. Journ. Sci. 10:274. 1826.

Hitchcock's Sedge. Rare. In woods and thickets. Spring and summer. Vermont and Ontario to Michigan, south to West Virginia, Kentucky, and western Missouri.

J. K. Small reports that in all probability its range extends south into Tennessee.

52. CAREX OLIGOCARPA Schk.; Willd. Sp. Pl. 4:279. 1806.

Few-fruited Sedge. Not common. In dry woods and thickets. Spring and summer. Ontario and Vermont to Michigan, south to West Virginia, Kentucky, and Oklahoma.

In Tennessee, A. Gattinger, at Nashville.

53. CAREX AMPHIBOLA Steud. Syn. Pl. Cyp. 234. 1855. Syn.--

Carex grisea var. angustifolia Boott, Ill. 34. 1858.

Carex grisea var. (?) rigida Bailey, Mem. Torr. Club

1:56. 1889. Narrow-leaved Sedge. Common. In dry soil. Spring. New York to Iowa and Missouri, south to Florida and Texas.

In Tennessee, reported by A. Gattinger.

54. CAREX GRISEA Wahl. Kongl. Vet. Acad. Handl. (II.) 24:154.

1803. Gray Sedge. Common. In woods and thickets and meadows. Spring and summer. Maine to Ontario and Minnesota, south to North Carolina, west to Kansas and Arkansas.

In Tennessee, S. M. Bain, at Jackson, Madison Co., May, 1892. A. Gattinger, at Nashville.

55. CAREX GLAUCODEA Tuckerm, Olney, Proc. Am. Acad. 7:395.

1868. Syn.--Carex grisea var. mutica Carey, in A. Gray, Man. 552. 1848. Not C. mutica R. Br. 1823. Glaucous Sedge. Common. In open fields and meadows. Spring and summer. Massachusetts to Ontario, Illinois, Virginia, and Arkansas.

Reported by Gattinger over the state.

56. CAREX FLACCOSPERMA Dewey, Am. Journ. Sci. (II.) 2:245.

1846. Syn.--Carex laxiflora var. (?) mutica Torr. Ann. Lyc. N. Y. 3:414. 1836. Not C. mutica R. Br. 1823. Thin-fruited Sedge. Not common. In low ground or on shaded hillsides. Summer. Southern Missouri to Texas, east to North Carolina and Florida.

In Tennessee, A. Gattinger, at Nashville.

57. CAREX GRANULARIS Muhl.; Willd. Sp. Pl. 4:179. 1803.

Syn.--Carex granularis recta Dewey; Wood's Class Book 763. 1860. Meadow Sedge. Common. In moist meadows and woods. Spring and summer. New Brunswick to Manitoba, south to Florida and Louisiana.

In Tennessee, J. K. Underwood, at Fountain City, Knox County, 1000 ft. elev., June 19, 1929. Reported over the state by Gattinger.

58. CAREX COMPLANATA Torr. Ann. Lyc. N. Y. 3:408. 1836.

Syn.--Carex triceps Michx., var. hirsuta (Willd.) Bailey, Mem. Torr. Club 1:35. Carex hirsuta Willd. Sp. Pl. 4: 252. 1805. Not Suter, 1802. Carex triceps Michx. Fl. Bor. Am. 2:170. 1803. Not Schrank. 1789. Hirsute Sedge. Common. In woods, fields, and swamps. Spring and summer. Maine to southern Ontario and Michigan, south to Florida and Texas.

In Tennessee, A. Gattinger, at Mitchellville, Sumner Co. A. Gattinger, at Leeville, Wilson Co. S. M. Bain, at Henderson, Chester Co. Lamson-Scribner, at Knoxville and White Cliff Springs, May 10, 1890, and July 5, 1890, respectively. J. K. Underwood, at Andrew Johnson Lake, Concord, Knox Co., 1000 ft. elev., June 28, 1929.

59. CAREX CAROLINIANA Schwein. Ann. Lyc. 1:67. 1824. Syn.

--Carex Smithii Porter; Olney, Car. Bor. Am. 2, name

only. 1871. Not Tausch. 1821. Carex triceps var. Smithii Bailey, Bot. Gaz. 13:88. 1888. Carolina Sedge. Local. In meadows. Spring and summer. New Jersey and Pennsylvania to North Carolina, Arkansas, and Texas.

