Introduction

The sedge family, or Cyperaceae, is the third largest monocot family, consisting of an estimated 5000 species in 104 genera (Fig. 1). The largest genera with approximate numbers of species are Carex, 2000 spp.; Cyperus, 550 spp. (excluding Kyllinga and Pycreus); Fimbristylis, 300 spp.; Rhynchospora and Scleria, 250 spp. each; Eleocharis, 200 spp.; and Bulbostylis, Pycreus and Schoenus, 100 spp. each.1

Sedges are grass-like flowering plants with linear leaves, parallel venation, and small, mostly wind-pollinated flowers. Although sedges have traditionally been viewed as close relatives of the grasses (Poaceae),3 recent cladistic analysis using molecular and morphological data shows they are more closely allied with the Juncaceae and Thurniaceae.4

Sedges, grasses, rushes and other similar
kinds of monocot plants with small, inconspicuous flowers and linear leaves are grouped informally as graminoids. Although exceptions do occur, the anonymous rhyme “sedges have edges, rushes are round, grasses are hollow right up from the ground” does have value in enabling beginners to grasp general differences in vegetative structure among these families (Table 1). Although most sedges have three-angled stems, hence “sedges have edges,” some do not. For example, the stems of *Dulichium arundinaceum* (L.) Britt. and many *Eleocharis* species are round in cross section.

**Common Names Can Be Confusing!**

Common names are often derived uncritically and can be confusing, especially for grasses, rushes and sedges. The so-called bulrushes (*Scirpus* spp., *Schoenoplectus* spp.), spike-rushes (*Eleocharis* spp.), and beak-rushes (*Rhynchospora* spp.) are actually sedges. Likewise, the cotton-grasses (*Eriophorum* spp.), umbrella-grasses (*Fuirena* spp.), and sawgrass (*Cladium jamaicense* Crantz) are sedges, and the nut-sedges (*Cyperus esculentus* L., *C. rotundus* L.) are often called “nut-grasses.” Universality and relative lack of ambiguity are major advantages of scientific names. Because many graminoids, sedges included, are relatively inconspicuous and escape all but passing notice, most do not have common names. Therefore, scientific names are employed liberally in this article.

**Uses of Sedges by Humans**

Although not generally recognized for their economic importance and beneficence, sedges have been used by humans for thousands of years. The English word “paper” is derived from “papyrus,” the Latin name for the sedge *Cyperus papyrus* L., first exploited ca. 4500 years ago by the ancient Egyptians to manufacture paper. Another sedge, *Schoenoplectus corymbosus* (R. & S.) Raynal was employed in funeral wreaths by the ancient Egyptians. Chinese water-chestnuts, widely consumed in oriental cuisine, are the edible starchy tubers of the aquatic spikerush, *Eleocharis dulcis* L., grown in paddies in Asia. *Cyperus esculentus*

<table>
<thead>
<tr>
<th><strong>Table 1. A comparison of the graminoid families</strong></th>
<th><strong>Cyperaceae</strong></th>
<th><strong>Poaceae</strong></th>
<th><strong>Juncaceae</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>The Sedge Family</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>• Stems usually three-angled (but sometimes terete, quadrangular, or lenticular)</td>
<td>• Stems terete</td>
<td>• Stems terete</td>
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<tr>
<td>• Stems usually with solid pith</td>
<td>• Stems with solid nodes and hollow internodes</td>
<td>• Stems with solid pith</td>
<td></td>
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<tr>
<td>• Leaf sheaths closed</td>
<td>• Leaf sheaths open</td>
<td>• Leaf sheaths open</td>
<td></td>
</tr>
<tr>
<td>• Inflorescence a complex of spikelets (simple spikelet in <em>Eleocharis</em>)</td>
<td>• Inflorescence a complex of spikelets</td>
<td>• Inflorescence a complex of cymes</td>
<td></td>
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<tr>
<td>• Perianth of 1–many bristles or hairs, or absent</td>
<td>• Perianth hardly evident, apparently reduced to scale-like palea (outer series?) and tiny lodicule (inner series)</td>
<td>• Perianth of six scale-like parts in two series</td>
<td></td>
</tr>
<tr>
<td>• Stamens 3 (1-2, rarely 6)</td>
<td>• Stamens 3 or 6 (rarely 1-2)</td>
<td>• Stamens 6 (rarely 3)</td>
<td></td>
</tr>
<tr>
<td>• Pistil of 2-3 fused carpels</td>
<td>• Pistil of 2(3) fused carpels</td>
<td>• Pistil of 3 fused carpels</td>
<td></td>
</tr>
<tr>
<td>• Fruit an achene</td>
<td>• Fruit a caryopsis (grain)</td>
<td>• Fruit a capsule</td>
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var. sativus Boeck., yellow-nutsedge, one of the oldest crops in Egypt, is cultivated in Africa, Asia and southern Europe for its tubers called chufas, tiger nuts, Zulu nuts or earth almonds, which are rich in starch, sugar and fat and have a nutty flavor when roasted. Chufas are also made into flour and the Spanish drink horchata de chufa and are the source of a non-drying oil of some economic value. Yellow nut-sedge is also planted for its tubers to provide food for wildlife. The rhizomes of bulrushes (Schoenoplectus spp.) were eaten by native Americans, and robust bulrushes, like Schoenoplectus californicus (C.A. Mey.) Sojak, have been exploited to construct houses and boats. Stems, leaves, or fibers of many sedges are used as materials for weaving, especially in undeveloped parts of the world. For example, the stems and leaves of various bulrushes (Scirpus spp., Schoenoplectus spp.) including Scirpus americanus Pers., commonly called chairmaker’s rush, are woven into baskets, mats, and chair seats, and fibers from Fimbristylis umbellaris (Lam.) Vahl are used as material for weaving in Asia.

A surprising number of sedges are cultivated as ornamentals. Umbrella sedge (Cyperus alternifolius subsp. flabelliformis Kük.) has been grown in water gardens and as a pot-plant for more than 200 years, and papyrus (Cyperus papyrus), dwarf papyrus (Cyperus prolifer Kunth), and certain bulrushes (Scirpus spp., Schoenoplectus spp.) are cultivated in water gardens and ponds. A number of Carex spp. are planted in woodland gardens, and Cyperus albostratus Schrad. and Isolepis cernua (Vahl) Roem. & Schult are used in pots and hanging baskets. The bulrush Schoenoplectus lacustris (L.) Palla has been employed in Germany and the Neth-
erlands for water purification, and certain *Fimusbristylis* species are indicators of copper deposits in Australia.6 Bryson and Carter10 have accumulated a list of more than 150 species of Cyperaceae cultivated as ornamentals or otherwise, which they attribute to be an important factor in their dispersal as weeds, and Simpson and Inglis2 have compiled a comprehensive checklist of sedges exploited by humans.

