

# CYPERACEAE

## etal

Got Sedge? Part Two  
revised 24 May 2015.

Draft from Designs On Nature; Up Your C 25

SEDGES, *FOINS COUPANTS*, *LAÎCHES*, *ROUCHES*, *ROUCHETTES*, & some mostly wet things in the sedge family.

Because Bill Gates has been shown to eat footnotes (*burp!*, & *enjoy it*), footnotes are (*italicized in the body of the text*) for their protection.

Someone who can spell caespitose only won way has know imagination.

Much of the following is taken verbatim from other works, & often not credited. There is often not a way to paraphrase or rewrite habitat or descriptive information without changing the meaning. I am responsible for any mistakes in quoting or otherwise. This is a learning tool, & a continuation of an idea of my friend & former employer, Jock Ingels, LaFayette Home Nursery, who hoped to present more available information about a plant in one easily accessible place, instead of scattered though numerous sources. This is a work in perpetual progress, a personal learning tool, full uv misstakes, & written as a personal means instead of a public end. Redundant, repetitive, superfluous, & contradictory information is present. It is being consolidated.

**CYPERACEAE** *Sauergrasgewächse* SEDGES, aka BIESIES, SEGGEN Formally described in 1789 by De Jussieu. The family name is derived from the genus name *Cyperus*, from the Greek *kupeiros*, meaning sedge.

Many species are grass-like, being tufted, with long, thin, narrow leaves, jointed stems, & branched inflorescence of small flowers, & are horticulturally lumped with grasses as graminoids. Archer (2005) suggests the term graminoid be used for true grasses, & cyperoid be used for sedges. (*If physical anthropologists have hominoids & hominids, why don't we have graminoids & graminids?*)

There are approximately 104 genera, 4 subfamilies, 14 tribes, & about 5000 species worldwide, with 27 genera & 843 species in North America (Ball et al 2002).

*Cyperaceae* has traditionally been classed a non-mycorrhizal family. A review of the literature by Muthukumar et al (2003), lists numerous sedges that are mycorrhizal, but the presence of mycorrhizae is strongly influenced by environmental conditions. With data available for 211 sedge species, 40% are mycorrhizal, 11% are facultatively mycorrhizal, & 49% are non-mycorrhizal. The ecological role of mycorrhiza in sedges is not well documented & presents no clear generalizations. The action of mycorrhizae in sedge growth, nutritional benefits, or nonnutritional benefits has not been determined. Mycorrhizae in sedges are predominately arbuscular mycorrhiza, with a few ectomycorrhizal associations such as *Kobresia bellardii*.

The following data is from Muthukumar et al (2003), using those *Cyperaceae* genera that are in the Midwest seed trade. The species counts are on a worldwide basis.

Genus	mycorrhizal	facultatively mycorrhizal	non-mycorrhizal	Totals
<i>Carex</i>	25	4	47	76
<i>Cyperus</i>	17	9	11	37
<i>Eleocharis</i>	4	0	6	10
<i>Rhynchospora</i>	4	1	2	7
<i>Scleria</i>	1	2	0	3
" <i>Scirpus</i> "	8	0	5	13
Total				146

"*Scirpus*" includes *Bolboschoenus*, *Schoenoplectus*, & *Scirpus*.

The following information is extracted from Table 1, Muthukumar et al (2003). The genera are those *Cyperaceae* used in Midwest restoration work, but the species listed are widely distributed throughout the world. Several inconsistencies have not been corrected.

Species	status:	Species	status:
<i>Carex acnescens</i> (s	non-mycorrhizal	<i>Carex wahuensis</i>	non-mycorrhizal
<i>Carex albonigra</i>	non-mycorrhizal	<i>Carex wahuensis</i> ssp.	mycorrhizal
<i>Carex amphibola</i>	non-mycorrhizal	<i>Cyperus arenarius</i>	mycorrhizal
<i>Carex annectens</i>	mycorrhizal	<i>Cyperus articulatus</i>	facultatively mycorrhizal
<i>Carex aphylla</i>	non-mycorrhizal	<i>Cyperus brevifolius</i>	mycorrhizal
<i>Carex aquatilis</i>	non-mycorrhizal	<i>Cyperus bulbosa</i>	non-mycorrhizal
<i>Carex atherodes</i>	facultatively mycorrhiz	<i>Cyperus castaneous</i>	non-mycorrhizal
<i>Carex baccans</i>	mycorrhizal	<i>Cyperus clarkei</i>	mycorrhizal
<i>Carex bicknellii</i>	mycorrhizal	<i>Cyperus compressus</i>	facultatively mycorrhizal
<i>Carex bigelowii</i>	non-mycorrhizal	<i>Cyperus cyperinus</i>	mycorrhizal
<i>Carex blanda</i>	mycorrhizal	<i>Cyperus decompositus</i>	non-mycorrhizal
<i>Carex boelckeiana</i>	non-mycorrhizal	<i>Cyperus difformis</i>	facultatively mycorrhizal
<i>Carex brevior</i>	mycorrhizal	<i>Cyperus distans</i>	facultatively mycorrhizal
<i>Carex brizoides</i>	non-mycorrhizal	<i>Cyperus dubius</i>	mycorrhizal
<i>Carex buxbaumii</i>	mycorrhizal	<i>Cyperus esculentus</i>	non-mycorrhizal
<i>Carex caryophyllea</i>	non-mycorrhizal	<i>Cyperus halpan</i>	facultatively mycorrhizal
<i>Carex cephalophora</i>	non-mycorrhizal	<i>Cyperus haspan</i>	non-mycorrhizal
<i>Carex crawei</i>	mycorrhizal	<i>Cyperus iria</i>	mycorrhizal
<i>Carex cristatella</i>	mycorrhizal	<i>Cyperus javanicus</i>	non-mycorrhizal
<i>Carex ebenae</i>	non-mycorrhizal	<i>Cyperus kylingia</i>	facultatively mycorrhizal
<i>Carex ericetorum</i>	non-mycorrhizal	<i>Cyperus laevigatus</i>	mycorrhizal
<i>Carex fillifolia</i>	non-mycorrhizal	<i>Cyperus ligularis</i>	mycorrhizal
<i>Carex flacca</i>	non-mycorrhizal	<i>Cyperus ligularis</i>	facultatively

			mycorrhizal
<i>Carex flava</i>	non-mycorrhizal	<i>Cyperus luzulae</i>	non-mycorrhizal
<i>Carex fuscula</i>	mycorrhizal	<i>Cyperus nutans</i>	mycorrhizal
<i>Carex gayana</i>	non-mycorrhizal	<i>Cyperus odoratus</i>	mycorrhizal
<i>Carex granularis</i>	mycorrhizal	<i>Cyperus paniceus</i>	mycorrhizal
<i>Carex gravida</i>	mycorrhizal	<i>Cyperus pilosus</i>	mycorrhizal
<i>Carex hirta</i>	non-mycorrhizal	<i>Cyperus platyphyllus</i>	mycorrhizal
<i>Carex hystericina</i>	non-mycorrhizal	<i>Cyperus pohlii</i>	non-mycorrhizal
<i>Carex interior</i>	non-mycorrhizal	<i>Cyperus pygmaeus</i>	mycorrhizal facultatively mycorrhizal
<i>Carex lachenali</i>	non-mycorrhizal	<i>Cyperus rotundus</i>	mycorrhizal
<i>Carex lasiocarpa</i>	facultatively mycorrhiz	<i>Cyperus squarrosus</i>	mycorrhizal
<i>Carex lindleyana</i>	mycorrhizal	<i>Cyperus stoloniferous</i>	mycorrhizal
<i>Carex lurida</i>	mycorrhizal	<i>Cyperus strigosus</i>	non-mycorrhizal facultatively mycorrhizal
<i>Carex madoviana</i>	non-mycorrhizal	<i>Cyperus surinamensis</i>	mycorrhizal
<i>Carex maritime</i>	non-mycorrhizal	<i>Cyperus tenuispica</i>	non-mycorrhizal
<i>Carex membranace</i>	non-mycorrhizal	<i>Cyperus triceps</i>	mycorrhizal
<i>Carex mertensii</i>	non-mycorrhizal	<i>Dulichium arundinaceum</i>	mycorrhizal
<i>Carex meyenii</i>	mycorrhizal	<i>Eleocharis dulcis</i>	mycorrhizal
<i>Carex microchaeta</i>	non-mycorrhizal	<i>Eleocharis geniculata</i>	mycorrhizal
<i>Carex misandra</i>	non-mycorrhizal	<i>Eleocharis geniculata</i>	non-mycorrhizal
<i>Carex muricata</i>	non-mycorrhizal	<i>Eleocharis ovata</i>	mycorrhizal
<i>Carex myosurus</i>	mycorrhizal	<i>Eleocharis scheuchzeri</i>	non-mycorrhizal
<i>Carex nardina</i>	non-mycorrhizal	<i>Eleocharis tenuis</i>	non-mycorrhizal
<i>Carex nigra</i>	mycorrhizal	<i>Eleocharis triste</i>	non-mycorrhizal
<i>Carex pellita</i>	non-mycorrhizal	<i>Eleocharis vaginatum</i>	non-mycorrhizal
<i>Carex pennsylvanica</i>	mycorrhizal	<i>Rhynchospora barbata</i>	mycorrhizal facultatively mycorrhizal
<i>Carex pumila</i>	non-mycorrhizal	<i>Rhynchospora cephalotes</i>	mycorrhizal
<i>Carex rhynchophys</i>	non-mycorrhizal	<i>Rhynchospora cf. brasiliens</i>	mycorrhizal
<i>Carex rosea</i>	mycorrhizal	<i>Rhynchospora ciliata</i>	non-mycorrhizal
<i>Carex rostrata</i>	non-mycorrhizal	<i>Rhynchospora cormbosa</i>	mycorrhizal
<i>Carex ruprestris</i>	non-mycorrhizal	<i>Rhynchospora longisetis</i>	non-mycorrhizal
<i>Carex scirpoidea</i>	non-mycorrhizal	<i>Rhynchospora squarrosa</i>	mycorrhizal
<i>Carex scoparia</i>	facultatively mycorrhiz	<i>Bolboschoneus maritimus</i>	mycorrhizal
<i>Carex speciosa</i>	mycorrhizal	<i>Schoenoplectus grossus</i>	non-mycorrhizal
<i>Carex sprengelii</i>	non-mycorrhizal	<i>Schoenoplectus juncooides</i>	non-mycorrhizal
<i>Carex stenophylla</i>	non-mycorrhizal	<i>Schoenoplectus senegaler</i>	non-mycorrhizal
<i>eleocharis</i>	non-mycorrhizal	<i>Schoenoplectus supinus</i>	mycorrhizal
<i>Carex sterilis</i>	non-mycorrhizal	<i>Scirpus acutus</i>	mycorrhizal
<i>Carex stipata</i>	mycorrhizal		
<i>Carex tenera</i>	non-mycorrhizal	<i>Scirpus atrovirens</i>	mycorrhizal
<i>Carex tetanica</i>	mycorrhizal	<i>Scirpus cyperinus</i>	mycorrhizal
<i>Carex tribuloides</i>	mycorrhizal	<i>Scirpus fluviatilis</i>	mycorrhizal

<i>Carex utriculata</i>	non-mycorrhizal	<i>Scirpus maritimus</i>	mycorrhizal
<i>Carex vesicaria</i>	mycorrhizal		
<i>Carex vulpinoidea</i>	mycorrhizal		

*Te audire no possum, musa sapienum fixa est in aura*

Other CYPERACEAE

[Bolboschoenus](#)

[Bolbostylis](#)

[Cyperus](#)

Dulichium

Eleocharis

Eriophorum

Hemicarpha

Rhynchospora

Schoenoplectus

Scirpus

Scleria

**BOLBOSCHOENUS** Palla 1905 Bolboschoe'nus (bol-bo-SKEE-nus) *Bolboschoenus* Bolboschoe'nus (bol-bo-SKEE-nus) New Latin bulb-rush, from Greek βολβός, *bolbos*, a swelling or bulb, & σχοῖνος, *skhoinos*, or *schoenos*, a rush, reed, or cord, for the presence of corms, as opposed to *Schoenus*, which has no tubers. A genus of 10-16 herbaceous sp cosmopolitan. Some authors place the following in *Schoenoplectus* (plants.usda.gov, bonap13). Formerly part of a broadly defined *Scirpus*.