In Tennessee, T. H. Kearney, in Hiwassee Valley.

60. CAREX VIRESCENS Muhl.; Willd. Sp. Pl. 4:251. 1805.

Syn.--Carex virescens var. costata Dewey, Am. Journ. Sci. 9:260. 1825. Carex costellata Britton, Bull. Torr. Club 22:223. 1895. Ribbed Sedge. Common. In woods. Summer. Maine and Ontario to Georgia and Kentucky.

In Tennessee, A. Gattinger, in East Tennessee, 1859. A. Gattinger, at Rising Sun Bluffs, Nashville and Sewanee, July, 1878. Lamson-Scribner, on Lookout Mountain, Hamilton Co., May 21, 1890, and at Knoxville, June 1, 1890. J. K. Underwood, at Line Spring, Blount Co., 1400 ft. elev., June 6, 1930. A. J. Sharp, at Knoxville and on Mt. Guyot, Cosby, Cocke Co., May 18, 1930.

61. CAREX SWANII (Fernald) Mackenzie, Bull. Torr. Club 37: 246. 1910. Syn.--Carex virescens var. Swanii Fernald, Rhodora 8:183. 1906. Swan's Sedge. Common. In dry woods and thickets. Summer. Nova Scotia to Michigan, North Carolina, Tennessee, and Missouri.

In Tennessee, J. K. Underwood, in Cades Cove, Blount Co., 1200 ft. elev., June 14, 1928.

62. CAREX DAVISII Schwein. and Torr. Ann. Lyc. N. Y. 1:326. 1825. Syn.--Carex Torreyana Dewey, Am. Journ. Sci. 10: 47. 1826. Davis' Sedge. Rare. In moist thickets and meadows. Spring and summer. Massachusetts to Minnesota, south to Georgia, Kentucky, and Texas.

In Tennessee, A. Gattinger, at Nashville.

63. CAREX GRACILLIMA Schwein. Ann. Lyc. N. Y. 1:66. 1824. Syn.--Carex gracillima var. *humilis* Bailey, Mem. Torr. Club 1:71. 1889. Graceful Sedge. Not common. In moist woods and meadows. Spring and summer. Newfoundland to Manitoba, North Carolina, Ohio, Michigan, and Mississippi.

In Tennessee, A. Gattinger, at Nashville.

64. CAREX AESTIVALIS M. A. Curtis; A. Gray, Am. Journ. Sci. 42:28. 1842. Summer Sedge. Rare. In mountain woods. Summer. New Hampshire, Massachusetts, and northern New York to Georgia.

In Tennessee, W. A. Anderson, at Cherokee Orchard, near Gatlinburg, Sevier Co., elev. 2500 ft., June 29, 1928. Chickering, at summit of Clingman's Dome, Sevier Co., 6642 ft. elev., and Roane Mountain. J. K. Underwood, at Beech Gap, Great Smoky Mountains, near Gatlinburg, Sevier Co., 4000 ft. elev., July 13, 1930.

65. CAREX OXYLEPIS Torr. and Hook. Ann. Lyc. N. Y. 3:409.

1836. Sharp-scaled Sedge. Not common. Rich woods and low ground. Spring. Southern Missouri to Tennessee and South Carolina, Florida, and Texas.

Reported in Tennessee by Gattinger and Mackenzie.

66. CAREX PRASINA Wahl. Kongl. Vet. Acad. Handl. (II.) 24: 161. 1803. Syn.--Carex miliacea Muhl.; Willd. Sp. Pl. 4:290. 1805. Drooping Sedge. Not common. In meadows and moist thickets. Spring and summer. Maine to Michigan, District of Columbia, and Ohio, south in the Alleghanies to Georgia.

In Tennessee, A. Gattinger, on Lookout Mountain, Hamilton Co., July, 1882. J. K. Underwood, in Buffalo Cove, Jamestown, Fentress Co., elev. 1300 ft., May 17, 1931.

67. CAREX SHORTIANA Dewey, Am. Journ. Sci. 30:60. 1836. Short's Sedge. Not common. In moist meadows and thickets. Spring and summer. Pennsylvania to Virginia and Tennessee, west to Iowa, eastern Kansas, and Oklahoma.

In Tennessee, A. Gattinger, at Tunnel Hill, Nashville, and East Tennessee.