**Sedges as Weeds**

Many sedges are adapted to open, sunny sites with reduced competition from taller shading trees and shrubs. Such plants are called heliophytes, and their habitats are often dependent upon natural or artificial disturbance. These sedges have intrinsic characteristics such as high reproductive output, rapid growth, vegetative proliferation, and extended seed dormancy that promote population expansion after disturbance, and they probably originally evolved as colonizers following disturbance.11, 12, 13 Although there is a tendency to think in terms of catastrophic perturbations, more subtle and continual natural processes provide open areas for colonization by such species, e.g., exposed bars and banks along streams and coasts.12 The same characteristics that make sedges successful colonizers following natural disturbance enable them to occupy habitats artificially disrupted and maintained by humans, such as agricultural fields, lawns, and gardens.12 Such opportunistic plants, often called weeds, are usually not problems so long as they are elements of their naturally co-evolved communities. However, when dispersed by humans from their native ranges and communities, they can adversely affect natural ecosystems, agriculture, and other societal interests. Moreover, habitat destruction and disturbance of natural ecosys-
tems by humans creates the conditions necessary for such plants to survive and establish a “beach head” for subsequent dispersal during the early stages of naturalization and invasion.

Holm et al.\textsuperscript{14} cited purple nut-sedge (\textit{Cyperus rotundus}) as the world’s worst weed and listed other sedges among the forty worst weeds: \textit{Cyperus esculentus} (16th), \textit{C. difformis} L. (32nd), \textit{C. iria} L. (33rd), and \textit{Fimbristylis miliacea} (L.) Vahl (40th), all of which have been introduced into Georgia. Additionally, a number of other native and introduced sedges are considered by many to be weeds of agriculture, lawns and gardens, turfgrass, or natural areas.\textsuperscript{15}

\textbf{General Structure}

Sedges are widely believed to be taxonomically challenging. This is largely due to extreme reduction of flowers and associated structures in both number and size and the inherent difficulty in handling and describing such small, specialized parts. Based mainly upon the organization of complex inflorescences and small fruits (achenes) and associated parts (e.g., perianth, tubercle), reliable identification requires reproductively mature specimens with fully developed spikelets and achenes, the use of a good hand lens or a dissecting microscope, and the ability to manipulate and dissect fine structures. A glossary is provided at the end of this article to assist readers with some of the specialized terminology of sedges.

\textbf{Habit.} Sedges are morphologically diverse and, depending upon the species, may have annual or perennial habits. Most species are perennial herbs persisting and spreading vegetatively by rhizomes, stolons, corms, or tubers.

\textbf{Stems and leaves.} Typically, stems are trigonous with three sides and three angles; however,
Figure 7. Individual spikelet of *Cyperus sanguinolentus* isolated to show distichous scales.

Figure 8. Portion of inflorescence of *Cyperus haspan* showing the sequential separation of scales and fruits from base to apex of spikelet. In this species the fruits are dispersed individually. Note two white fruits of central spikelet, exposed after separation of their subtending scales.

Figure 9. In *Cyperus echinatus* the spikelets fall intact—achenes, scales and all—and the entire spikelet is dispersed as a unit. Note scattered, intact spikelets.

Figure 10. In *Cyperus odoratus* the spikelets break apart into one-fruited segments, the unit of dispersal.

In *Dulichium* stems are round in cross section (terete), and in *Eleocharis* they can be terete or two-, three-, four- or more-angled. Leaves of sedges arise at intervals along a leafy stem (e.g., *Dulichium, Scirpus, Bolboschoenus*) or are clustered near the base of the plant (e.g., *Cyperus, Kyllinga*). They have closed sheaths (Fig. 2) with generally lanceolate to linear, grass-like blades. Unique within the family, plants of *Eleocharis* have leaves reduced to bladeless sheaths and, thus, appear leafless (Fig. 3).

**Inflorescence.** Some genera such as *Cyperus* and *Kyllinga* have prominent leafy bracts positioned below the inflorescence (Fig. 4). This feature is perhaps best developed in the white-topped sedges (*Rhynchospora* section *Dichromena*), characterized by dazzling white bracts with contrasting green tips (Fig. 1). The basic unit of the sedge inflorescence is
the spikelet. Generally, spikelets are organized into paniculate, cymose, umbellate or spicate clusters (Fig. 5), except Eleocharis with the inflorescence reduced to a single spikelet (Fig. 6). Essentially, each spikelet consists of one or more tiny flowers subtended by small bracts called scales. The scales and flowers may be spirally arranged (Fig. 6) or distichous (Fig. 7). In some sedges, the fruits are dispersed individually as they fall away one-by-one with their associated scales from the base to the apex of the spikelet (Fig. 8). In others, the spikelets separate as intact units—scales, fruits and all (Fig. 9), or the spikelet axis breaks apart into one-fruited segments, each segment having a portion of the axis, a scale, and a fruit (Fig. 10). The flowers in most genera of Cyperaceae are perfect (bisexual) with both stamen and pistil. However, Carex, Cymophyllus and Scleria have imperfect (unisexual) flowers that are usually borne in separate pistillate (female) and staminate (male) inflorescences on the same plant (monoecious) (Fig. 11). Carex and Cymophyllus are also unique among our sedges in having each pistillate flower enclosed within a small, sac-like perigynium (Fig. 11).

Flowers. The small flowers of many sedges are devoid of perianth segments (e.g., Bulbosynis, Carex, Cymophyllus, Cyperus, Fimbristylis, Kyllinga). However, others have a perianth of tiny bristles (Figs. 12, 13) or hairs (Fig. 14). Fuirena has the most elaborate perianth, which is usually differentiated into two series—the outer three bristles and the inner three paddle-
shaped segments (Fig. 15). When present, the perianth normally persists attached to the mature fruit (Figs. 12–15) and facilitates its dispersal. Perianth bristles generally have teeth along their edges that attach to fur or feathers of animals, and a perianth of long hairs undoubtedly promotes dispersal of the tiny fruits by wind. The numbers and kinds of perianth segments are useful in distinguishing among genera and species.

Achenes and Associated Structures. The small fruits of sedges, called achenes, have only one seed. Mature achenes are usually necessary for reliable identification. Achene shape is correlated with the number of carpels in the pistil. Pistils with two carpels normally have two-branched (bifid) styles and develop into biconvex (lenticular) or plano-convex achenes. Pistils derived from three carpels have three-branched (trifid) styles and form trigonous or terete achenes. The terete achenes of Scleria species are bony white (Fig. 16), and, in Scleria and other genera, the surface ornamentation of the achene is useful in distinguishing among species (Figs. 16–18). In Fimbristylis, the style is usually fringed with hairs (Figs. 19, 20), and, in a number of genera (e.g., Bulbostylis, Eleocharis, Rhynchospora), an enlarged style-base persists as a distinct tubercle (Figs. 12, 13, 21) attached to the summit of the achene. In Scleria, the achene usually has a rudimentary perianth adhering to its base in the form of a discoid or lobed hypogynium (Fig. 16).