**Bolboschoenus fluviatilis** (Torrey) Soják \*KY, MA, PA, TN RIVER BULRUSH, aka **BOLBOSCHOENUS FLUVIATILE**, **SCIRPE FLUVIATILE**, (*fluviatilis* -is -e pertaining to, of or from a river.) Obligate

Habitat: Seasonally inundated areas, marshes, tidal (???) & nontidal, farmed wetlands, margins of streams & lakes, moist sandy shores. Shallow water marshes, sloughs, borders of ponds & bays, riverbanks. Semi-permanent to permanently flooded conditions. distribution/range: Margins of streams & lakes, marshes; occasional in the n ¾ of Illinois, rare elsewhere (m14). 37 of the lower 48 states.



Culture: propagation: ①90 (or 60) days cold moist stratification, or best planted outdoors in the fall. (pm09). ②Seed cold moist stratified for 180 days germinated in light at 30° to 32°C. Inferred dormancy is physiological dormancy. (bb03) ③24-48 hour soak followed by 60-90 day cool moist stratification or plant outside fall to early winter (wns). ④Dormant seed or moist cold stratify (90-120), light. Some say the seed needs cold-water treatment. Stratify seeds in sloppy wet sphagnum peat worked great spring 2012. In mixes plant 0.06 to 0.125 lbs pls per acre (us97).

Tubers, bare root, & plugs are commercially available. Plugs are preferred for establishment. Tubers will be of mixed viability. Plugs usually sell out early. Seed crops can be erratic, & seed availability may be limited some years.

cultivation: Plant tubers 2-5" deep on 1-3" centers in 1-4" of water in spring or early summer. Young shoots should not be flooded. Mud flat conditions preferred for planting. 1000 roots per acre at 1.5' intervals in up to 2' of water (Anon 1981). (I would not put a name on that math either). Spreads quickly & may form monocultures. Can increase established plants by division, but labor intensive. 2" to 30" water to moist soil. Nutrient load tolerance moderate to high. Siltation tolerance high. Anaerobic tolerance high. CaCO3 tolerance high. Drought tolerance low. Fertility requirement medium. Salinity tolerance none or low to moderate. Shade intolerant, partial to full sun. pH variously 4.0-7.5 or 7.0-9.1.

bottom line: Dormant seed. RIVER BULRUSH has very low germination rates, versus dormant seed (5% or less) without dormant seeding or cold moist stratification. Consistently strongly dormant.

draft beer not people

Germ 1.4, 1.0, 0.0, sd 1.5, r0.0-5.0 (5.0)%. Dorm 79.4, 84, 90, sd 15.8, r54-94 (40)%. Test 32, 31, 28, r22-48 days. (#25).\*\*

Description: Perennial emergent herb, robust, triangular stems, 3.0-5.0(7.0)', 16" minimum root depth' broad, flat leaves; 2n = 94.

Comments: status: Endangered in Kentucky. Special Concern in Massachusetts & Tennessee. Rare in Pennsylvania. phenology: Blooms May to September. In northern Illinois, harvest seed mid-September. Wetland restoration, useful in lower shoreline areas, macho rain gardens, & vegetated swales for erosion rol. Rhizomatous, aggressive, excellent shoreline erosion control. 54,000, 56,049 (gnh01), 62,000 (gn00), 63,275 (gna05), 64,000(pm), 64,016 (gn07), 64,631 (gnaau09), 68,694 (gnh03), 68,800 (agr07, pm02), 69,571 (gnh02), 73,510 (gna11), 80,000 (ecs, aes10), 87,000 (gn99), 108,000 (wns01), 4,400,000 (jfn04) seeds per pound. Seed source farmed & restored wetlands, Lee Co.

After a hard fall freeze, a dry stand of RIVER BULRUSH has a pleasant rustling, out-of-tune fiddle kind of sound in a slight wind, to wit, Truman Capote, INDIAN GRASS, The Grass Harp. The same stand literally roars when it burns.

"Abundant in Pecatonica River sloughs north of Pecatonica, but not known elsewhere in the co. Also in Stephenson co in Pecatonica River sloughs." (ewf55)

Associates: Provides food & cover for waterfowl. Seeds eaten by ducks, geese, rails, & shorebirds. Muskrats eat stems & roots. Spawning habitat for bluegill & bass.

VHFS: A current alternate name is *Schoenoplectus fluviatilis* (Torrey) MT Strong. Formerly *Scirpus fluviatilis* (Torrey) Gray. [*Bolboschoenus fluviatilis* (Torr) Soják, *B. maritimus* (L) Palla ssp *fluviatilis* (Torr) A&D Löve, *Schoenoplectus fluviatilis* (Torr) MT Strong]

CC Baskin & JM Baskin, 2003, Propagation protocol for production of container *Schoenoplectus fluviatilis* (Torr) MT Strong plants: University of Kentucky, Lexington, Kentucky, In Native Plant Network, [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

***Bolboschoenus maritimus*** (Linnaeus) Palla or a current alternate *Schoenoplectus maritimus* (Linnaeus) Lye \*CT, IL, NJ, NY ALKALI BULRUSH, aka BAYONET GRASS, COSMOPOLITAN BULRUSH, SALTMARSH BULRUSH, SEASIDE BULRUSH, (*maritimus*, maritime, of the sea) (*paludosus*, marsh-loving)

Habitat: Fresh water marshes below 4000 feet. Saline roadsides. Wet alkaline or saline soils in meadows, marshes, or near waterways.

distribution/range: Shores & margins of ponds, rare; Cook, DuPage, Kankakee, Kendall, & LaSalle cos (m14). Probably more common than records indicate. Adventive in our area, but not noted as such in m14. Native to the Great Plains, coastal Texas, and coastal New England. Throughout temperate North America, Asia, & New Zealand.

Culture: Seed cold moist stratified for 80 days germinated at alternating temperatures of 30°/5°C, with germination greater in light than dark (cb03)

Seed from Presidio, Ca needs no treatment (Young 2001). 160,000 (ecs), 162,000 (gran), 430,000 (wns01) seeds per pound. Plant 8 lb pls per acre in fall or spring for pasture or reclamation (gran).

Growth rate moderate. Seedling vigor medium. Vegetative spread rate moderate.

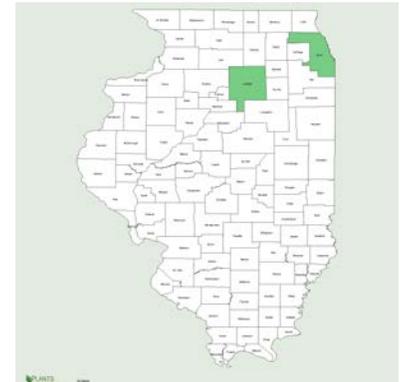
cultivation: Anaerobic tolerance high. CaCO<sub>3</sub> tolerance medium. Drought tolerance low. Fertility requirement low. Salinity tolerance high. Shade intolerant. pH 4.0-7.0, basic to neutral soils in one source. Best in moderately fine to fine soils.

Description: Cool-season, stout, tall, 2-5', rhizomatous, sod-forming, grasslike perennial; roots rhizomatous; culms 2-3.2(-5)'; leaves; sheaths; heads; capsules achenes; N. key features:

Comments: status: *Scirpus paludosus* A Nels var *atlanticus* Fern is endangered in Connecticut.

Endangered in Illinois, New Jersey, & New York. phenology: Blooms August – September (or 5-9).

Recommended for reclamation of mudflats, bogs, or other areas adjacent to shallow or stagnant water. Seed source commercial sources.



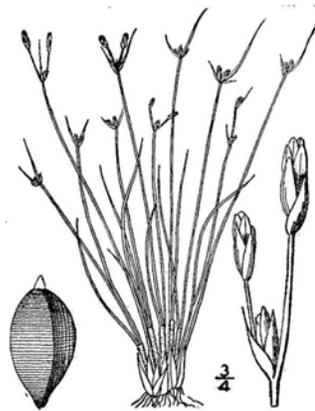
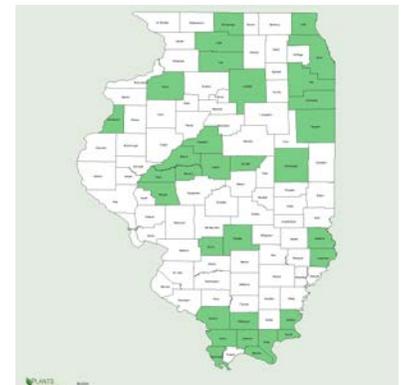
Associates: Species is often used in wetland wildlife plots. Valuable for cover for waterfowl & shorebirds.  
VHFS: Formerly *Scirpus maritimus* Linnaeus. [*Bolboschoenus maritimus* (L) Palla, *B maritimus* (L) Palla ssp *paludosus* (A Nels) A&D Löve, *B maritimus* (L) Palla var *paludosus* (A Nels) Dorn, *B paludosus* (A Nels) Soó, *Schoenoplectus maritimus* . Lye, *Scirpus fernaldii* Bickn, *S maritimus* L, *S maritimus* L var *feraldii* (Bickn) Beetle, *S maritimus* L var *paludosus* (A Nels) Kükenth, *S pacificus* Britt, *S paludosus* A Nels, *S paludosus* A Nels var *atlanticus* Fern]

CC Baskin, 2003, Propagation protocol for production of container *Schoenoplectus maritimus* L Lye plants: University of Kentucky, Lexington, Kentucky. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

B Young, 2001, Propagation protocol for production of container *Schoenoplectus maritimus* L Lye plants: Golden Gate National Parks, San Francisco, California In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

**BULBOSTYLIS** Kunth **HAIR SEDGE** *Bulbostylis* having a bulblike style, from Latin *bulbus* from Greek βολβός, *bolbos*, onion, bulbous root, & στύλος, *stylos*, a pillar or rod. Not known in restoration.

***Bulbostylis capillaris*** (Linnaeus) CB Clarke **HAIR SEDGE**, aka **COMMON HAIR SEDGE**, **DENSETUFT HAIRSEEDGE** (*capillaris*, *capillare* fine as hair, hair-like, slender) “Common in the Sugar River sand area & also on the right-of-way of the C & NW Ry near Kent Creek west of Rockford.” (ewf55)



*Bulbostylis capillaris*

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**CLADIUM** P Browne **SAWGRASS, TWIG-RUSH**

*Cladium Mariscus*, sow at 22°C (72°F) in muddy compost for 2-4 wks, move to +2 to +4°C (34-39°F) for 4-6 wks, after which temperature should be raised gradually (tchn).

Add *Cladium mariscoides* (Muhlenberg) Torrey, **TWIG-RUSH, FEN-SEEDGE, SMOOTH SAWGRASS.**

**CYPERUS** Linnaeus 1753 **GALINGALE, FLAT SEDGE, UMBRELLA SEDGE, PRAIRIE POPYRUS** *Cyperus* (ki-PEER-us, or colloquially si-PEER-us) *Cyperus* New Latin, from Latin *cypērus*, *cypēros*, a kind of rush, from Greek κύπερος, κύπερος, *kypeiros*, *kyperos* (*kuperos*), an ancient name for an aromatic marsh plant from Herodotus or sedge, the Eurasian *Cyperus longus* L, probably of Semitic origin; akin to Hebrew *koper*,

a resin. Huge genus, 600 (500-550) species from tropics to temperate zones. Many ornamental species, some house plants, water garden plants, & weeds. *Cyperus rotundus* PURPLE NUT SEDGE, is the world's worst weed, infesting crops in tropical & warm temperate regions. Some species are tuberous, with many nut-like & edible, some fragrant & used in perfumery, & some Amazon species are medicinal. All have triangular stems & spikelets of flat overlapping scales. Most are easy from seed.

*Cyperus eragrostis*, sow at 18-22°C (64-71°F) for 2-4 wks, move to +2 to +4°C (34-39°F) for 4-6 wks, move to 5-12°C (41-53°F) for germination in a year or more. *Cyperus glaber*, sow at 20°C (68°F), germinates in less than two wks. (tchn)

**Cyperus aristatus** Rottb. BEARDED FLATSEGE (*aristatus -a -um* aristate, awned (like heads of wheat), bearded, a long bristle-like tip, with bearded awns like the ear of Barley, from Latin *arista*, noun, the beard of an ear of grain, corn silk; ear of grain or corn, & *-atus*, adjective, possessive of or likeness of something.) “Particularly common on the muddy or sandy bank of Rock River at Rockford but found in similar situations over the co.” (ewf55) Now included in *C. squarrosus*.

**Cyperus bipartitus** Torrey SHINING FLAT SEDGE, aka SLENDER FLAT SEDGE,

Habitat: Mudflats of creeks & rivers. “Emergent shorelines, ditches, puddles, often in disturbed places; 0–1500 m” (fna). distribution/range:

Culture:

Description: Annual resembling *C. diandrus*. to 16”, glistening. key features: Scales red along the midrib & pear shaped seeds.