68. CAREX LACUSTRIS Willd. Sp. Pl. 4:306. 1805. Syn.--Carex riparia Muhl. Descr. Gram. 259. 1817. Not Curtis, 1783. Lake-bank Sedge. Common. In swamps and on wet

shores. Spring and summer. Newfoundland to James Bay and Manitoba, south to Delaware, Iowa, Idaho, Florida, Louisiana, and Texas.

J. K. Small reports that in all probability its range includes Tennessee.

69. CAREX HIRTA L. Sp. Pl. 975. 1753. Hairy Sedge. Local. Not common. In fields and waste places. Summer and fall. Massachusetts to New York, New Jersey, Pennsylvania, and Tennessee.

Reported in Tennessee by J. K. Small.

70. CAREX FRANKII Kunth, Enum. 2:498. 1837. Syn.--Carex stenolepis Torr. Ann. Lyc. N. Y. 3:420. 1836. Not Less. 1831. Frank's Sedge. Common. In swamps and wet meadows. Summer and fall. Eastern Pennsylvania to eastern Virginia and Georgia, west to Illinois, Missouri, Louisiana, and Texas.

In Tennessee, J. K. Underwood, at Knoxville, 1000 ft. elev., June 28, 1929.

71. CAREX SQUARROSA L. Sp. Pl. 973. 1753. Squarrose Sedge. Common. In swamps and bogs and wet woods. Spring and summer. Ontario to Connecticut, Michigan, Nebraska, Georgia, Louisiana, and Arkansas.

In Tennessee, A. Gattinger, at Hadley's Bend, and Shelby Pond, Nashville.

72. CAREX HYSTRICINA Muhl.; Willd. Sp. Pl. 4:282. 1805.

Syn.--Carex hystericina Dudlei Bailey, Mem. Torr. Club 1:54. 1889. Carex Cooleyi Dewey, Am. Journ. Sci. 48:144. 1845. Porcupine Sedge. Common. In swamps and low meadows. Summer. Newfoundland to Alberta, south to Georgia, New Mexico, and Arizona.

In Tennessee, A. Ruth, at Knoxville, 1000 ft. elev.

73. CAREX LURIDA Wahl. Kongl. Acad. Handl. (II.) 24:153.

1803. Syn.--Carex lurida var. exundans Bailey, Britt. and Brown, Ill. Fl. I:299. 1896. Carex lurida var. parvula (Paine) Bailey, Bull. Torr. Club 20:418. 1893. Carex lurida var. flaccida Bailey, Mem. Torr. Club I:73. 1889. Carex tentaculata var. parvula Paine, Cat. Pl. Oneida 105. 1865. Carex tentaculata Muhl.; Willd Sp. Pl. 4:266. 1805. Sallow Sedge. Very common. Swamps and wet meadows. Summer and fall. Nova Scotia to Minnesota, Nebraska, Florida, and Texas.

In Tennessee, Lamson-Scribner, at White Cliff Springs, July 5, 1890. Lamson-Scribner, at Madisonville, Monroe Co., August, 1890. Lamson-Scribner, at Knoxville, 1000 ft. elev. J. K. Underwood, on Clinch Mountain, Blaine, Grainger Co., 1100 ft. elev., July 6, 1929. A. Gattinger, in oak barrens, Middle Tennessee. S. M. Bain, at Jackson, Madison Co.

74. CAREX BAILEYI Britton, Bull. Torr. Club 22:220. 1895.

Syn.--Carex tentaculata var. gracilis Boott, Ill. 94.
1860. Not Carex gracilis R. Br. 1810. Bailey's Sedge.
Not common. In bogs. Summer. Maine and Vermont to
Virginia and Tennessee.

In Tennessee, A. Gattinger (no data on herbarium
specimen).

75. CAREX LUPULINA Muhl.; Willd. Sp. Pl. 4:266. 1805. Syn.
--Carex Bella-villa Dewey, Am. Journ. Sci. (II.) 41:229.
1866. Carex lupulina Bella-villa Bailey, Mem. Torr. Club
I:12. 1889. Carex lupulina var. pedunculata Dewey, in
Wood, Bot. and Flor. 376. 1870. Hop Sedge. Not common.
Perennial by rootstocks. In swamps, ditches, and woods.
Summer. New Brunswick to Hudson Bay, western Ontario,
Iowa, Florida, and Texas.