Generic Survey of the Sedges of Georgia
In the following survey, the genera are classified into groups that correspond more or less with tribes of the Cyperaceae. However, in electing
Figure 14. A portion of the overly mature inflorescence of *Scirpus cyperinus* showing scattered tiny, white achenes with persistent perianth. Note the entangled and dangling, curly perianth hairs.

Figure 15. Scanning electron micrograph of achene-perianth complex in *Fuirena breviseta*. Note short, outer perianth segments (o); large, paddle-shaped, inner perianth segments (i); and the achene (a) with its stipitate base and its bristly, peg-like apex.

Figure 16. The achene-hypogynium complex in *Scleria reticularis*; proximal (bottom) view on left showing three-lobed hypogynium and lateral/distal (top) view on right. Note reticulate-pitted achene surface and greenish hypogynium.

Figure 17. The achene of *Scleria georgiana*. Note smooth, whitish, bony surface and absence of hypogynium in this species.

to emphasize form relationships instead of phylogeny, I have departed from recent tribal classifications\(^1,16\) in placing *Lipocarpha* and retaining the segregates of *Scirpus* in the same informal group with *Scirpus*. It is my belief that, in doing this, a more practical grouping of genera is achieved. English derivations of genus names are provided in order to make the Latin more approachable.\(^17,18,19\)

**THE SPIKE-RUSH SEDGE GROUP:** plants apparently leafless, with bladeless leaves reduced to sheathing bases; inflorescence a single, terminal, unbranched spikelet; flowers perfect *Eleocharis* (from Greek *elos*, marsh, and *charis*, grace)—**Spike-rushes**

The spike-rushes are the most structurally reduced sedges, consisting of little more than an apparently leafless stem terminated by an unbranched spikelet. However, the taxonomy of *Eleocharis* is complex, with marked variation in perianth, tubercles, and surface ornamentation of the achenes. *Eleocharis acicularis* (L.) R. & S., *E. microcarpa* Torr. and *E. parvula* (R. & S.) Link ex Bluff, Nees & Schauer are delicate plants with diminutive, cespitose habits; whereas others, such as *E. equisetoides* (Ell.) Torr. and *E. quadrangulata* (Michx.) R. & S., are graceful, stoloniferous perennials forming extensive stands sometimes dominating the shallows of ponds (Fig. 22). Tips of the arch-
Figure 18. The spikelet of Scleria reticularis showing intact achene. Note three scales and reticulate-pitted surface of achene.

Figure 19. Achene with attached style in Fimbristylis caroliniana showing fringed, bifid style and two terminal stigmas.

Figure 20. Portion of inflorescence of Fimbristylis puberula showing spikelets with spirally arranged scales and fuzzy stigmas.

Figure 21. Achene of Bulbostylis barbata showing tubercle at upper right. Note transverse lines of cells on achene surface.
ing, aerial stems of *Eleocharis melanocarpa* Torr. and *E. baldwinii* (Torr.) Chapm. take root when they touch the ground, effecting a kind of “walking” asexual proliferation. Thusly, *E. baldwinii* forms dense mats on exposed hydric, sandy or peaty soils in flatwoods of the coastal plain.

A number of our species are adept colonizers following disturbance, especially in hydric soils of wetlands and floodplains and seasonally wet sites in fields and pastures, and some are listed as weeds, e.g., *E. obtusa* (Willd.) Schult., *E. montevidensis* Kunth and *E. quadrangulata*.\(^{15}\) *Eleocharis albida* (Torr.) Torr. and *E. parvula* are particularly common and weedy in disturbed brackish soils along the Georgia coast, where they may be locally abundant.

*Websteria* (commemorating G. W. Webster, American botanist and farmer, 1833–1914) Websteria consists of a single species, *Websteria confervoides* (Poir.) Hooper, widely distributed in tropical, subtropical and warm temperate regions around the world.\(^{20}\) In the United States, *Websteria* is infrequently collected and known only from Florida and Georgia, where it is found submerged in ponds and lakes.\(^{20, 21}\)

It has one-fruited spikelets and capillary stems and is vegetatively similar to and sometimes confused with *Eleocharis vivipara* Link.

**The Bulrush Sedge Group:** plants usually leafy; scales spiral; flowers perfect; perianth of bristles or hairs, or absent; style base indistinct; tubercle absent

*Scirpus* (classical Latin name for the bulrush)—**Bulrushes**

Traditionally, *Scirpus* has been defined broadly to encompass species more recently segregated into the genera *Bolboschoenus*, *Isol-
epis, Oxycaryum and Schoenoplectus. Although others have placed the Scirpus segregates variously, and sometimes questionably, in the tribes Cyperae, Fuireneae or Scirpeae, I have pragmatically grouped them with Scirpus (tribe Scirpeae), because all have spiral arrangement of scales, indistinct style bases, and etuberculate achenes.

Scirpus is characterized by leafy stems; a large, compound, cymose inflorescence of many spikelets; and glabrous scales with usually acute to acuminate tips. There are about eight species in Georgia, inhabiting a variety of hydric sites including floodplain forests, swamps, marshes, stream banks, wet meadows, and ditches. Scirpus divaricatus Ell. haunts shaded floodplain forests and swamps, and S. lineatus Michx. and S. pendulus Muhl. are often associated with open, wet calcareous sites. Scirpus cyperinus (L.) Kunth, called wooly bulrush or wooly bully, is one of the most common and widespread bulrushes in Georgia (Fig. 23). This robust sedge has leaves with harsh, cutting edges and is sometimes a weed of disturbed, hydric sites, occurring in a variety of marshy and wetland habitats. The wooly perianth of S. cyperinus persists, attached to its tiny achene, and thus promotes wind dispersal (Fig. 14). Interestingly, two of the native Scirpus species occurring in Georgia are introduced in other parts of the world: S. pendulus in Australia and S. georgianus Harper in New Zealand. Because of its epithet and the origin of its type in Clarke County, Georgia, S. georgianus deserves special note. It is widely distributed in the eastern United States and in Georgia is most common in the piedmont and mountain provinces. Scirpus georgianus has been treated as a variety or synonym of S. atrovirens Willd., but more recently has been restored to the rank of species based upon its brownish scales and rudimentary or absent perianth.
Schoenoplectus (from Greek, schoinos, rush, and plectos, plaited, referring to use of stems in weaving of mats, etc.)—Naked-stem Bulrushes

The bulrushes with leafless, wand-like stems and ciliate scales are separated from Scirpus as Schoenoplectus, of which there are about ten species in Georgia.24 Schoenoplectus pungens (Vahl) Palla, a common associate of the coastal salt-marsh community, is well marked by its pseudolateral clusters of sessile spikelets (Fig. 24) subtended by an erect bract that appears to be a continuation of the stem. Schoenoplectus etuberculatus (Steud.) Sojak is found as an emergent in shallow ponds of the coastal plain or laxly submerged in swiftly flowing blackwater streams.