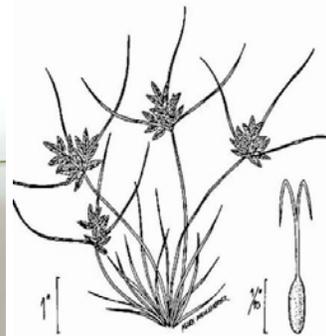
Comments: Fruiting summer. Common.

“On most stream banks but most abundant in the boggy places in Coon Creek bottom, there forming large mats.” (ewf55 as *Cyperus rivularis* Kunth)

VHFS: Formerly known as *Cyperus rivularis* Kunth. (*rivularis -is -e* brook-loving, found or growing near brooks, from Latin *rīvulus*, diminutive of *rīvus* stream.) [*Cyperus niger* Ruiz & Pav var *rivularis* (Kunth) VE Grant, *C. rivularis* Kunth, *Pycneus rivularis* (Kunth) Palla]



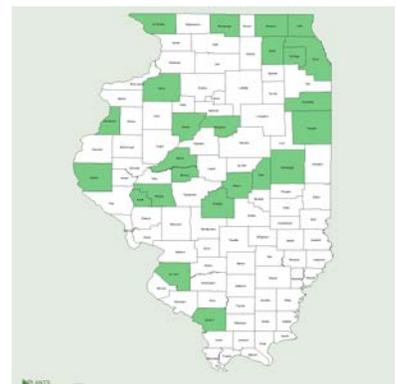
*Cyperus bipartitus*



**Cyperus diandrus** Torrey LOW CYPERUS, aka UMBRELLA FLAT SEDGE, (*diandrus, diandra, diander* furnished with two or twin stamens, from Greek *di*, two, double, & *andros*, male, two stamens.)

Habitat: Gravel shoreline & mudflats.

Culture:

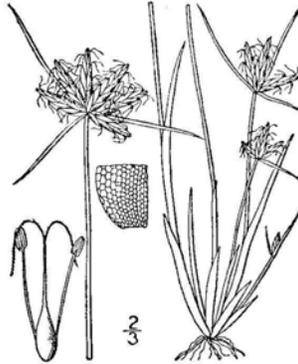


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Description: Annual, lancelike spikelets, overlapping scales with reddish margins & egg shaped seeds

Comments: Rare “Infrequent. Most common on Rock River bank but also on Kent & Keith Creeks.”  
(ewf55 as *C. diandrus* L)

VHFS: [*Pycneus diander* (Torr) CB Clarke]



**Cyperus engelmannii** Steudel (*engelmannii* for George *Engelmann*, 1809–1884, German physician & botanist who worked in the USA.)

Habitat: Ponds

Culture:

Description: Shining annual to 15”, resembling *C. ferruginescens*, but with very slender spikelets, shining red scales overlapping, & banana-shaped seeds.

Comments: “Uncommon on Rock & other river banks.” (ewf55)

VHFS: Now included in *Cyperus odoratus* [*C. odoratus* Linnaeus var *engelmannii* (Steudel) R Carter, SD Jones, & J Wipff]

**Cyperus erythrorhizos** Muhlenberg REDROOT FLATSEEDGE, aka RED-ROOTED SEDGE, (*erythrorhizos* with red roots, from *erythro-*, red, combining form of Greek ἐρυθρός, *erythros*, red, & *rhizo-*, a root, referring to a root, from Greek ρίζα-, *rhiza-*, root.)

Habitat: Wet ditches, Green River Lowland, mudflats of creeks & rivers.  
Emergent shorelines.

Culture: 6,048,000, 7,820,689 (gnhe12), 8,647,619 (gnaecs06), 9,559,574 (gnae07) seeds per pound.

bottom line: 60% of lots have a significant to strong requirement for dormant seeding, but sow when wetland is available. 40% of lots are essentially nondormant, <5%. Small seeds must be surface sown. Flipflop species. Germ 49.5, 44.5, na, sd 32.7, r6.0-90.5 (84.5)%. Dorm 40.2, 45.5, 84, sd 33.4, r0.0-84 (84)%. Test 31, 30, na, r24-39 days.\*\*

Description: Common. Tall annual with red roots; culms 0.2-0.8’, trigonous to roundly trigonous; scratchy margined basal leaves, leaves flat to M-shaped; cylindrical clusters of narrow spikelets, green ribbed reddish scales, & trigonous egg-shaped seeds.

Comments: Blooms August to October (rhm 75). Fruiting summer. Seed source DeKalb Co.

“Common on the muddy banks of Rock & Kishwaukee Rivers & elsewhere over the co.” (ewf55)





*Cyperus erythrorhizos*

**Cyperus esculentus** Linnaeus \* NOX CA, CO, HI, OR, WA YELLOW NUT SEDGE, aka CHUFFA, EARTH-ALMOND, FIELD NUT SEDGE, GROUND ALMOND, NUT SEDGE, YELLOW NUT GRASS, WILD CHUFA, (*esculentus* -a -um Latin edible, esculent, fit for human food.) [fac+] Facultative Wet

Habitat: Moist fertile soils, agricultural wetlands, & lawns. Moist fields, meadows, lawns & gardens. Common plant of farmed wetlands & disturbed soils. distribution/range: A widespread polymorphic species. Nearly worldwide, throughout the USA except Alaska, Montana, & Wyoming. In every Illinois co.

Culture: No treatment. Anon (1981) recommends 25 lbs of tubers per acre drilled in between April 1 & June 15. Ernst recommends 40 lb planted alone. Variety *sativa*, sow tubers in spring in moist soil. Generally available as tubers, or transplants, not as seed. Grows easily from seed on moist soil. Drawdown said to stimulate new growth from tubers. 754 (gnhe12), 1,101 (gna06), 1,363 (gnae11), 1,495 (gnhe13) tubers per pound. 3,750,000 (jfn04) seeds per pound.



Cultivation: Tolerates seasonal or occasional flooding, up to 12". Full sun. Moderate drought tolerance. Nutrient load tolerance high. Salt tolerance low. Siltation tolerance high. pH 5.0-7.5, or pH 5.0-7.0 (ecs).

Bottom Line: Drill or hand rake tubers dormant or spring. Germ 85.6, 90, 90, sd 12.1, r52-96 (44%). Dorm 5.5, 2.0, 0.0, sd 8.5, r0.0-30 (30)%. Test 22, 13, na, r9-43 days.\*\*

Description: Native, short-lived perennial sedge, culms 0.5-2.0(3.0)'; stoloniferous, stolons soft, spongy, flexible when dried, bearing tubers; 10" minimum root depth.

Comments: status: Considered a noxious weed in California, Colorado, Hawaii, Oregon, & Washington.

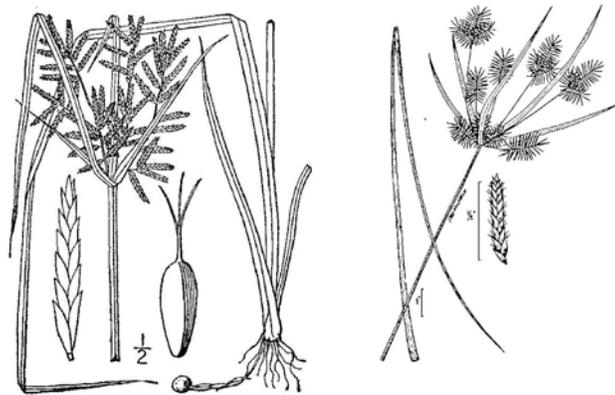
phenology: Yellowish flower in mid-July to August (6-10 rhm75). Fruiting summer. Achenes seldom maturing. Aggressive. Useful for urban stream bank stabilization & wild life plantings. Tuber source Wisconsin commercial.

"Common in low meadows or other wet places." (ewf55)

Associates: Seeds are eaten by waterfowl & other critters. Waterfowl eat tubers (rhizomes in one source). Waterfowl, upland game birds, & songbirds eat the seeds & tubers. Terrestrial furbearers (esp squirrels) & small mammals eat tubers. Provides cover for reptiles, amphibians, & small mammals.

VHFS: Seven varieties have been recognized in the past, but only four currently. The unrecognized variety *sativa* Böckler, CHUFA, aka EARTH ALMOND, TIGER NUTS, is a distinct cultivar, 8" to 3' (aka *sativa* Boeckeler).

Add Illinois varieties.



*Cyperus esculentus*

**Cyperus ferruginescens** Boeckler

Habitat: Saline tollway ditches.

Culture:

Description: Coarse annual to 2", congested spikelets, rusty scales overlapping midway, stubby white seeds.

Comments: "Common on muddy stream banks." (ewf55)

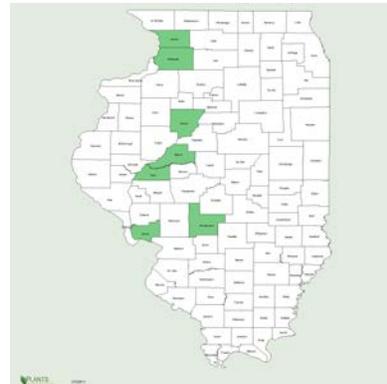
VHFS: Now included in *Cyperus odoratus* L (pug14).

**Cyperus grayoides** Mohlenbrock \*IL ILLINOIS FLAT SEDGE, aka MOHLENBROCK'S SEDGE, UMBRELLA SEDGE, DEEP SAND SEDGE, (in reference to *Cyperus grayoides*, from New Latin *grayi*, & Greek -οειδης, *-ooides*, resembling, like, for the appearance similar to *C grayi*.)

Habitat: Dry sand prairies. "Sand prairies, waste places, fallow fields; of conservation concern" (fna). distribution/range: Known from west of Manlius, Bureau Co & Thomson, Whiteside co. Illinois is the northern limit of the species range.

Description: N 2n = 166. key features: spikes spherical; rachilla wingless; scales subremote, barely reaching the base of the next scale above; achenes 2-2.6 mm long (Louisiana DNR Rare Plant Fact Sheet PMCYP061G0).

Threatened in Illinois. Fruiting summer.



**Cyperus houghtonii** Torrey HOUGHTON'S FLAT SEDGE, (named after Douglas Houghton, 1809-1845.)

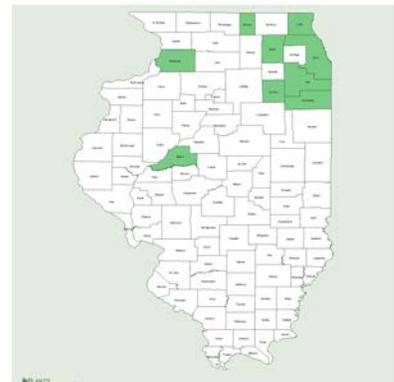
Habitat: Dry upland sites. distribution/range:

Culture:

Description: perennial, cespitose; roots; culms; leaves; sheaths; heads; capsules; seeds; N 2n = 168, 170, 172. key features:

Comments: status: phenology: Blooms seeds per pound

VHFS:



**Cyperus inflexus** Muhlenberg

Habitat: Gravel bars of cool, clean creeks.

Culture:

Description: Uncommon. Large leafy annual to 3". Globose clusters of narrow, flattened scales with recurved tips, & triangular plumbob shaped seeds.

Comments: The bruised plant smells like White Sweet Clover.

VHFS: Usually included in *Cyperus squarrosus* Linnaeus.

**Cyperus lupulinus** (Sprengell) Marcks GREAT PLAINS FLAT SEDGE, aka SAND CYPERUS, SAND SEDGE, (*lupulinus* -a -um lupuli'nus (loo-pew-LIE-nus) Latin literally like a little wolf, meaning hop-like in form or habit, for the similarity to the inflorescence of *Humulus lupulus*, from *lupulus*, *lupuli*, hops, (literally small wolf), & -īnus -a -um, adjectival suffix indicating possession or resemblance, from the plants' old name willow-wolf, from its habit of climbing over willows.)

Habitat: Disturbed sands. distribution/range:

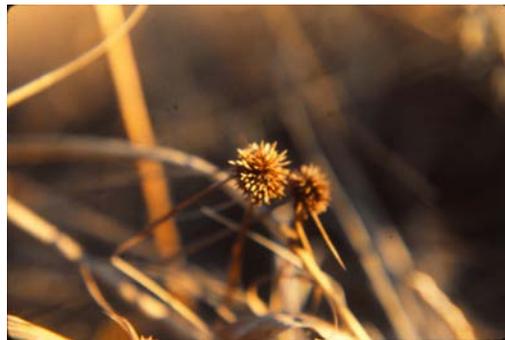
Culture: Propagation: Small seeds need light to germinate, scant soil cover. Moist cold stratify or dormant seed.

Description: 0.5-1.0'; key features:

Comments: status: phenology: Blooms 6,7,8,9 bunching  
"Very common & varying greatly as to size, number of heads, etc.  
Sandy places & dry prairies." (ewf55)

VHFS: Many authors refer this as *Cyperus lupulinus* (Spreng) Marcks.