In Tennessee, A. Gattinger, at Nashville. J. K.
Underwood, at Nashville, 1000 ft. elev., August 20, 1930.

76. CAREX INTUMESCENS Rudge, Trans. Linn. Soc. 7:97. pl. 9,
f. 3. 1804. Bladder Sedge. Common southward. Swamps,
meadows, and alluvial woods. Spring to fall. Newfound-
land to Manitoba, Florida, and Louisiana.

In Tennessee, Lamson-Scribner, at White Cliff
Springs, July 5, 1890. A. Gattinger, at Nashville.
S. M. Bain, in Haywood Co., June 16, 1893. J. K. Under-
wood, on Clinch Mt., above Lea Lakes, Blaine, Grainger
Co., 1100 ft. elev., July 6, 1929. J. K. Underwood, at

Jamestown, Fentress Co., 2000 ft. elev., August 18, 1930.

- 76(a). CAREX INTUMESCENS Rudge var. FERNALDII Bailey. Common northward. Newfoundland to Manitoba, south to Massachusetts. New York, Michigan, and Wisconsin, and in the mountains of North Carolina and Tennessee.

In Tennessee, J. K. Underwood, on the State Line Ridge, Sevier Co., 5000 ft. elev., July 12, 1930.

77. CAREX ASA-GRAYI Bailey, Bull. Torr. Club 20:427. 1893. Syn.--Carex Grayi hispidula A. Gray; Bailey, Mem. Torr. Club 1:54. 1889. Carex intumescens var. globularis A. Gray, Ann. Lyc. N. Y. 3:236. 1834. Not Carex globularis L. 1758. Carex Grayi Carey, Am. Journ. Sci. (II.) 4:22. 1847. Not Carex Grayana Dewey, 1834. Gray's Sedge. Not common in East Tennessee. In swamps and wet meadows. Summer and fall. Vermont to Michigan, south to Georgia and Missouri.

In Tennessee, A. Gattinger, in swamps of West Tennessee.

78. CAREX GIGANTEA Rudge, Trans. Linn. Soc. 7:99, pl. 10, f. 2. 1804. Syn.--Carex grandis Bailey, Mem. Torr. Club 1:13. 1889. Large Sedge. Not common. In swamps. Summer. Delaware to Kentucky and Missouri, south to Florida, Louisiana, and Texas.

In Tennessee, Lamson Scribner, at White Cliff

Springs, July 5, 1890.

79. CAREX BULLATA Schk.; Willd. Sp. Pl. 4:309. 1805. Syn.
--Carex Olneyi Boott, Ill. Car. 1:15. 1858. Carex
Greenii Boeck. Flora 41:649. 1858. Carex bullata var.
Greenii Fernald, Rhodora 8:202. 1906. Button Sedge.
Common. In swamps. Summer. Maine and New Hampshire
to North Carolina.

In Tennessee, A. Gattinger, at Nashville.

80. CAREX CRINITA Lam. Encycl. 3:393. 1789. Syn.--Carex
crinita var. minor Boott, Ill. Car. 1:18. 1858.
Fringed Sedge. Common. In swamps and wet woods. Sum-
mer. Newfoundland to Minnesota, south Florida, and
Texas.

In Tennessee, Lamson-Scribner, at White Cliff
Springs, July 5, 1890. A. Gattinger, at Whitesides,
July 7, 1867. J. K. Underwood, at Jamestown, Fentress
Co., 2000 ft. elev., August 18, 1930.

81. CAREX STRICTA Lam. Encycl. 3:387. 1789. Syn.--Carex
stricta angustata Bailey, in A. Gray, Man. ed. 6, 600.
1890. Carex xerocarpa S. H. Wright, Am. Journ. Sci.
(II.) 42:334. 1866. Tussock Sedge. Common. In dense
clumps. In swamps. Summer and fall. Newfoundland to
Ontario, Nebraska, Georgia, and Texas.

In Tennessee, S. M. Bain, at Jackson, Madison Co.,

May 15, 1893. W. A. Anderson, at Gatlinburg, Sevier Co.,
May 12, 1929. H. M. Jennison and W. A. Anderson, at
Kinzel Springs, Blount Co., May 13, 1928.

82. CAREX TORTA Boott; Tuckerm. Enum. Meth. II. 1843.

Twisted Sedge. Common. Generally in rocky beds of
streams, also marshes, and wet thickets. Summer. Quebec
to Minnesota, south to North Carolina and Missouri.