Bolboschoenus (from Greek bolbos, bulb, and schoinos, rush, referring to the enlarged, cormous stem bases)—Tuberous Bulrushes

Bulrushes with leafy stems, cormous stem bases, large spikelets, and puberulent scales are included in Bolboschoenus. Bolboschoenus robustus (Pursh) Sojak, seacoast bulrush, is the only well documented tuberous bulrush from Georgia.23

Isolepis (from Greek, isos, equal, and lepis, scale, referring to the uniform floral scales)

Isolepis is a genus of mostly low, cespitose plants with basal leaves and terminal or pseudolateral capitate or solitary inflorescences. There are only two species of Isolepis in Georgia, both annuals. The native Isolepis carinata Hook. ex Arn. Ex Torr. [=Scirpus koilolepis Steud.] is an ephemeral inhabitant of intermittently wet depressions of fields and open woods during spring. Isolepis pseudosetacea (Dav.) Gand. [=Scirpus molestus M.C. Johnst.], an introduced species, has a similar habitat and phenology.25

Oxycaryum (from Greek, oxys, sharp, and carya, nut, referring to the sharp-pointed achene)

The only species of the monotypic genus Oxycaryum is widespread in tropical, subtropical, and warm temperate regions of the Eastern and Western Hemispheres.27 In the United States, Oxycaryum cubense (Poepp. & Kunth) Lye [=Scirpus cubensis Poepp. & Kunth] ranges from eastern Texas into Georgia and southward into peninsular Florida. It is apparently recently introduced into Georgia, first reported in 1996.28 Spreading locally by stolons and forming extensive floating batteries in lakes, ponds, and wetlands (Fig. 25), this aquatic sedge could threaten freshwater aquatic communities in warmer parts of the southeastern United States.
United States. Its terminal, umbellate or monocepalous inflorescence subtended by whorls of leafy bracts gives *O. cubense* a superficial resemblance to some *Cyperus* and *Kyllinga* species (Fig. 26).

**Lipocarpha** (from Greek *leipo*, to fall, and *carpha*, chaff, referring to the deciduous inner scales of certain species)

Georgia’s only species, *Lipocarpha maculata* (Michx.) Torr., is somewhat ruderal. It is occasional to common in the coastal plain, where it is found in wet ditches, disturbed hydric soils of depressions in the flatwoods, and along the exposed margins of ponds. This species superficially resembles *Kyllinga* with its cespitose habit and terminal inflorescence of tightly clustered spikelets subtended by a whorl of leafy bracts (Fig. 27). The classification of *Lipocarpha* as more closely allied with either *Scirpus* (Tribe Scirpeae) or *Cyperus* (Tribe Cyperaeae) depends on how one interprets the various kinds of scales in the inflorescence and, thus, whether one views the inflorescence as a simple spikelet or a compound spike. Although the current, prevailing view is to interpret the inflorescence as a spike of reduced spikelets,¹ ¹⁶ I employ the simpler interpretation here and informally group *Lipocarpha* with *Scirpus* and other sedges with spikelets of spirally arranged scales and flowers, since this relationship of gross form is easier for non-specialists to see and grasp. This conundrum illustrates well the struggle inherent in two fundamental purposes of taxonomy to provide stable and ultimately useful means of identifying and naming plants and to construct classification schemes that reflect phylogenetic (evolutionary) relationships.

**The Umbrella-grass Sedge Group:** plants mostly leafy; leaf blades or sheaths usually pubescent; scales spiral, usually pubescent; flowers perfect; perianth differentiated into two series, 3 outer bristles and 3 inner paddle-like segments; achene with stipitate base and peg-like apex; tubercle absent

**Fuirena** (commemorating Georg Fuiren, Danish Botanist, 1581–1628)—**Umbrella-grasses**

Five species of *Fuirena* are known to occur in Georgia: *Fuirena breviseta* (Cov.) Cov., *F. longa* Chapm., *F. pumila* (Torr.) Spreng., *F. scirpoides* Michx., and *F. squarrosa* Michx. All are heliophytes of wetland habitats, including bogs, marshes, interdunal swales, ditches, margins of ponds, and wet depressions in savannas²⁹ ³⁰ Robert Kral’s²⁹ thorough treatment of *Fuirena* for North America provides a dichotomous key for identification, technical descriptions, distribution maps, and illustrations. The umbrella-grasses are well marked by their usually leafy
stems; pubescent leaves; large spikes; spirally arranged scales; perianth in two distinct series; and distinctive achene with stipitate base and peg-like apex (Figs. 15, 28). Although most species have conspicuously leafy stems, the coastal species *F. scirpoidea* and *F. longa* have reduced leaf blades and a wand-like habit, unusual in *Fuirena*.

**The Fringe-sedge Group:** plants leafy; leaves basal; inflorescences terminal; scales spiral; flowers perfect; perianth absent; style-base distinct; tubercle present (Bulbostylis) or absent (Fimbristylis) *Fimbristylis* (from Latin *fimbria*, fringed, and *stylus*, style)—**Fringe-sedges**

*Fimbristylis* and *Bulbostylis* are distributed mostly in tropical and warm temperate regions around the world, and Kral’s thorough account of the North American species of these genera provides a dichotomous key for identification, technical descriptions, distribution maps, and illustrations. As the genus name suggests, most *Fimbristylis* species have a fringed style with its base clearly distinct from the summit of the attached achene (Figs. 19, 20). Our species include a number of weeds widely distributed in both the Old and New Worlds: *Fimbristylis schoenoides* (Retz.) Vahl, *F. tomentosa* Vahl, *F. dichotoma* (L.) Vahl, *F. annua* (All.) R. & S., and *F. miliacea. Fimbristylis annua*, *F. dichotoma*, *F. miliacea*, and *F. tomentosa* have long been associated with rice agriculture and were probably brought into the southeastern United States from Asia as contaminants of rice seed shortly after colonization by Europeans. Most *Fimbristylis* species have branched, umbellate inflorescences of several to many spikelets. However, in *F. schoenoides* the inflorescence is usually reduced to a single spikelet, imparting an *Eleocharis* look to the plants until a closer inspection of the tufted stems reveals narrow basal leaves.