For many years known as *Cyperus filiculmis* Vahl SLENDER SAND SEDGE, (*fliculmis* -is -e New Latin, thread stemmed, from *fili*- & *culmis*, a stem of grain.) Add *Cyperus lupulinus* (Sprengel) Marcks var *macilentus* (Fernald) A Haines.



*Cyperus lupulinus macilentus*

**Cyperus odoratus** Linnaeus \*MS, PA, RI, TN FRAGRANT FLATSEEDGE, AKA ENGELMANN'S FLAT SEDGE, ENGELMANN'S UMBRELLA SEDGE, GALINGALE (*odoratus -a -um* odora'tus (o-do-RAH-tus, oh-dor-AY-tus) Latin adjective, scented, odorous, fragrant, sweet-smelling.)

Habitat: distribution/range:

Culture: propagation: Growth rate moderate. Seedling vigor high. Vegetative spread rate none. Seed spread rate moderate. USDA says routinely available.

asexual propagation: None.

cultivation: 3450-4800 plants per acre (3.5-3.0 centers). Tolerant of coarse to medium textured soils. Anaerobic tolerance medium. CaCO<sub>3</sub> tolerance medium. Drought tolerance low. Fertility requirement medium. Fire tolerance none, no resprout ability. Salinity tolerance medium. Shade tolerance medium. pH 5.0-8.3.

bottom line:

greenhouse & garden:

Description: annual/perennial key features:

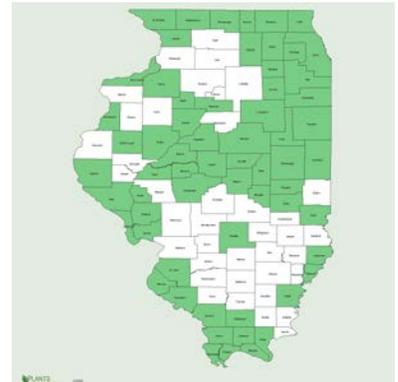
Comments: status: Threatened in Massachusetts. Rare in Pennsylvania. Special Concern in Rhode Island & Tennessee. This taxon is considered weedy or invasive in some parts of its range (SWSS 1998).

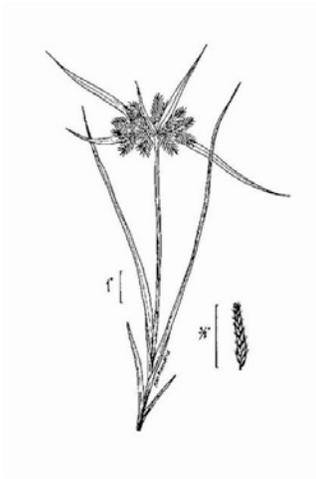
phenology: Blooms

Associates: Provides food for large & small mammals, water fowl, & upland birds.

Ethnobotany:

VHFS: [*Cyperus acicularis* Schrad ex Nees, *C eggersii* Boeck, *C engelmannii* Steud, *C ferax* Rich, *C ferruginescens* Boeck, *C longispicatus* JBS Norton, *C macrocephalus* Liebm, *C macrocephalus* Liebm var *eggersii* (Boeck) SD Jones, Wipff & R Carter, *C odoratus* L var *acicularis* (Schrad ex Nees) O'Neill, *C odoratus* L var *engelmannii* (Steud) R Carter & SD Jones, *C odoratus* L var *squarrosus* (Britton) SD Jones, Wipff, & R Carter, *C speciosus* Vahl, *C speciosus* Vahl var *squarrosus* Britton, *Mariscus huarmensis* Kunth, *Torulinium confertum* Desv ex Ham, *T eggersii* (Boeck) CB Clarke, *T odoratum* (L) S Hooper]





*Cyperus odoratus*

**Cyperus schweinitzii** Torrey ROUGH SAND SEDGE, aka CROWFOOT SEDGE, CROWFOOT CYPERUS, GREAT PLAINS SAND SEDGE, SCHWEINITZ'S CYPERUS, SCHWEINITZ'S FLAT SEDGE, (*schweintzii* after Lewis David von Schweinitz, 1780-1834.) [upl]

Habitat: Sand prairies & sandy savannas. distribution/range:

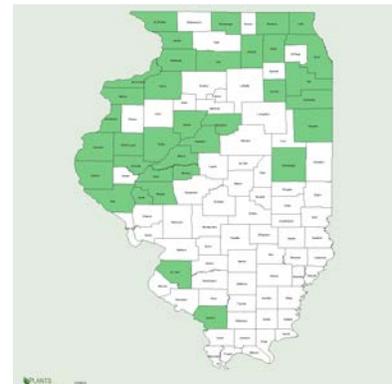
Culture: Seeds germinate after a period of cold, moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). Seeds germinate after about 60 days of cold, moist stratification. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover. (he99) Small seeds need light to germinate, scant soil cover. Moist cold stratify or dormant seed. 880,000 (pm) seeds per pound.

Description: Erect perennial, 0.5-2.0'

Blooms 6,7,8. In northern Illinois, collect seeds in September. Collect seeds in se Wisconsin in August - October (he99). Bunching.

“Common in Sugar River sand areas & on the sand prairies about Camp Grant & to a less extent on high prairies.” (ewf55)

VHFS: [*Cyperus alterniflorus* Schwein, 1824 non R Br, 1810, *C. schweinitzii* Torr var *uberius* Kük, *Mariscus schweinitzii* (Torr) T Koyama]





*Cyperus schweinitzii*

**Cyperus squarrosus** Linnaeus BEARDED FLAT SEDGE, (*squarrosus -a -um* rough, scurfy, with protruding scales, with leaves spreading at right angles, with parts spreading horizontally, or even recurved at the ends, from Latin *squarrosus*, rough, scurfy.)

Habitat: Marshes, wet ditches, disturbed areas distribution/range:

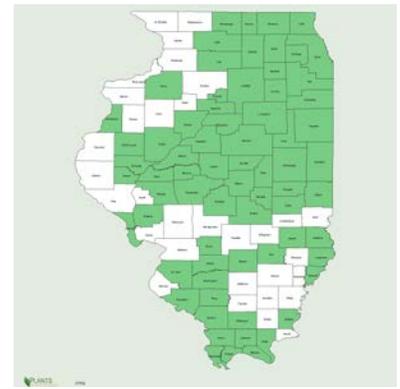
Culture:

Description: Annual; key features: “*Cyperus squarrosus* can be recognized by its small size & annual habit combined with its oblong-lanceolate floral scales bearing five to eleven conspicuous ribs & excurved awns.” (fna)

Comments: status: native phenology:

Associates:

VHFS: [*Chlorocyperus inflexus* (Muhl) Palla, *C aristatus* Rottb, *C. aristatus*, Rottb var *inflexus* (Muhl) Kük, *C. aristatus*, Rottb var *runyonii* O'Neill, *C inflexus* Muhl, *Dichostylis aristata* (Rottb) Palla, *Mariscus squarrosus* (L) CB Clarke]



**Cyperus strigosus** Linnaeus FALSE NUTSEGE, aka STRAW-COLORED CYPERUS, (*strigosus -a -um* bristly, strigose, covered with *strigæ*, of stiff, straight, flat-lying hairs, New Latin *strigosus*, from *striga* bristle, furrow, swath of hay or corn, flute of a column, & Latin *-osus -ose*.)

Habitat: Weedy marshes & cultivated ground. Common.

Culture:

Description:

Comments: “Usually in wet places where it is common, but at times forming large patches in fields & on railroad tracks. Occasionally a troublesome weed.” (ewf55)

VHFS: [*Cyperus hansenii* Britton, *C stenolepis* Torr, *C strigosus* L f *robustior* Kunth, *C strigosus* L var *capitatus* Boeck, *C strigosus* L var *hansenii* (Britton) Kük, *C strigosus* L var *multiflorus* Geise, *C strigosus* L var *robustior* (Kunth) Britton, *C strigosus* L var *stenolepis* (Torr) Kük, *Mariscus stenolepis* (Torr) CB Clarke, *Mariscus strigosus* (L) CB Clarke]

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**DULICHIUM** Persoon **THREWAY SEDGE, DULICHE** *Dulichium* from the Latin *Dulichium*, *Dolicha*, from Greek Δολίχη, *Dolikhe*, a city or an island of the Ionian Sea, southeast of Ithaca, belonging to the kingdom of Ulysses, or Latin *dulichium*, a kind of sedge. According to Homer, *Dulikhium* abounded in

grass & wheat. Some sources refer to *Dulichium* as an ancient name for Euboia, in eastern Greece. A monotypic genus found in North America, but known from Europe as fossils.  $x = 16$ .

***Dulichium arundinaceum*** (Linnaeus) Britton THREE-WAY SEDGE, aka *DULICHE ROSEAU*, POND SEDGE, (*arundinaceus* -a -um reed-like from the Latin, *arundo*, reed, cane, & -*aceus*, resembles, like.) Common name is from the alignment of the leaves. OBL

Habitat: Bogs & marshes, swamps, & sedge meadows. In the se USA, streambanks, marshes, bogs, ditches (w12). “Open wet places, lake & pond margins, marshes, swamps, bogs, stream shores; 0–700 m” (fna). Bogs, marshes, lake margins, swampy fields, & ditches (ecs). Moderate shade tolerance. Low drought tolerance. No salt tolerance. pH 4.7-7.5. distribution/range: Swamps & low ground in woods; throughout the state but not common; rare in the s cos (m14).

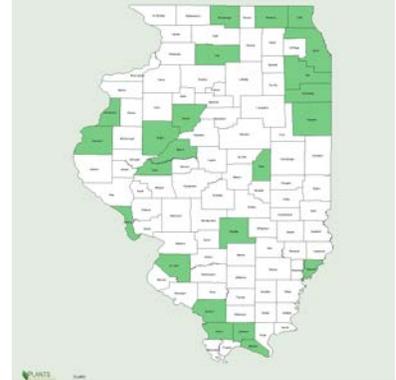
Culture: 60 days cold moist stratification (pm09). 1,600,000 (jfn04) seeds per pound

Description: Erect, perennial, semi-aquatic, emergent sedge; rhizomatous, spreading, 18” minimum depth; culms 1-3’, stems, stiff, round, hollow; leaves narrow 2-7” long stiff, spiraling up & away from stem sheaths; heads inflorescence long, spikelets in 2 rows in upper leaf axils; capsules; seeds brownish, beaked nutlet with fine barbed bristles; N. key features: The combination of distichous *Cyperus*-like spikelets & many, distinctly 3-ranked, cauline leaves makes this species distinctive (w12). Stems round, hollow.

Comments: status: Native. phenology: Blooms July to August. Fruiting July-October (fna). One of the easiest member of the sedge family to recognize with three-ranked leaf arrangement.

Associates: Provides food for waterfowl & muskrats. Waterfowl eat the achenes. Attracts moose. Look out! (Tell that to the homeowners association.)

VHFS: Midwestern material is var *arundinaceum*. [*Cyperus arundinaceus* Linnaeus, Sp. Pl. 1: 44. 1753 (as *arundinacea*)]



*Dulichium arundinaceum*

2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

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*Sic gorgiamus allos subjectatos nunc.*

draft beer not people

**ELEOCHARIS** R Brown 1810 **SPIKERUSH** *Eleocharis* (*Heleocharis*) Eleo'charis (e-lee-O-ka-ris, or he-lee-O-ka-ris, el-ee-OK-ar-is) marsh-beauty, marsh-favor, marsh-joy, New Latin, from Greek ἔλεο- *heleo-*, marsh, or *helodes*, growing in marshes, *heleios*, dwelling in marshes, & *χαρις*, *kharis* grace, beauty, pleasant, or *χαίρω*, *kharo*, to rejoice. Formerly *Heleocharis* Lestibudois, now dumbed-down to an orthographic variant, but the current spelling is not etymologically correct. RHM (2005) introduced the name SPIKESEDGE since *Eleocharis* are in the sedge family not the rush family. A genus of 120-200 (200) species of aquatic & wetland herbaceous annuals & perennials, cosmopolitan. Cold moist stratification, saturated soils, light, division of mature plants of perennial species. Seeds are achenes. The seeds of many species are highly dormant. The seed of many northern Illinois species are ripe in July. Waterfowl eat the stems, roots, & achenes of SPIKERUSH.