In Tennessee, Lamson-Scribner, at headwaters Tellico
River, Monroe Co., April 23, 1890. A. Ruth, in Valley
of Hiawasse, Monroe Co. J. K. Underwood, at Pidgeon
Forge, near Henderson Springs, Sevier Co., 1100 ft.
elev., April 27, 1930.

Addenda

The species named below (No. 83) is one of the laxi-
flora series, evidently closely related to C. plantaginea
(No. 35).

83. CAREX PLATYPHYLLA Carey, Am. Journ. Sci. (II.) 4:23.

1847. Broad-leaved Sedge. Rare. In woods and thickets
along streams. Spring and early summer. Quebec and
Ontario, to Michigan, south to Virginia and Illinois.

In Tennessee, J. W. Johnson, at base of Brown's
Mountain, Knoxville, 1000 ft. elev., April 30, 1931.

14. CYMOPHYLLUS Mackenzie

Perennial with short rootstocks and flattened culms. Culms with four to six overlapping striate bladeless sheaths, and after flowering developing one large blade-bearing leaf without sheath, ligule, or midrib, and with undulate margins appearing minutely serrulate. Flowers monoecious.

A single species known to occur in our range:

CYMOPHYLLUS FRASERI (Andr.) Mackenzie. Leaves glabrous, pale green; blades 2-4 dm. long, flat, firm, spreading, finely many nerved, and with their margins usually finely crumpled in drying, accompanied by clasping basal sheaths. Culms smooth, slender, reclining, 2.5-5 dm. long; spike solitary, bractless, terminal, androgynous, 1-2.5 cm. long, the pistillate portion dense, about 1.2 cm. in diameter in fruit; perianth none; scales ovate, obtuse, much shorter than the perigynia; perigynia ovoid, pale green, faintly many-nerved, fully 4 mm. long, each with a short, nearly truncate beak; achene triangular.

Annotations for the Species

CYMOPHYLLUS FRASERI (Andr.) Mackenzie, Britton and Brown, Ill. Fl. Nor. States and Canada 1:441. 1913. Syn. Carex Fraseri Andrews, Bot. Rep. pl. 639. 1811. Carex Fraseriana Sims, Bot. Mag. pl. 1391. 1811. Fraser's Sedge.

Rare. Perennial by short rootstocks. Culms flat. Monococious. In rich mountain woods. Spring and summer. Southwestern Virginia, West Virginia, East Tennessee, and North Carolina. Endemic to the region named.

In Tennessee, J. K. Underwood, on Mt. LeConte, Sevier Co., 4000 ft. elev., May 3, 1930. H. M. Jernison, on Mt. Guyot, Cosby, Cocke Co., 3500 ft. elev., May 18, 1930.

GLOSSARY

ACAULESCENT.— Stemless or apparently so, or with stem subterranean.

ACHENE.— A small dry and hard 1-celled, 1-seeded indehiscent fruit.

ACUMINATE.— Tapering at the end.

ACUTE.— Terminating with a sharp or well defined angle.

ANNUAL.— Of only one year's duration.

ANTHER.— The polliniferous part of a stamen.

APPRESSED.— Lying close and flat against.

ARISTATE.— Awned; provided with stiffish bristle-shaped appendages.

ASCENDING.— Rising somewhat obliquely, or curving upward.

ATTENUATE.— Slenderly tapering, becoming very narrow.

AWL-SHAPED.— Tapering upward from the base to a slender or rigid point.

AWN.— A bristle-shaped appendage, generally from a scale.

AXILLARY.— Situated in an axil.

BARBED.— Furnished with rigid points either ascending or reflexed.

BEAKED.— Ending in a prolonged tip.

BLADE.— The expanded portion of a leaf.

BRACT.— A more or less modified leaf subtending inflorescence.

BRACTLET.— A secondary bract, as one upon the pedicle of a flower.

CAESPITOSE OR CESPITOSE. — Growing in tufts; forming mats or turf.

CHANNELED. — Deeply grooved longitudinally, like a gutter.

COMPOUND. — Composed of 2 or more similar parts united into one whole.

COMPRESSED. — Flattened, especially laterally.

CONDUPLICATE. — Folded together lengthwise.

CONVOLUTE. — Rolled up longitudinally.

CORIACEOUS. — Leathery in texture.