*Fimbristylis perpusilla* Harper was first collected by Roland M. Harper from Sumter County, Georgia and is endangered in Georgia. This diminutive sedge is endemic to the southeastern United States, where it occurs sporadically along the exposed shores of ponds and reservoirs from Georgia to Delaware and is sometimes locally abundant. Robert Kral’s long-term observations, suggesting sporadic occurrences of this species, are of interest. In 1962, he noted that *F. perpusilla* was locally abundant but apparently restricted to only one pond in Seminole County, Georgia, despite there being other similar ponds in the area. He also observed only a few plants upon revisiting the site a year later and a great abundance again ten years later! *Fimbristylis brevigaginata* Kral, described as a new species in
and narrowly endemic on granitic and sandstone outcrops in the Cumberland Plateau of Alabama and the Piedmont of Georgia, is of possible conservation concern.\textsuperscript{32, 36}

*Bulbostylis* (from Latin *bulbus*, bulbous, and *stylus*, style, referring to the enlarged bulbous style bases of many species)

As the genus name suggests, in most *Bulbo*

As the genus name suggests, in most *Bulbo*
stylias species the swollen base of the style forms a distinct tubercle on the summit of the achene (Fig. 21). *Bulbostylis barbata* (Rottb.) C. B. Clarke is widely distributed in both Old and New Worlds.\textsuperscript{31, 37} With its reddish-brown inflorescences (Fig. 29), this diminutive sedge is often locally abundant and conspicuous en masse in the coastal plain during late summer and autumn especially in open, disturbed, sandy areas and along the edges of agricultural fields. *Bulbostylis warei* (Torrey) C. B. Clarke, endemic to the Atlantic and Gulf coastal plain of the southeastern United States, inhabits open sands in longleaf pine-scrub oak communities; this tufted perennial has hemispherical, head-like clusters of spikelets and distinctive inflorescence bracts with beautifully fringed basal sheaths.

**THE FLAT-SEDGE GROUP:** plants leafy; leaves basal; leafy bracts subtending inflorescence; inflorescence terminal, umbellate with pedunculate rays or capitule cluster of sessile spikes; scales distichous; flowers perfect; perianth absent; style base indistinct; tubercle absent

*Cyperus* (from Greek *cyperus*, edge, referring to the sharp-edged leaves or perhaps the three-edged stems)—**Flat-sedges or Umbrella Sedges**

*Cyperus* is distinguished by spikelets with distichous (two-ranked) floral scales, usually two
or more flowers and fruits per spikelet, and the absence of a perianth. Some Cyperus species (e.g., *C. flavescens* L., *C. polystachyos* Rottb., *C. sanguinolentus* Vahl) have pistils with two stigmas and lenticular achenes. Others have pistils with three stigmas and trigonous achenes. *Cyperus* species also differ in how the spikelets, scales and achenes separate from the inflorescence at maturity. In *C. odoratus* L., the spikelets break apart into one-fruited segments (Fig. 10). In other species, like *C. flavescens*, *C. polystachyos*, and *C. haspan* L., the achenes and scales fall away one by one from the base to the apex of the spikelet axis (Fig. 8), and in another group that includes *C. croceus* Vahl, *C. echinatus* (L.) Wood, *C. retrorsus* Chapm., and *C. strigosus* L. the entire spikelet drops off intact—achenes, scales and all (Fig. 9).

In Georgia, *Cyperus* species are found in diverse habitats. Some, like *Cyperus distinctus* Steud., *C. erythrorhizos* Muhl., *C. flavescens*, *C. haspan*, *C. lanceolatus* Poir., *C. odoratus*, *C. ovatus* Baldw., *C. polystachyos*, *C. pseudovegetus* Steud., *C. strigosus*, and *C. surinamensis* Rottb., and *C. virens* Michx., inhabit open, hydric soils along stream banks or shores of ponds and lakes or in ditches. Other species, like *C. filiculmis* Vahl, *C. grayii* Torr., *C. hystricinus* Fern., *C. plutenetii* Fern. and *C. nashii* Britt. ex Small, tend toward more xeric sites and are often associates of longleaf pine-scrub oak communities in the coastal plain. *Cyperus croceus*, *C. retrorsus* and *C. echinatus* are occasional to common in well drained soils, along roadsides or in poorly kept lawns or other disturbed sites. *Cyperus tetragonus* Ell. is endemic to the coastal plain of the southeastern United States (Florida, Georgia, South Carolina), and in Georgia it is found on well drained, sandy soils in the maritime live oak forest on barrier islands or the immediately adjacent mainland. *Cyperus* species are among the world’s most notorious weeds, and some of the diverse characteristics and strategies that make plants competitive weeds are illustrated well by these sedges.

*Cyperus rotundus* (purple nut-sedge) and *C. esculentus* (yellow nut-sedge), the world’s worst and sixteenth worst weeds, respectively, are distributed around the world in tropical, subtropical, and warm-temperate regions.14 Their common names derive from the colors of their floral scales. Although both species are major agricultural, lawn, and garden pests in Georgia, they infrequently set viable seeds. Instead their reproduction and dispersal is primarily asexual, through tubers formed at the tips of rhizomes.38 In contrast with the sweet, edible tubers (*chufas*) of yellow nut-sedge, those of purple nut-sedge are bitter and inedible.38, 39 Although reproduction and dispersal in these sedges is mostly asexual, they rarely reproduce sexually, forming small achenes that are readily dispersed. This combination of asexual and sexual reproduction, has enabled purple and yellow nut-sedge to be among the world’s most successful weeds and to colonize agricultural areas throughout much of the world.

The annual sedges *Cyperus difformis* and *C. iria*, also among the world’s worst pests, have evolved a very different strategy, in which individual plants produce tremendous numbers of tiny, readily dispersed achenes and have very short life cycles. A single plant of *C. iria* can produce more than 5,000 viable seeds, and an individual of *C. difformis* can set 50,000 seeds.14 *Cyperus difformis* and *C. iria* can produce multiple generations each growing season, with *C. difformis* completing its life cycle in only four to six weeks.14 In the southeastern...
United States, *C. difformis* (Fig. 5, 30) and *C. iria* are primarily weeds of ditches, rice fields, and poorly drained sites in other agricultural fields or disturbed areas. *Cyperus iria* is common and widespread throughout much of the state. *Cyperus difformis* was first reported from Georgia in Lanier County in 1996 and has been found more recently in McIntosh County. Despite its tremendous reproductive potential, *C. difformis* does not yet appear to be widespread or common in Georgia.

*Cyperus entrerianus* Boeck. (deeprooted sedge) is native to temperate regions of South America and was first reported from the United States in 1990. It ranges from eastern Texas into Georgia and Florida in the southeastern United States, where flooding, construction equipment, mowing, and soil moving activities, especially along highways, disperse its small achenes. An individual plant of deeprooted sedge can set more than 100,000 achenes per year, and, in addition to producing tremendous numbers of seeds, it is a perennial with short, deeply set rhizomes and corms that persist through the winter. Thus, *Cyperus entrerianus* will likely continue to spread in the coastal plain of Georgia, where it occupies ditches and other low, disturbed sites in the flatwoods.