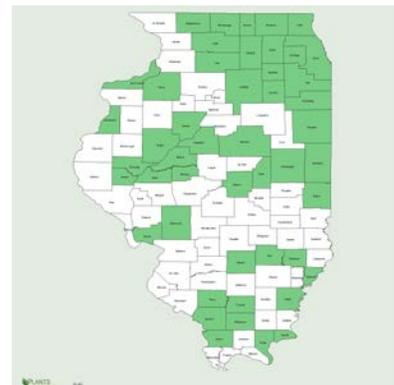
The amphibious leafless sedge *Eleocharis vivipara* develops C4-like traits & Kranz anatomy under terrestrial conditions, but it develops C3-like traits without Kranz anatomy under submerged conditions.



Line drawing public domain from Hippolyte Coste - *Flore descriptive et illustrée de la France, de la Corse et des contrées limitrophes*, 1901-1906.

***Eleocharis acicularis*** (Linnaeus) Roemer & JA Schultes **NEEDLE SPIKE RUSH**, aka *ÉLÉOCHARIDE ACICULAIRE*, HAIRGRASS, (*acicularis* - *is* -*e* acicular'is (classically a-kik-ew-LAH-ris, or a-sik-yoo-LARE-is) pertaining to a needle, by usage, needle-like, needle-shaped, like a pin or needle, from Latin *acicula*, a small pin for a head-dress, & *-aris*, from *-alis*, of, or pertaining to, needle-shaped, needle pointed, slender; or diminutive of *acus*, *acis*, *aci-*, for the stems.) obl

**Habitat:** Seasonally inundated areas. Marshes, mudflats, exposed muddy shores forming large mats, very springy calcareous areas (sw94). Low wet ground (m02). “Species is distributed in shallow waters, sloughs, often occurring as dense mats in dried-up temporary ponds, mudflats, springy calcareous areas” (Ilpin).



**distribution/range:** Occasional throughout Illinois.

**Culture:** 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). Seeds germinate after about 60 days of cold, moist stratification. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover. (he99) Cold moist stratification, saturated soils, light. 943,867 (gna06), 1,120,000 (pm, jfn04, aes10), 1,127,950 (gna10), 1,156,888 (gnamr06), 1,165,597 (gnamr07), 1,401,235 (gnhm11), 1,706,767 (gnh13) seeds per pound.

Seed cold moist stratified for 90 days germinated at 15°C. Seed dormancy is physiological dormancy. (cb03)

Seed from Eugene, Lane Co, Oregon, dormant seeded with outside natural winter stratification, fair germination in 2 weeks at 70°/50° F greenhouse (Bartow 2004).

cultivation: Division of mature plants of perennial species.

bottom line: For field establishment, the small seeds are best surface sown dormant, but plant when wetland is accessible. Consistently strongly dormant (58-91%). Germ 7.0, 5.0, 3.0, sd 7.0, r0.0-22 (22)%. Dorm 79.5, 85, 91, sd 10.3, r58-91 (33)%. Test 34, 35, 34, r21-42 days. (#17).\*\*

Description: key features: “Achenes distinguish *Eleocharis acicularis* from *E intermedia*. Culm width & culm length distinguish *E acicularis* from *E wolfii*. Bristles may be present or absent.” (Ilpin)

Comments: status: phenology: Blooms July-October (mo2), May 11 – October 1. C3. Seed source Hamilton & Harmon Twps, Lee Co, & Hannaman & Hume Twps, Whiteside Co.

“Common on muddy banks of Rivers, creeks, & sloughs.” (ewf55)

VHFS: Includes var *gracilescens* Svenson & *f inundata* Svenson.

Amy Bartow, 2004, Propagation protocol for production of container *Eleocharis acicularis* (Linnaeus) Roemer & JA Schultes plants: Corvallis Plant Materials Center, Corvallis Oregon. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

CC Baskin, 2003, Propagation protocol for production of container *Eleocharis acicularis* (L) Roemer & JA Schultes plants: University of Kentucky, Lexington, Kentucky. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.



*Eleocharis acicularis*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

***Eleocharis calva*** Torrey BALD SPIKE-RUSH, (*calvus -a -um* bare, naked, bald, hairless, from Latin *calvus -a -um*, bald, hairless, naked, or *calva, calvae*, the bald scalp.) Although still seen in the seed trade, it is an invalid name. See *E erythropoda*.

2,268,000 seeds per pound.

“Is rather common. It resembles the two preceding (*E palustris* & *E smallii*) & has been treated as a variety of *E palustris*, but is easily separated by the solitary basal scale.” (ewf55 as *E calva* Torr.)

***Eleocharis coloradoensis*** (Britton) Gilly COLORADO SPIKERUSH, aka DWARF SPIKERUSH, (*coloradoensis -is -e* of or from Colorado.)

Culture: Seed warm stratified for 21 days germinated at 22°C (cb03)

CC Baskin, 2003, Propagation protocol for production of container *Eleocharis coloradoensis* (Britt) Gilly plants: University of Kentucky, Lexington, Kentucky. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Yeo & Thurston, 1979, Survival of seed & tubers of dwarf spikerush (*Eleocharis coloradoensis*) after exposure to extreme temperatures. *Weed Science* 27, 434-436.

**Eleocharis compressa** Sullivant Alternate nomenclature is *E elliptica* Kunth var *compressa* (Sull) Drapalik & Mohlenbrock FLAT-STEMMED SPIKERUSH, aka *ÉLÉOCHARIDE COMPRIMÉE*, (*compressus -a -um* compressed, flattened)

Habitat: Occasional in calcareous, moist to mesic prairies, shallow soils over limestone. Low areas (mo2). distribution/range: Scattered throughout Illinois, but rarer in the s cos.

Culture: Seeds germinate after about 60 days of cold, moist stratification. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover. (he99) Sow at 20°C (68°F), germinates in less than two wks (tchn).

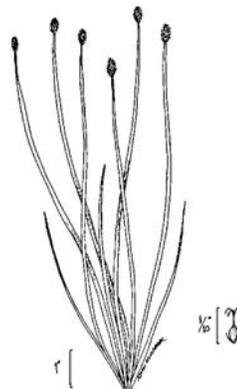
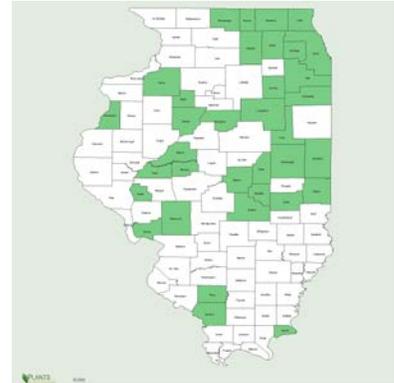
Description: Rhizomatous; culms sharp stems; leaves; sheaths; heads; capsules; achenes;  $N 2n = 24, 26$ . key features: “Versus *Eleocharis elliptica* var *elliptica*, var *compressa* has: 1) culms with 9-14 vascular bundles, that appear compressed; 2) reticulate achenes. Culms may appear flat & broad. Rhizomes are thick & creeping & fertile scales are bifid.” (Ilpin)

Comments: status: Native. Special Concern in Wisconsin. phenology: Blooms May – July (mo2) April 26 – June 14. Collect seeds in se Wisconsin in August - October (he99). ? seeds per pound

“Of the same growth habit & about as common as *E palustris*.” (ewf55)

VHFS: Var *atrata* Svenson, with conspicuously nigrescent scales & larger spikelets, is known from Lake Co Indiana, considered by some as a form of *E elliptica*. Chicago area specimens, especially in calcareous habitats are not clearly distinct from *E elliptica*. Some reports of this species in the Chicago area are based on bifid specimens of *E elliptica*.

[*E acuminata*, *E elliptica* Kunth var *compressa* (Sull) Drapalik & Mohlenbrock]



*Eleocharis compressa*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**Eleocharis dulcis** (Burman f) Trinius ex Henschel vars CHINESE WATER CHESTNUT, (*dulcis -is -e* (DUL-kis) sweet, or any taste not acrid, for the edible tuber.)

draft beer not people

Habitat: Canned food section of your supermarket. Also “field margins, lake margins, commonly cultivated; near sea level to 1500 m” (Lun-Kai Dai & Mark T Strong, Flora of China online).

distribution/range: Native of southeast Asia, adventive in Australia, Indian Ocean islands, Indonesia, Malaysia, Pacific Ocean islands, & elsewhere. Species native distribution is uncertain. Mapped from one co in Georgia by BONAP (2010) & plants.usda.gov.

Culture: Slice thinly, stir-fry well done, add MSG, soy sauce, some mystery meat, & chop-suey noodles. It is one of the few vegetables that remain very crisp after cooking, due to cross-linked cell walls that are reinforced by phenolic compounds. Eating uncooked & undercooked corms may result in the infection by the trematode (flatworm) *Fasciolopsiasis buski*, the largest human-parasitizing intestinal fluke, up to 7.5 cm long. Chinese take out anyone?

Description:  $N 2n = 38$ , ca 108.

VHFS: [*Andropogon dulcis* NL Burman, Fl Indica, 219. 1768, *Eleocharis equisetina* J Presl & C Presl, *E indica*, *E plantaginea* (Retzius) Roem & Schult, *E plantagineiformis* Tang & FT Wang, *E plantaginoides*, *E tuberosa* Schult, *Heleocharis tuberosa*, *Scirpus plantagineus* Retzius, *S tuberosus* Roxburgh (1819), not Desf(1798)]

The other invasive WATER CHESTNUT, aka WATER CALTROP is *Trapa natans* (Lythraceae).



*Eleocharis dulcis* & *Trapa natans*

***Eleocharis elliptica* Kunth** \*PA ELLIPTIC SPIKE-RUSH, aka *ÉLÉOCHARIDE ELLIPTIQUE*, GOLDEN-SEEDED SPIKE RUSH, SPIKERUSH, (*ellipticus -a -um* (e-LIP-ti-kus) elliptic, shaped like an ellipse.)

Habitat: Calcareous fens, interdunal pannes, & marl flats (sw94).

Low areas (mo2). “Very wet, calcareous (or brackish) shores, pool margins, fens, meadows, prairies; 0–1000 m” (Smith et al in fina).

distribution/range: Very rare, Cook Co (mo2), but several cos in sw94 & pug14.

Culture: Sow at 20°C (68°F), germinates in less than two wks (tchn).

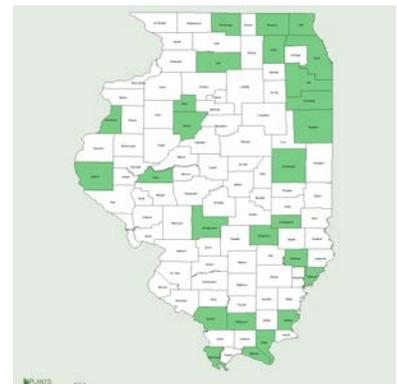
Description: Perennial, rhizomatous; culms sharp stems;  $N 2n = 38$ .

key features: “Versus *Eleocharis elliptica* var *compressa*, var *elliptica* (typical variety) has: 1) culms with 6-8 vascular bundles; 2) culms externally appear with 6-8 angles; 3) achenes are slightly warty or reticulate.” (Ilpin)

Comments: status: Endangered in Penneylvanica. phenology:

Blooms May- July (mo2) April 20 – June 6. Collect seeds in se Wisconsin in August - October (he99).

VHFS: [*Eleocharis capitata* (L) R Br var *borealis* Svens, *E compressa* Sull var *borealis* (Svens) Drapalik & Mohlenbr, *E tenuis* (Willd) Schult var *borealis* (Svens) Gleason]



**Eleocharis engelmannii** Steudel \*ME, NY, OH ENGLEMANN'S SPIKE RUSH, (*engelmannii* for George (Georg) *Engelmann*, 1809–1884, German-born St Louis physician & botanist & an authority on cacti, North American conifers, & oaks.)

Habitat: Similar to *E obtusa*, but rarer. “Fresh shores, marshes, disturbed places; 30–2400 m” (Smith et al in fna). distribution/range:

Culture:

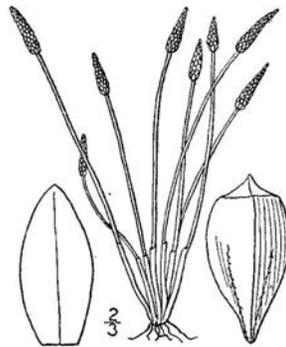
Description: Erect annual sedge; roots; culms; leaves; sheaths; heads; capsules; achenes;  $N 2n = 10$ . key features:

Comments: status: Possibly extirpated in Maine. Endangered in New York & Ohio. phenology: Blooms June 2 – August 15.