CORM. — The enlarged fleshy base of a stem, bulb-like but solid.

CORYMB. — A flat-topped or convex open flower-cluster.

CORYMBOSE. — In corymbs.

CULM. — The above-ground stem of sedges and grasses.

CYME. — A usually broad and flattish determinate inflorescence, i. e., with its central or terminal flowers blooming first.

CYMOSE. — Bearing cymes.

DECIDUOUS. — Not persistent; leaves, bracts, and scales falling away during growing season or after its close.

DECOMPOUND. — More than once compound or divided.

DECURRENT. — Extending down the stem or achene below the insertion.

DELTOID. — Shaped approximately like the Greek letter Delta.

DIOECIOUS. — Unisexual, with ^{the} two kinds of flowers on separate plants.

ENDEMIC. - Confined to, or peculiar to, a certain limited area or region as distinguished from introduced or naturalized; opposed to "exotic".

EXsertED. - Projecting beyond an envelope, as stamens or bristles from under scales.

FASCICLE. - A close bundle or cluster.

FILIFORM. - Thread-shaped; long, slender, and terete.

FUSIFORM. - Spindle-shaped; swollen in middle and narrowing toward each end.

GLABROUS. - Smooth; not rough, pubescent, or hairy.

GRANULOSE. - Composed of or appearing as if covered by minute grains.

HEAD. - A dense cluster of sessile or nearly sessile flowers on a very short axis or receptacle.

HIRSUTE. - Pubescent with rather coarse or stiff hairs.

IMBRICATE. - Overlapping, either vertically or spirally.

INDIGENOUS. - Native and original to the region.

INFLATED. - Enlarged, becoming sac- or pod-like.

INFLORESCENCE. - The flowering part of a plant, its mode of arrangement.

INVOLUCEL. - A secondary involucre.

INVOLUCRE. - A circle or collection of bracts surrounding a flower cluster or head, or a single flower.

INVOLUTE. - Rolled inward.

KEEL. - A central dorsal ridge.

LENTICULAR. - Lentil-shaped; shaped like a double convex lens.

LINEAR. — Long and narrow, with parallel margins.

MEMBRANACEOUS, MEMBRANOUS. — Thin, soft, more or less translucent.

MONOECIOUS. — With stamens and pistils in separate flowers on the same plant.

MUCRONATE. — Tipped with a short, abrupt point.

NERVE. — A simple or unbranched vein or slender rib.

OBLONG. — Longer than broad and with nearly parallel sides.

OBOVATE. — Inverted ovate.

OBOVOID. — The form of an inverted egg.

OBTUSE. — Blunt or rounded at the end.

ORBICULAR. — Circular.

OVATE. — Egg-shaped.

OVOID. — A solid with an oval outline.

PAPILLOSE. — Bearing minute nipple-shaped projections.

PEDUNCLE. — A primary flower-stalk, supporting either a cluster or a solitary flower.

PERENNIAL. — Lasting year after year.

PERFECT. — Having both pistil and stamens.

PERIANTH. — The floral envelope, consisting of bristles in the sedges.

PERIGYNIUM. — The inflated sac which incloses the ovary in Carex.

PUBESCENT. — Covered with short, soft, down-like hairs.

QUADRATE. — Nearly square.

RAY. — The branch of an umbel.

REFLEXED. - Abruptly bent or turned downward.

RETICULATE. - Net-veined.

REVOLUTE. - Rolled backward from the margins.

RHACHILLA. - A secondary axis.

RHACHIS. - The axis of a spike.

ROOTSTOCK. - A rhizome; a prostrate, subterranean stem.

SESSILE. - Without stalk or petiole.

SETACEOUS. - Bristle-like.

SHEATH. - A tubular envelope, as the lower part of the leaf
in grasses.

SIMPLE. - Of one piece; not compound.

SMOOTH. - Without roughness or pubescence.

SPIKELET. - A small or secondary spike.

STAMEN. - One of the pollen-bearing organs of the flower.

STOLONIFEROUS. - Producing runners that root.

STYLE. - The usually attenuated portion of the pistil connecting the stigma and ovary.

TERETE. - Having a circular transverse section.

TRIGONOUS. - Three-angled.

TUBERCLE. - The persistent base of the style.

UMBEL. - An inflorescence in which the peduncles or pedicels
of a cluster spring from the same point.

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