*Kyllinga* (commemorating Peter Kylling, seventeenth century Danish botanist)—Green Sedges

*Kyllinga* is distinguished by its terminal, capitate inflorescence (Fig. 31, 32); two-scaled, one-fruited spikelets (Fig. 33, 34); and lenticular achenes. The roots of fresh *Kyllinga* plants have a characteristically pleasant fragrance. *Kyllinga* is closely related to and probably derived from *Cyperus*, and some modern authors treat it within *Cyperus* as a subgenus or section. Five species of *Kyllinga* are known to occur in Georgia, including *K. squamulata* Thonn. ex Vahl not previously reported from the state. *Kyllinga brevifolia* Rottb. and *K. gracillima* Miq. are rhizomatous perennials, and *K. odorata* Vahl and *K. pumila* Michx. are cespitose annuals or short-lived perennials. *Kyllinga pumila* was initially described by Michaux in the first North American flora and is evidently our only native *Kyllinga* species. The naturalized species *K. brevifolia* and *K. odorata* were introduced long ago, with *K.*
brevifolia being reported initially in the United States in 1821 by Stephen Elliott and K. odorata in 1836 by John Torrey. Bryson et al. provide an illustrated account of Kyllinga species present in the southeastern United States, all of which can be weeds of lawns or turf-grass. Although previously known in the United States only from Florida and South Carolina, Kyllinga squamulata (Figs. 32, 34) has been found recently as a weed in turf-grass on athletic fields in Lowndes and Chatham counties, Georgia.

THE THREE-WAY SEDGE GROUP: plants leafy; stem terete; leaves cauline; upper leaves with well-developed lanceolate blades, conspicuously three-ranked; inflorescences axillary; scales distichous; flowers perfect; perianth of 6–9 bristles

_Dulichium_ (Latin name for a kind of sedge)—Three-way Sedge

The only species in this distinctive, monotypic genus is _Dulichium arundinaceum_. The following combination of characteristics makes even sterile plants easy to identify: rhizomes; terete stems; well developed and conspicuously three-ranked, cauline leaves; and axillary inflorescences (Fig. 35). Also, the combination of perianth bristles and distichous scales is found elsewhere among Georgia sedges only in _Eleocharis baldwinii_ and _Websteria confervoides_. The descriptive common name, three-way sedge, is derived from the delightfully tristichous (three-ranked) leaves, best observed in
the field by looking straight down the stem (Fig. 36). In Georgia, the three-way sedge is found in acidic soils of depressions along blackwater streams and shallows along ponds associated with such streams.

**The Beak-rush Sedge Group:** plants leafy; scales spiral; flowers perfect; perianth of few to many bristles or absent in sections Dichromena and Psilocarya; stigmas 2 (–3); achene biconvex to subterete; tubercle present

*Rhynchospora* (from Greek *rhyncho*, snout, and *spora*, seed, referring to the beaked achenes of many species)—Beak-rushes *Rhynchospora* is a taxonomically complex genus, well represented in the coastal plain of the southeastern United States, where remarkable numbers of beak-rush species can occur together in bogs, seeps, or wet savannas (Fig. 37). Although most beak-rushes inhabit hydric soils in bogs, wet savannas, margins of ponds, seeps, and depressions in flatwoods, *R. megalocarpa* Gray and *R. grayi* Kunth are found in open, xeric, sandy pinelands or sandscrub.

Species that are opportunistic colonizers of pastures, lawns, pond margins, and ditches, are treated as weeds, and one of our natives, *Rhynchospora caduca* Ell., is recently naturalized and spreading rapidly in Hawaii,

none is officially protected, a number of Georgia beak-rushes are of conservation concern: *R. crinipes* Gale, found on banks and bars of blackwater streams; *R. harveyi* var. *culixa* (Gale) Kral, found in ecotones between sandhills and bogs; *R. solitaria* Harper, inhabiting hillside bogs; and *R. thornei* Kral, growing along margins of limesink ponds.

Historically, species with conspicuous, green-tipped, white bracts have been treated in the segregate genus *Dichromena*; however, a compelling case has been made for including these white-topped sedges in *Rhynchospora*. These are striking plants in the field (Fig. 1), and two species are found in Georgia: *R. colorata* (L.) Pfeiff., an inhabitant of basic or circumneutral soils in seeps or swales, and *R. latifolia* (Baldw.) Thomas, a more robust plant of acidic soils of bogs and wet savannas. *Psilocarya*, formerly a small genus of annuals lacking perianth bristles, is also now treated within *Rhynchospora*.

**The Sawgrass Sedge Group:** plants leafy; scales spiral; flowers perfect; perianth absent; stigmas 3; achene terete

*Cladium* (from Greek *clados*, branch, alluding to the branched inflorescence)—Sawgrass

There are two species of *Cladium* in the southeastern United States: *C. jamaicense* Crantz and *C. mariscoides* (Muhl.) Torrey. Only *Cladium jamaicense*, sawgrass, is known to oc-
cur in Georgia. The predominant species of the Everglades marshes of southern Florida, this robust perennial with graceful, delicate inflorescences and lacerating foliage inhabits brackish and freshwater marshes along the Georgia coast and occasionally inland.21

**The Nut-rush Sedge Group:** plants leafy; flowers imperfect; spikelet generally with pistillate flowers below staminate and with several empty basal scales; achenes whitish, bony; hypogynium usually present

*Scleria* (from Greek *sclerus*, hard, referring to the bony achene)—**Nut-rushes**

In *Scleria*, the spikelets generally have both pistillate and staminate flowers with pistillate flowers below the staminate and several empty scales below the pistillate flowers at the base of the spikelet. The whitish, bony surfaces of the achenes are variously smooth, pitted, reticulate or pubescent (Figs. 16–18), and fused to the base of the achene there is usually a discoid, tuberculate, or lobed structure called the hypogynium (Fig. 16). There are about twelve species of *Scleria* in Georgia. Although most of our species (e.g., *S. baldwinii* (Torr.) Steud., *S. georgiana* Core, *S. minor* (Britt.) Stone, *S. muehlenbergii* Steud., *S. reticularis* Michx., *S. verticillata* Muhl. ex Willd.) are found on fairly wet sites such as open, moist, sandy or peaty soils of seepage slopes, bogs, depressions in flatwoods, and pond margins, *S. triglomerata* Michx. and *S. oligantha* Michx. ex Willd. are more often found on mesic to subxeric sites in shaded woods, open prairies, and pineland savannas. *Scleria ciliata* Michx. and *S. pauciflora* Muhl. ex Willd. both exhibit ample variation with several named varieties each and substantial ranges in habitat from dry to hydric sites.54

**The Caric Sedge Group:** plants leafy; flowers imperfect; staminate (male) and pistillate (female) flowers often borne in separate inflorescences or one type above the other in the same inflorescence; sac-like perigynium enclosing each pistillate flower and achene

*Carex* (from Greek *cairo*, to cut, referring to sharp edges of leaves in certain species)—**Caric Sedges**