Fruiting spring-fall. 1,600,000 (gni) seeds per pound

“In growth habit much like *E obtusa* but it is very uncommon, we having found it only in a boggy meadow on north Rockton Road 5 miles north of Rockford & in a prairie slough in Stephenson Co” (ewf55)

VHFS: [*Eleocharis engelmannii* Steud var *monticola* (Fern) Svens, *E engelmannii* Steud var *robusta* Fern, *E monticola* Fern, *E monticola* Fern var *pallida* H St John, *E obtusa* (Willd) Schult var *detonsa* (A Gray) Drapalik & Mohlenbr, *E obtusa* (Willd) Schult. var *detonsa* (A Gray) Drapalik & Mohlenbr, *E obtusa* (Willd) Schult var *engelmannii* (Steud) Gilly, *E ovata* (Roth) Roem & Schult var *detonsa* (A Gray) Mohlenbr, *E ovata* (Roth) Roem & Schult var *engelmannii* (Steud) Britt]



*Eleocharis engelmannii*

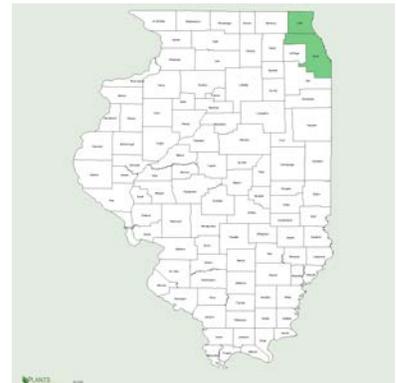
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**Eleocharis equisetoides** (Elliott) Torrey \*CT, IN, MD, NJ, NY, RI, TN, WI HORSETAIL SPIKERUSH, aka JOINTED SPIKE-SEDGE, JOINTED SPIKE-RUSH, JOINTED SPIKE-SEDGE, KNOTTED SPIKERUSH, (*equisetoides* resembling an *Equisetum*, Horsetail.)

Habitat: Wet ground or standing water (mo2). “Fresh ponds, lakes, marshes, streams, ditches, cypress swamps; 10–500 m” (Smith et al in fna). distribution/range: Occasional throughout Illinois?, Cook Co 1890, also Lake Co (Ilpin & pug14), Berrien Co Michigan.

Culture:

Description: Perennial; rhizomatous; key features: “Culms round, septate by cross-partitions, lowest sheaths frequently bearing a leaf; scales rather elliptic; bristles few. Leaves reduced to bladeless sheaths.” (Ilpin)



Comments: status: Probably extirpated in Illinois, Missouri, & Wisconsin. Endangered in Connecticut, Indiana, Maryland, New Jersey, & Tennessee. Threatened in New York. Special Concern in Rhode Island & Wisconsin. phenology: Blooms July – October. Fruiting late spring to late fall. C3. Associates: Wind pollinated. Seeds dispersed by water & wind. VHFS: [*Eleocharis elliottii* A Dietr, *Scirpus equisetoides* Elliott]



*Eleocharis equisetoides*

Line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image.

***Eleocharis erythropoda* Steudel** RED-ROOTED SPIKE RUSH, aka BALD SPIKE-RUSH, *ÉLÉOCHARIDE À TIGES ROUGES*, RED-BASED SPIKERUSH, (*erythropodus* -a -um red-footed, red-stalked, with a red stem or red base, from Greek ἐρυθρός, *erythros*, red, & πους, ποδος, *pous, podos*.) obl

Habitat: Seasonally inundated & wet meadows. One of the most common spike rushes, moist calcareous habitats, such as lake borders, marshes, & ditches, highly alkaline highway ditches & medians, sediment rich cattail marshes. Wet soil (mo2).

distribution/range: Common in the n ½ of Illinois, rare in the rest of the state.

Culture: propagation: Cold moist stratification, saturated soils, light. 737,612 (gna08), 809,821 (gnh09), 1,176,166 (gnh06), 1,375,758 (gnh13), 1,472,727 (gnhm11), 1,621,429 (gnam10), 1,600,000 (aes10), 2,268,000 seeds per pound.

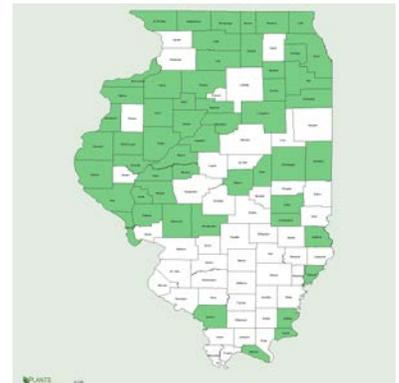
asexual propagation: Division of mature plants, any time with care.

cultivation: AES (2010) notes some salt tolerance. Tolerant of calcareous to alkaline situations,

bottom line: For field establishment, the small seeds are best surface sown dormant, but plant when wetland is accessible. 1/4 lots have strong germ, 3/4 have germ < 5%. Germ 17.3, 5.0, 5.0, sd 23.5, r0.0-59 (59)%. Dorm 67.9, 71.5, na, sd 21.3, r34-91.5 (57.5)%. Test 38, 37, 37, r30-43 days. (#11).\*\*

Description: Perennial, mat-forming, 0.5-2.5'; roots; culms; leaves; sheaths; heads; capsules; achenes; N 2n = 16, 18, 19, 20. key features: “large, single, suborbicular basal scale that completely encircles the culm (lpin).”

Comments: status: phenology: Blooms July - October, May 11 – June 19. Fruiting summer. In northern Illinois, collect seeds in late June - August. Useful in wetland restoration. Seed source farmed wetlands, drainage ditches, Green River Lowland, Whiteside Co.



VHFS: [*Eleocharis calva* Torr, *E calva* (A Gray) Torrey, *E glaucescens* (Willd) Roem & Schult, *E palustris* in part, *E palustris glaucescens*, *Scirpus glaucus* Torr, *Trichophyllum palustre* (L) Farw var *calvum* (Torr) House]

**Eleocharis geniculata** (Linnaeus) Roemer & Schultes BENT SPIKE-RUSH, aka CANADA SPIKERUSH, JOINTED SPIKERUSH, KNEE SPIKE RUSH, (*geniculatus -a -um* jointed, kneed, with bent knees, abruptly bent like a knee, of with joints, from Latin *geniculatus -a -um*, knotty , full of knots.)

Habitat: Low disturbed ground, calcareous marsh borders (sw94). Wet sands, very rare (mo2) distribution/range: Cook Co (1894), Lake & Porter cos., Indiana

Culture:

Description: Annual; N 2n = 10. key features: “This species is similar to *Eleocharis olivacea* in vegetative size & achene color. Species has orbicular to ovate-obtuse spikelets, rough & usually persistent bristles, & the tubercle of the achene is flush with the top of the round achene body.” (Ilpin)

Comments: status: phenology: Blooms June – September (mo2) July 29 – September 28.

VHFS: [*E capitata*, *E capitata dispar*, *E caribaea* (Rottb) Blake, *E caribaea* (Rottb) Blake var *dispar*]



**Eleocharis intermedia** (Muhlenberg) Schultes (or just Schultes) MATTED SPIKE RUSH, aka ÉLÉOCHARIDE INTERMÉDIAIRE, SPIKERUSH, (*intermedius -a -um* intermediate between two forms, as in shape or color, indicating that a species was halfway between two other species in regard to one or more characteristics; a space between two parts; or in reference to a hybrid being intermediate between its parents.)

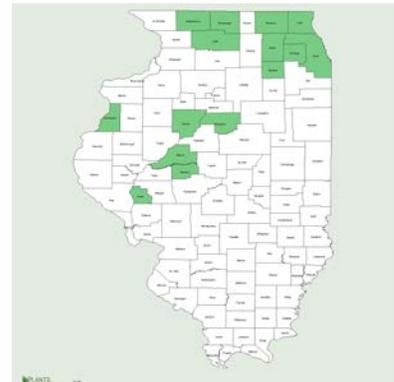
Habitat: Locally frequent in calcareous marsh borders & riverbanks, muddy ground, shallow water or rivulets (sw94). Riverbanks & swampy areas (mo2). distribution/range: Fairly common along the Illinois River, occasional elsewhere in the north ½ of Illinois.

Culture:

Description: Annual (perennial pug14); N 2n = 22. key features: “Immatures of *E intermedia* may be confused with immatures of *E acicularis*. Tubercle of *E intermedia* achene is subulate.” (Ilpin)

Comments: status: phenology: Blooms July – October (mo2) May 18 - September 29. “Uncommon on the island in Rock River at the IC RR bridge in Rockford” (ewf55).

VHFS:





*Eleocharis intermedia*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**Eleocharis macrostachya** Britton LARGE SPIKERUSH, aka *ÉLÉOCHARIDE À GROS ÉPI*, PALE SPIKERUSH, (*macrostachyus* -a -um with a large or long spike, from Latin *macro*, long, large, big, & Greek, *stachy*, relating to a spike.)

Habitat: Edges of swamps, sloughs, not common (mo2). “Species is distributed on edges of swamps, sloughs, and prairie swales” (Ilpin). distribution/range: DuPage, Lake, & McHenry cos. Throughout Illinois (Ilpin).

Culture:

Description: Erect perennial sedge; N  $2n = 18, 19, 38$ . ( $2n = 10$  &  $16$  also reported). key features:

Comments: status: Native. phenology: Blooms July – October (mo2).

VHFS: *Eleocharis palustris* (L) Roem & Schultes misapplied. Outside ne Illinois, this is included in *E. palustris*. “Ref. 8 gives the subsuming of *E. macrostachya* by *E. palustris* in gory detail” (Ilpin)



*Eleocharis macrostachya*



*Eleocharis macrostachya*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image.

**Eleocharis melanocarpa** Torrey BLACK-FRUITED SPIKE-RUSH, (*melanocarpus* -a -um (me-la-no-KAR-pus) with black fruits or dark fruits, from *melas*, dark, & *carpos*, fruit.)

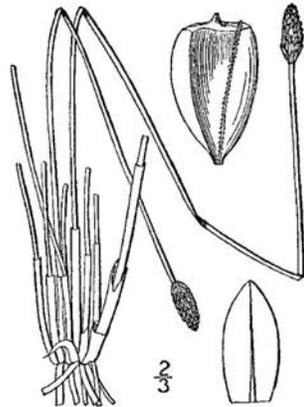
Habitat: Coastal Plain disjunct, moist sandy prairies, wet sand, floating muck mat (sw94). distribution/range: Northwest Indiana & Berrien Co, Michigan.

Culture:

Description: key features:

Comments: status: phenology: Blooms June 2 – July 18. ? seeds per pound.

VHFS:



*Eleocharis melanocarpa*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**Eleocharis microcarpa** Torrey var **filiculmis** Torrey \*CT, IN, MA, MI HAIR SPIKE RUSH, aka SMALL-FRUITED SPIKERUSH, TINY-FRUITED SPIKERUSH, (*microcarpus* -a -um small-fruited, with small fruit; *filiculmis* thread stemmed, from *fili-* & *culmis*, a stem of grain.)

Habitat: “Fresh, wet places in clearings in pine woods, depressions in cypress-black gum forests, lakeshores; 0–600 m” (fna). distribution/range: Porter & Jasper cos, Indiana.

Description: Annual;  $N 2n = 10$ . key features:

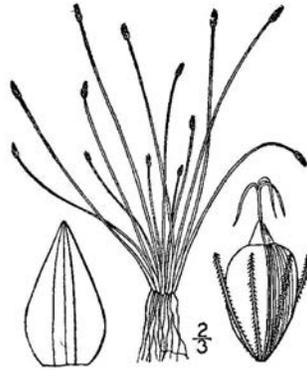
Comments: status: Special Concern in Connecticut.

Endangered in Indiana, Massachusetts & Michigan.

phenology: Fruiting spring - fall.

VHFS: *E microcarpa* of the Coastal Plain produces plantlets in the spikelets, with weak stems that fall & allow the plantlets to root. The stiffer stems of var *filiculmis* seldom allow this. (sw94) [*Eleocharis torreyana* Boeckeler]





*Eleocharis microcarpa* Torrey var *filiculmis*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**Eleocharis obtusa** (Willdenow) Schultes \*PA BLUNT SPIKE RUSH, (*obtusus -a -um* obtuse, blunt, rounded at the apex, from *obtusus*, blunt, obtuse, from *obtundo*, I beat upon, I make blunt or dull.) Obligate  
**Habitat:** One of the most common spike rushes, shores & moist flats, around artificial ponds, calcareous marshy ground, interdunal flats near Lake Michigan, old sandy excavations, small sandy ditches (sw94). Seasonally inundated, wet, muddy shores, disturbed artificial wetlands & ditches. Mudflat species, needs saturated soils.