*Carex* is well marked by imperfect flowers and, its most distinctive feature, the perigynium enveloping each pistillate flower and fruit (Fig. 11). Most *Carex* species occur in the northern temperate zone where they are primarily found in mesic, woodland habitats. With more than 2000 species, *Carex* is the largest genus of Cyperaceae and one of the largest genera of the world’s flora. *Carex* is also the largest genus of plants in Georgia and includes a number of recently named species found in the state: *Carex acidicola* Naczi, described in 2002; *C. appalachica* Webber & Ball, 1979; *C. calcifugens* Naczi, 2002; *C. cumberlandensis* Naczi, Kral & Bryson, 2001; *C. ghokonii* Naczi & Cochrane, 2002; *C. godfreyi* Naczi, 1993; *C. kraliana* Naczi & Bryson, 2002; *C. manhartii* Bryson, 1985; *C. pigra* Naczi, 1997; *C. planispicata* Naczi, 1999; *C. superata* Naczi, Reznicek & Ford, 1998; and *C. thornei* Naczi, 2002. Of these, *Carex acidicola*, *C. calcifugens* and *C. thornei* are of possible conservation concern.19
The majority of Georgia’s officially listed rare and protected sedges are *Carex* species.\(^{34}\) *Carex baltzellii* Chapm. ex Dewey, endangered in Georgia, is a rare plant of beech-magnolia forests on steep slopes of ravines, ranging from southern Mississippi to southwestern Georgia and northern Florida.\(^{35}\) Other rare caric sedges with official legal status in Georgia as threatened species are Biltmore sedge, *Carex biltmoreana* Mack., restricted to steep, sunny, granitic seeps in the Blue Ridge Province of northeastern Georgia, South Carolina and North Carolina;\(^{35}\) *Carex manhartii* Bryson, a denizen of moist deciduous or mixed deciduous evergreen forests in the Appalachians from West Virginia southward to northern Georgia;\(^{55}\) wretched sedge, *Carex misera* Buckley, whose leaves droop forlornly from shaded granitic cliffs and balds in the Blue Ridge from northeastern Georgia, eastern Tennessee and western North Carolina;\(^{35, 56}\) and *Carex purpuririfera* Mack., found in rocky, moist, deciduous forests in the southern Appalachians, usually associated with limestone.\(^{35, 55}\) *Carex dasycarpa* Muhl., an inhabitant of sandy, hardwood forests and hammocks in the coastal plain from Mississippi to South Carolina, has rare status in Georgia and is considered to be rare elsewhere in its range.\(^{57}\)

*Cymophyllus* (from Greek *kyma*, wave, and *phyll*, leaf, referring to wavy leaf margins)

The monotypic genus *Cymophyllus* differs from *Carex* primarily in having a single (rarely two) basal leaf. Its evergreen leaf has a broad flattened blade with finely toothed margins and lacks a midrib (Figs. 38, 39). The only species, Fraser’s sedge, *Cymophyllus fraserianus* (Ker-Gawl.) Kartesz & Gandhi, inhabits rocky, mesic woods in the Appalachians from West Virginia into northeastern Georgia.\(^{35, 58}\) Plants have striking white inflorescences and are probably pollinated by insects.\(^{59}\) Fraser’s sedge has threatened status in Georgia\(^{34}\) and is sometimes cultivated as an ornamental in woodland gardens.\(^{9, 60}\)
Dichotomous Key to the Sedge Genera of Georgia

1a. Achenes enclosed within a loosely or tightly fitting sac-like perigynium .................................................. 2

1b. Achenes not enclosed within sac-like perigynium ......................................................................................... 3

2a. Basal leaves more than 2; leaf blades folded with keeled midrib and basal sheath ................................. Carex

2b. Basal leaves 1(-2); leaf blades flattened without midrib or sheath ......................................................... Cymophyllus

3a. Leaves bladeless, reduced to sheaths, thus plants appearing essentially leafless; culm terminated by a single, unbranched spikelet ......................................................... Eleocharis

3b. Plants usually with some bladed leaves evident; culm usually terminated by a compound inflorescence of multiple spikelets variously arranged ........................................ 4

4a. Scales two-ranked (distichous) ....................................................................................................................... 5

4b. Scales spirally arranged ................................................................................................................................. 7

5a. Leaves cauline; stems terete; perianth present ............................................................................................. Dulichium

5b. Leaves basal; stems mostly trigonous; perianth absent ............................................................................. 6

6a. Spikelets usually with more than two scales and two or more achenes; inflorescence usually with pedunculate rays .................................................................................... Cyperus

6b. Spikelets with two scales and one achene; inflorescence a terminal cluster of one to several sessile heads .......................................................................................... Kyllinga

7a. Style-base persistent, forming distinct tubercle atop achene ..................................................................... 8

7b. Style base not persistent, tubercle absent .................................................................................................. 9

8a. Sheath summit or juncture of blade and sheath with tufts of lines of hairs; perianth absent; tubercle forming small bulbous structure atop achene ........................................ Bulbostylis

8b. Sheath summit and juncture of blade and sheath glabrous; perianth bristles present or absent; tubercle usually larger, conicle, subulate, or otherwise shaped, rarely small and bulbous ............................................................ Rhynchospora

9a. Perianth absent or present as a single series of bristles or hairs ............................................................... 10

9b. Perianth in two series, differentiated into three outer stout bristles and three inner bladed and paddle-like segments .................................................................................. Fuirena

10a. Leaves cauline ............................................................................................................................................... 11

10b. Leaves entirely basal, or mostly basal with only 1 (-2) cauline leaves, or reduced to inconspicuous rudimentary blades ...................................................................................... 13

11a. Achene subterete ........................................................................................................................................ Cladium

11b. Achenes trigonous, biconvex or plano-convex ....................................................................................... 12

12a. Spikelets mostly less than 3.5 (-5) mm in diameter; scale glabrous, apex rounded to acute; culms without cormous bases; achene minutely papillose ................................................ Scirpus

12b. Spikelets mostly more than 4 mm in diameter; scale pubescent, apex notched and awned; culms with cormous bases; achene smooth .................................................. Bolboschoenus

13a. Style base markedly distinct from achene summit; style usually fringed with hairs ......................... Fimbristylis

13b. Style base not distinct from achene summit; style not fringed ............................................................... 14

14a. Inflorescence bracts usually conspicuous and leaf-like, mostly spreading to divaricate and exceeding the inflorescence .................................................................................. 15
14b. Inflorescence bracts inconspicuous or few with at most only the lowest exceeding the inflorescence, sometimes largest bract appearing as continuation of the stem  ............... 16

15a. Cespitose annual; achene trigonous or terete  .................................................. Lipocarpha
15b. Stoloniferous perennial; achene plano-convex with corky margins and apex  ....... Oxycaryum
16a. Achene rugose (sometimes faintly so), transversely ridged or smooth  ............... Schoenoplectus
16b. Achene papillose ................................................................. Isolepis

Glossary 61, 62, 63

Achene—a small, single-seeded, dry fruit
Acuminate—abruptly narrowing to a sharp-pointed apex
Acute—gradually and consistently narrowing to a sharp-pointed apex
Annual—a plant that persists for no more than one year, going from seed to seed within a period of one year or less
Apex—the summit or tip of a structure
Asexual reproduction—reproduction without sexual union of gametes; usually involving growth from a vegetative organ such as a rhizome, stolon, corm or bulb
Axil—the angle formed by leaf and stem at the node
Axillary—developing from and attached at the leaf axil
Basal—developing from and attached to the base of the plant or structure
Biconvex—a structure such as an achene with two convex faces and two edges
Bifid—with two branches
Bisexual—having both male (stamen) and female (pistil) parts; usually with reference to the flower
Blade—the expanded, flattened portion of the leaf arising from the rim of the sheath
Bract—a modified leaf positioned below a flower or an inflorescence
Bulbous—bulb-shaped
Capillary—a slender, hair-like structure
Capitate—compact and head-like
Carpel—the fundamental unit of the pistil bearing the immature seeds (ovules) of the flowering plant; thought to be a highly modified leaf
Cauline—of or on the stem; cauline leaves are stem leaves, as opposed to basal leaves
Cespitose—with the stems basally clumped or tufted
Compound—branched
Conical—cone-shaped
Corm—a modified stem, usually subterranean, usually broader than high, with a series of ring-like nodes and internodes; its functions include asexual reproduction and food storage
Cormous—corm-shaped or bearing corms
Culm—the stem of a grass or sedge
Cyme—a compound inflorescence based upon sets of three flowers each, with the central, sessile flower developing first
Cymose—an inflorescence of cymes or one resembling cymes; in context of sedges, an inflorescence with spikelets in branched sets of three, the central spikelet being sessile and the two lateral ones pedunculate
Dioecious—with male (staminate) and female (pistillate) flowers on separate plants; opposite of monoecious
Discoid—disc-shaped
Distichous—in two ranks; two-ranked
Divaricate—spreading at a wide angle
e—prefix meaning without; for example, etuberculate “without a tubercle”
Erect—vertical
Fimbriate—fringed
Glabrous—smooth; without pubescence
Habit—general appearance, posture, and manner of growth; for example, annual herb, shrub, tree, vine
Habitat—where the organism grows
Head—a very compact, tight inflorescence
Hydric—wet; usually descriptive of a habitat or soil; see mesic, xeric
Hypogynium—the lobed or discoid structure fused with the base of the achene in Scleria (Fig. 16)
Imperfect—unisexual flowers having either male (stamen) or female (pistil) parts
Inflorescence—a group or cluster of flowers
Keel—a structure shaped like a boat’s keel
Keeled—like a keel or with a keel
Lanceolate—lance-shaped
Lateral—developing and attached along the sides of the stem
Lenticular—lens-shaped; compressed and two-angled in cross section
Linear—long and narrow with more or less parallel sides
Mesic—moderately moist; usually descriptive of a habitat or soil; see hydric, xeric
Monoecious—having both staminate and pistillate flowers on the same plant; opposite of dioecious
Monocephalous—having one head
Monotypic—a taxonomic group with only one representative; for example, a genus with only one species
Panicle—a highly branched inflorescence, with the branches usually alternately arranged
Panículate—having a panicle or like a panicle
Papillose—covered with tiny, pimple-like protuberances
Peduncle—a stalk-like stem bearing an inflorescence
Pedunculate—with peduncles
Perennial—a plant that persists for more than two years
Perfect—a flower with both male (stamen) and female (pistil) parts
Perianth—the outer series of floral parts peripheral to the stamens and the pistil; in the typical flower, the perianth consists of sepals and petals collectively; in sedges the perianth segments, when present, are reduced to bristles, hairs, scales, or similar structures
Perigynium (perigynia, plural)—a sac-like structure enveloping the pistillate flower and achene in species of Carex and Cymophyllus
Pistil—the “female” floral structure composed of basal ovary; slender, neck-like style; and terminal stigma
Pistillate—having one or more pistils but lacking a stamen; referring to the unisexual “female” flower or the inflorescence or plant
Pitted—covered with tiny depressions
Plano-convex—a structure with two faces and two angles, with one face flattened and the other curved (convex)
Pseudolateral—appearing to be lateral, but actually terminal
Puberulent—minutely pubescent
Pubescent—covered with hairs
Ray—a major branch of an inflorescence
Reticulate—netted
Rhizomatous—producing or having a rhizome
Rhizome—elongated, horizontal, subterranean stem with nodes, buds and scale-like leaves
Rugose—with a wrinkled surface
Scale—a small bract associated with the flowers of sedges
Sessile—without a stalk
Sheath—the modified base of the sedge leaf enveloping the stem
Simple—unbranched
Solitary—borne singly
sp.—an abbreviation for *species* (singular), often used after the genus name to denote a single species not specifically named
spp.—an abbreviation for *species* (plural), often used after the genus name to denote multiple species not specifically named
Spicate—in the form of a spike or like a spike
Spike—a simple, indeterminate inflorescence with sessile flowers

Spikelet—the fundamental unit of the sedge inflorescence; a small spike with highly reduced, sessile flowers, each normally subtended by a scale

Spreading—outstretched

Stamen—the “male” floral structure consisting of slender, supporting filament and terminal anther, with pollen produced in the anther

Staminate—having one or more stamens but lacking a pistil; referring to the unisexual “male” flower or the inflorescence or plant

Sterile—lacking functional sexual organs

Stigma—the terminal portion of the pistil, which is receptive to pollen

Stipitate—with a stalked base

Stolon—elaborated, horizontal stems arising from the plant base, usually growing at or just below the soil surface

Stoloniferous—bearing stolons or having a stolon

Style—the slender, neck-like portion of the pistil above its basal ovary; sometimes with branches

Subulate—awl-shaped; a stiffish structure that tapers from base to apex

Suberete—almost circular in cross-section; see terete

Subxeric—somewhat xeric; transitional from xeric to mesic; see mesic, xeric

Terete—round in cross-section

Terminal—developing and attached at the tip of the stem

Trifid—with three branches

Trigonoous—three-angled

Tristichous—in three ranks; three-ranked

Tuber—a thickened subterranean stem, usually developing at the apex of a rhizome

Tubercle—an enlarged style base that persists attached to the summit of the mature achene; characteristic of certain species of Bulbostyliis, Eleocharis, Rhynchospora

Umbel—a simple inflorescence with many well-developed pedicels all arising from near the same point at the distal end of the peduncle; inflorescence spherical, or with a convex or flat top

Umbellate—in the form of an umbel; descriptive of the inflorescences of many Cyperus spp.

Unisexual—having either male (stamen) or female (pistil) parts, but never both; usually with reference to the flower

Voucher—a dried plant specimen with collection data on its label, preserved in an herbarium as a permanent record documenting the occurrence of a species at a particular geographical location

Xeric—dry; usually with reference to a habitat or soil; see hydric, mesic

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