**Culture:** 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). Saturated soils, light. Annual, spreads by seed where there is little competition. Requires drawdown to mudflat conditions for germination. 900,794 (gnhm09); 1,041,284 (gnam06); 1,120,988 (gna06); 1,360,391 (gnavs02); 1,520,000 (jfn04); 1,600,000 (pm02 & ecs); 2,508,287 (gnh13); 2,543,417 (gn08); 2,564,972 (gna10); 2,734,940 (gnh09); 2,835,000 (gnh11) seeds per pound. In mixes, plant 0.02-0.4 lb pls per acre (us97).



**cultivation:** Tolerates inundation to depth of 6". Full sun.

Low drought tolerance. Nutrient load tolerance moderate to high. Salt tolerance variously reported as none to low to moderate. Siltation tolerance low. pH 4.0-8.7. Said to prefer alkaline soils.

**bottom line:** For field establishment, the small seeds are best surface sown dormant, but plant when wetland is accessible. 1/4 lots have strong germ, 3/4 have germ < 5%. Germ 4.0, 2.0, 1.0, sd 4.5, r0.0-12 (12)%. Dorm 81, 82, 83, sd 7.6, r65-94 (29)%. Test 34, 36, 37, r26-42 days. (#20).\*\*

**Description:** Almost exclusively an annual tufted herb, rarely moderately rhizomatous & short-lived perennial, 1.0-1.5', occasionally 2.0'. 10" minimum root depth, brownish flower. **key features:** "Versus the two other varieties, this one has: 1) tubercle greater than 2/3 width & 1/4- 1/2 height of achene; 2) bristles mostly present, exceeding achenes" (Ilpin).

**Comments:** **status:** Var peasei is Endangered in Pennsylvania. **phenology:** Blooms mid-May - late September. In northern Illinois, collect seeds in mid-July - mid-August. Wetland restoration, useful in upper shoreline zones, stream bank stabilization, & in vegetated swales. Bunching, calcareous soils. Seed source farmed wetlands Hume & Tampico Twps, Whiteside Co.

"Common on muddy river & creek banks. In Coon Creek bottom peat areas that have been plowed & are still very wet the next year, it is at times an abundant first invader." (ewf55)

**Associates:** Roots & seeds are eaten by waterfowl. Provides food for rails, muskrats, & rabbits. Ducks & rabbits eat seeds & plants.

**VHFS:** *E ovata* in part.

Deam (1940) reported var *ellipsoidalis* Fern, with elliptic instead of conic cylindrical spikelets, from La Porte Co., Indiana, but it is restricted to the Atlantic coastal plain by Fernald (1950).



*Eleocharis obtusa*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image.

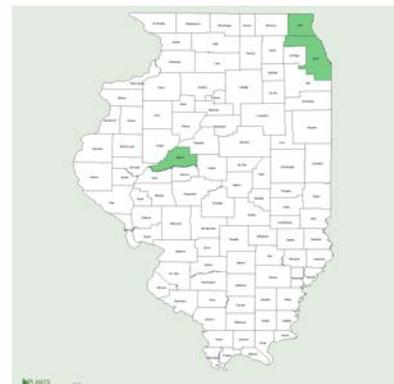
**Eleocharis olivacea** Torrey \*IL, KY, MN, OH, PA WRINKLED-SHEATH SPIKE RUSH, aka BRIGHT GREEN SPIKERUSH, CAPITATE SPIKE RUSH, *ÉLÉOCHARIDE OLIVÂTRE*, OLIVACEOUS SEDGE, OLIVACEOUS SPIKE-RUSH, SPIKERUSH, (*olivaceus -a -um* olive-like, of olive color, olive green, brownish green, having the quality of olives.)

Habitat: Panne shores & bogs (sw94). Wet sands, very rare (mo2).

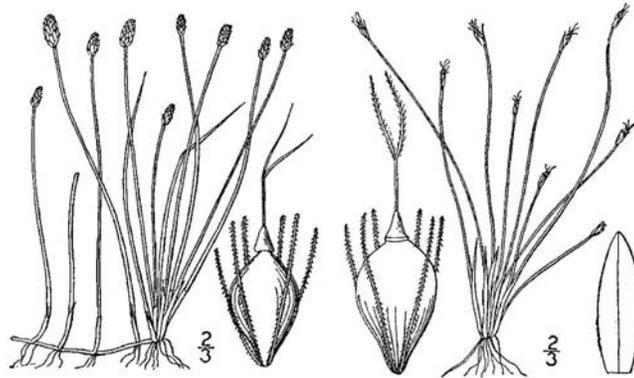
“Bogs, cold springs, dry stream banks, lake and pond margins, maritime mud flats, marshes, moist meadows, swamps; 0–1000 m” (Smith et al in fna). distribution/range: Cook, Lake, & Mason cos, northwest Indiana, & Berrien Co Michigan.

Culture:

Description: N 2n = 20. key features: “Cespitose, short spongy culms; sheaths dark red to straw colored; leaves reduced to bladeless sheaths scales ovate; achenes have short projection; bristles exceeding achene.” (Ilpin).



Comments: status: Endangered in Illinois. Special Concern in Kentucky. Threatened in Minnesota & Ohio. Rare in Pennsylvania. phenology: Blooms July-September, June 27 – September 25. C3.  
VHFS: New nomenclature is *Eleocharis flavescens* (Poir) Urban var *olivacea* (Torr) Gleason (fna).  
Synonyms for var *olivacea* are: [*E flavescens* (Poir) Urb var *olivacea* (Torr) Gleason, *E flaccida* (Rchb) Urb var *olivacea* (Torr) Fern & Grise]



*Eleocharis olivacea* & var *olivacea*

Line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**Eleocharis ovata** (Roth) Roemer & Schultes \*MA, NY, OH OVAL SPIKE RUSH, aka BLUNT SPIKERUSH, ÉLÉOCHARIDE OVALE, OVATE SPIKERUSH, SPIKERUSH, (*ovatus* -a -um ovate.)

Habitat: “Fresh, often drying shores, lake and stream beds, bogs, tidal estuaries, disturbed places; 10–700 m (East)” (fna). distribution/range:

Culture:

Description: Annual;  $n 2n = 10$ . key features:

Comments: status: Endangered in Massachusetts, New York, & Ohio.

phenology: Blooms ? In northern Illinois, collect seeds in mid-July - mid-August. ? seeds per pound. Swink & Wilhelm, 1994, note this plant is not extant in ne Illinois & cite one record from Newton Co, Indiana. Voss (1972) maps it only from northern Michigan.

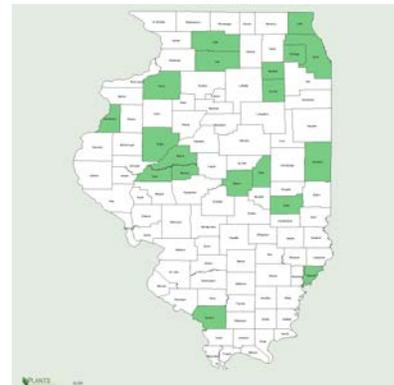
“Not common. Rock River bank at Rockford.” (ewf55)

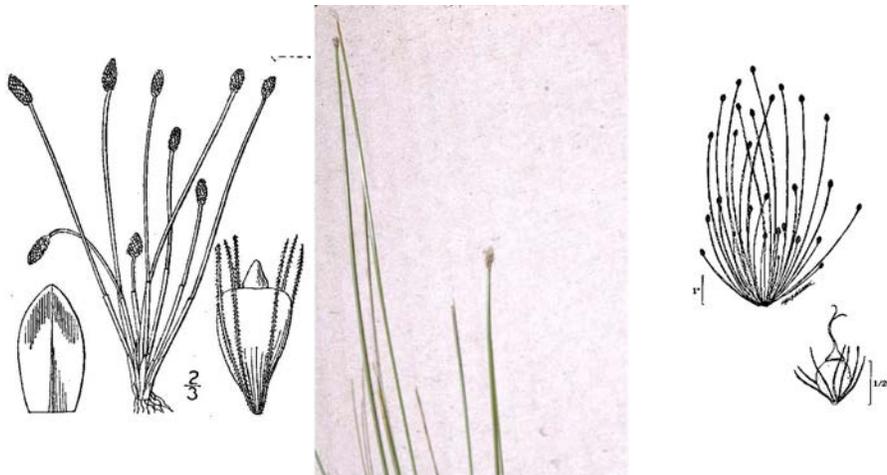
VHFS: *Eleocharis ovata* (Roth) Roemer & Schultes var *ovata*, SPIKERUSH wet ground; scattered but uncommon throughout Illinois, with tubercle  $\frac{1}{2}$  to  $\frac{2}{3}$  the width of the achene.

*Eleocharis ovata* (Roth) Roemer & Schultes var *detonsa* (Gray) Mohlenbr, SPIKERUSH, wet ground; occasional throughout Illinois. Annual, blooms May-October, with tubercle more than  $\frac{2}{3}$  the width of the achene & up to  $\frac{1}{4}$  the height of the achene.  $2n = 10$ . key features: “Versus 2 other varieties: 1) tubercle is greater than  $\frac{2}{3}$  width; less than or equal  $\frac{1}{4}$  height of achene; 2) bristles are as long or longer than achene, or lacking.” (Ilpin)

*E engelmannii* Steud, *E engelmannii* Steud var *detonsa* Gray, *E obtusa* (Willd) Schult var *engelmannii* (Steud) Gilly, *E obtusa* (Willd) Schult var *detonsa* (Gray) Drapalik & Mohlenbrock.

*Eleocharis ovata* (Roth) Roemer & Schultes var *obtusata* (Willd) Kukenth, BLUNT SPIKERUSH, wet ground, occasional throughout Illinois, blooms May - October. key features: *E obtusata* (Willd) Schultes. *E obtusata* (Willd) Schultes var *ovata* (Roth) Drapalik & Mohlenbrock. key features: “Versus the 2 other varieties, 1) tubercle  $\frac{1}{2}$  to  $\frac{2}{3}$  width of achene; 2) bristles usually longer than the tubercle.” (Ilpin)





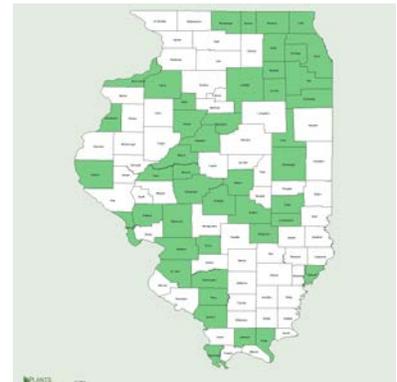
*Eleocharis ovata*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

**Eleocharis palustris** (Linnaeus) Roemer & Schultes MARSH SPIKE RUSH, aka COMMON SPIKE RUSH, CREEPING SPIKE-RUSH, *ÉLÉOCHARIDE DES MARAIS*, (*palustris*, *palustre* (pa-LUS-tris) marsh-living, of swamps, of marshes, or growing in bogs, marsh loving, from Latin *paluster -tris -tre* marshy, boggy.) see *E smallii*

**Habitat:** Edge of swamps, sloughs, ponds, & streams (mo2). “Fresh (to slightly brackish?) marshes, meadows, shores, ponds; 0–3000 m” (Smith et al in fna). **distribution/range:** Occasional throughout Illinois. “*Eleocharis palustris* is the most widespread and common species of the extremely difficult circumboreal “*E palustris* complex,” which in North America comprises *E palustris*, *E mamillata*, *E macrostachya*, *E erythropoda*, *E uniglumis*, *E kamtschatica*, and *E ambigens*” (Smith et al in fna).

**Culture:** 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). “No pre-treatment needed. Sow seeds just below soil surface at 70°F & water.” (ew12) 601,213 \*gnh12), 620,000 (wns01), 649,499 (gna11), 1,156,688 (gnamr07), 1,237,057 (gnh02), 1,286,119 (gna04), 1,319,767 (gnh06), 1,552,000 (ew12), 1,600,000 (gn, aes10), 1,181,250 (gnh13), 2,268,000 (jfn04) 2,718,563 (gna10) seeds per pound.



**cultivation:** Space plants 1.0-2.0'. Very wet soils, full sun.

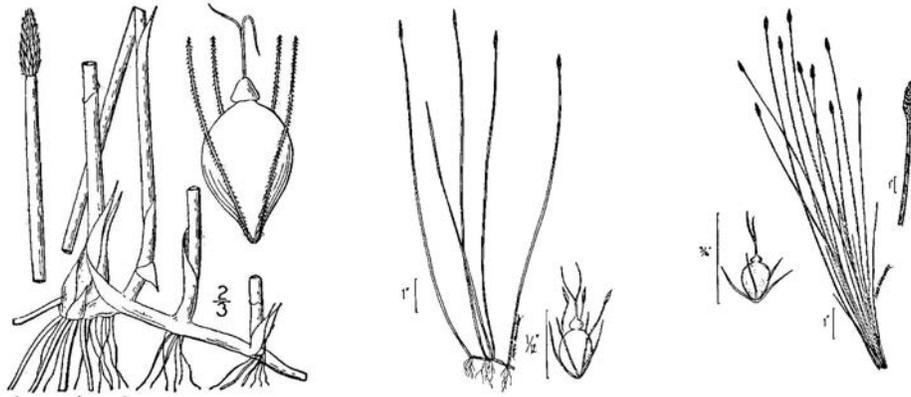
**bottom line:** For field establishment, the small seeds are best surface sown dormant, but plant when wetland is accessible. Consistently strongly dormant, >75%. Germ 6.3, 4.5, 4.0, sd 4.6, r1.0-15 (14)%. Dorm 85.6, 86, 86, sd 4.9, r75-93 (18)%. Test 33, 31, 31, r25-44 days. (#15).\*\*

**Description:** Erect, perennial, semi-aquatic, emergent sedge; mat-forming, rhizomes, evident, long; culms 0.3-3.3' tall, alone or in spaced clusters; leaves; sheaths as base of stem; heads in spiral covered by brownish scales; inflorescence solitary pointed spikelet; capsules; achenes gold brown nutlet with half of top covered with a cap;  $N 2n = 16, 17, 36$  (& numerous others fna). **key features:**

**Comments:** **status:** **phenology:** Blooms June - September. C3. In northern Illinois, collect seeds 2<sup>nd</sup> to 3<sup>rd</sup> week in July. Genetic source Harmon Twp, Lee Co. In nature, this species may grow into clear, deep water. In restorations, plant it shallow & let the plant find its own adaptation to the basin.

“It is not always easily separable from the two following (*E smallii* & *E calva*): the growth habit is much the same. All have lenticular achenes & a more or less oblique, herbaceous sheath orifice. This is the most common, being found in wet places over the co.” (ewf55)

VHFS: RHM (date?) & fna maintains this name over *Eleocharis smallii* Britt. [*Scirpus palustris* L, Sp Pl 1: 47. 1753; *Eleocharis smallii* Britt]



*Eleocharis palustris*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> & 3<sup>rd</sup> line drawings Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image.

**Eleocharis parvula** (Roemer & Schultes) Link ex Bluff, Nees & Schauer \*MI, NH, OH, PA SMALL SPIKERUSH, aka DWARF SPIKESEDGE, *ÉLÉOCHARIDE NAINÉ*, LEAST SPIKERUSH, (*parvulus* -a -um small, somewhat small, very small.)

Habitat: Wet soil, very rare (mo2). “Brackish or saline, mostly coastal tidal marshes, shores, mud flats, swamps, ponds, ditches; 0–600 m” (fna). distribution/range: Cole & Effingham cos.

Culture:

Description: Annual / perennial; tuberous;  $N 2n = 10$  (Europe). key features: “Densely (sic) tufted; spikelets ovoid, somewhat flattened; scales ovate absent leaves reduced to bladeless sheaths minutely triangular tubercle; achene trigonous; bristles occasionally.” (Ilpin)

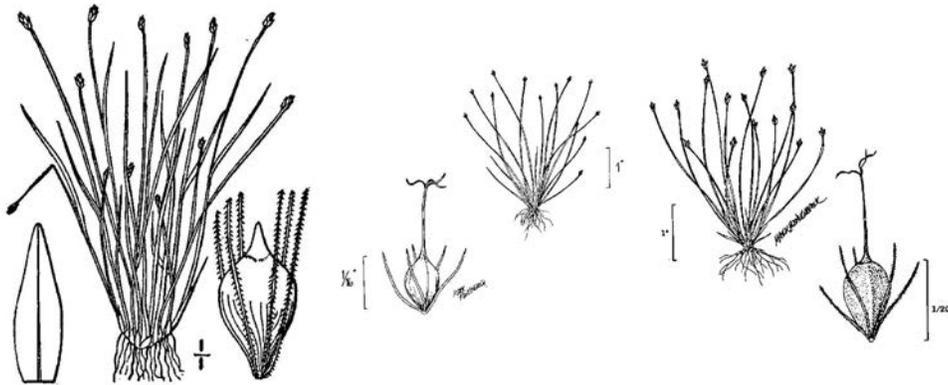
Comments: status: Threatened in Michigan & new Hampshire.

Endangered in Ohio & Pennsylvania. phenology: Blooms July – September (mo2). Fruiting summer to fall. C3. Non-mycorrhizal.

VHFS: [*Scirpus parvulus* Roemer & Schultes in JJ Roemer et al, Syst



Veg 2: 124. 1817; *Eleocharis pygmaea* Torr; *Scirpus nanus* Spreng]



*Eleocharis parvula*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> & 3<sup>rd</sup> line drawings Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species.* USDA Natural Resources Conservation Service. Not copyrighted images. Photos Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted images.

***Eleocharis pauciflora*** (Lightfoot) Link \*IL, ME, MA, NH, NJ, OH, PA, VT FEW-FLOWERED SPIKERUSH, aka ÉLÉOCHARIDE À CINQ FLEURS, FEW-FLOWERED SPIKESEDGE, (*pauciflorus -a -um* with few flowers, from classical Latin *pauci-*, combining form of *paucus*, few.)

Habitat: Wet areas (m02). “Calcareous shores and meadows; sandy soils” (Ilpin). “Fens, wet meadows, seeps, springs, hot springs; 0–3600 m” (fna).

distribution/range: Restricted to the extreme northeast cos.

Culture:

Description: Perennial; from rhizomes & tubers (bulbs); culms; leaves; sheaths; heads; capsules; achenes; N. key features: “Scales lanceolate, hyaline margin; conical tubercles; spikelets ellipsoid to ovoid; bristles rarely-none; leaves reduced to bladeless sheaths.” (Ilpin)

Comments: status: Endangered in Illinois, Maine, Massachusetts, New Hampshire, New Jersey, & Pennsylvania. Threatened in Ohio & Vermont. phenology: Blooms July – October. C3.

Non-mycorrhizal. Wind pollinated. Seeds dispersed by water & wind.

VHFS: New? nomenclature is *Eleocharis quinqueflora* (Hartmann) O. Schwarz. [*Scirpus quinqueflorus* Hartmann, Primae Lin Inst Bot ed 2, 85. 1767; *E fernaldii* (Svenson) Å Löve; *E pauciflora* (Lightfoot) Link; *E pauciflora* var *feraldii* Svenson; *E quinqueflora* subsp *feraldii* (Svenson) Hultén]



*Eleocharis pauciflora*



*Eleocharis pauciflora*

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***Eleocharis quadrangulata*** (Michaux) Rhoemer & Schulte \*CT, NY, PA, WI SQUARE-STEMMED SPIKERUSH, aka ANGLED SPIKERUSH, FOUR-ANGLED SPIKE-RUSH, SQUARESTEM SPIKERUSH, (*quadrangulatus -a -um* with four angles.)

Habitat: Shallow water in ponds & lakes, not common. “Shallow water of fresh lake and pond shores, marshes; 10–600 m” (fna).

distribution/range: Primarily in the s ¼ of Illinois

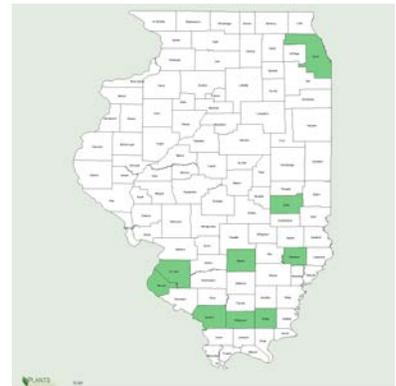
Culture:

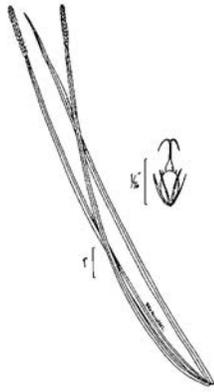
Description: key features: “Thick, coarse, brown-red, fibrous roots, with 4-sided & sharply angled culms. Both scales & bristles are present” (Ilpin).

Comments: status: Endangered in Connecticut, New York, Pennsylvania, & Wisconsin. phenology: Blooms June - October.

VHFS: Including var *crassior* Fernald, which intergrades with the species. [*Scirpus quadrangulatus* Michaux, Fl Bor-Amer 1:30. 1803;

*Eleocharis quadrangulata* var *crassior* Fernald, *Scirpus albomarginatus* Schultes; *S marginatus* Muhlenberg] “Ref. 8 says too much intergradation to recognize varieties *quadrangulata* & *crassior*” (Ilpin).





*Eleocharis quadrangulata*

Line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image.

**Eleocharis rostatella** (Torrey) Torrey \*FL, IL, ME, MN, PA, RI, WA, WI SPIKERUSH, aka BEAKED SPIKERUSH, WALKING SEDGE,

Habitat: Marshy, calcareous soil (m02). “Base of bluffs, tufaflat, calcareous marshes, marly lake borders” (Ilpin). “Very wet calcareous or brackish fens, springs, shores; 50–2400 m” (fna). distribution/range: Cook, Kendall, Lake, McHenry, Wabash, & Will cos.

Culture:

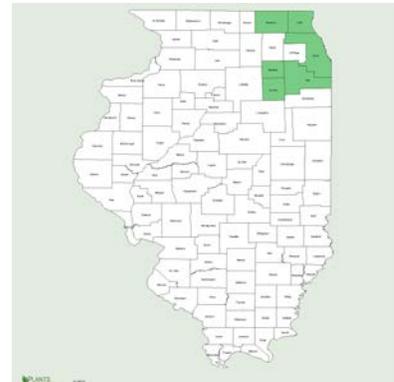
Description: Perennial; key features: “Cespitose; culms sometimes rooting at tip; scales elliptic.” (Ilpin)

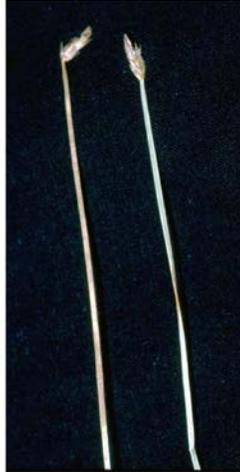
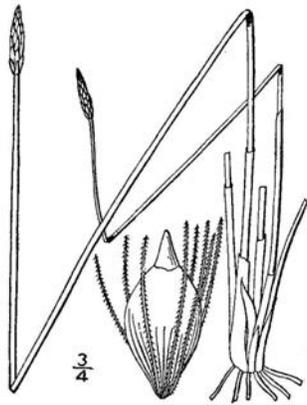
Comments: status: Endangered in Florida & Pennsylvania. Threatened in Illinois, Minnesota, & Wisconsin. Possibly Extirpated in Maine.

Special Concern in Rhode Island. Sensitive in Washington. phenology: Blooms July – September. C3.

Non-mycorrhizal. Wind pollinated. Seeds Waterfowl eat the stems, roots, and achenes of spikerush. Spikerush palatability is low for livestock and wildlife. High deer resistance.

VHFS: [*Scirpus rostellatus* Torrey, Ann. Lyceum Nat. Hist. New York 3: 318. 1836, *Eleocharis rostellata* (Torr) Torr var *congonii* Jeps, *Eleocharis rostellata* (Torr) Torr var *occidentalis* S Watson]





*Eleocharis rostellata*

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***Eleocharis smallii*** Britton CREEPING SPIKE RUSH, aka MARSH SPIKE RUSH, Obligat

Habitat: Mudflat species, needs saturated soils. “Species is distributed in ditches, sloughs; wet meadows; nondescript muddy places; peaty soils, and calcareous habitats” (Ilpin). distribution/range “It is found in all parts of Illinois” (Ilpin)

Culture: Saturated soils, light, & division of mature plants. Sow seed on mudflats during drawdown conditions; Spreads underground by rhizomes & by seed where competition is reduced. In seed mixes, plant 0.2-0.4 lb pls per acre (us97), but 0.063 to 0.125 lbs is recommended. The availability of this species is as uncertain as its taxonomy.

cultivation: pH data not available. Nutrient load tolerance low. Salt tolerance moderate. Siltation tolerance low. Full sun.

Description: Grasslike perennial herb, 1.0-1.5’ w/ extensive creeping rhizomes, brownish flowers

Comments: status: phenology: Blooms 6-9. Fruiting summer. “It is a questionable species much like the above (*E palustris*). It is uncommon, being found in Coon Creek bottom & in the sandy low prairie west of Yale bridge.” (ewf55)

Associates: Seeds are eaten by waterfowl. Non-mycorrhizal.

VHFS: Some authorities include this in *E palustris* (L) Roem & Schult. (pug14) “Ref 8 goes into gory detail about how *E smallii* is subsumed under *E palustris* (L) Roem & Schult” (Ilpin).

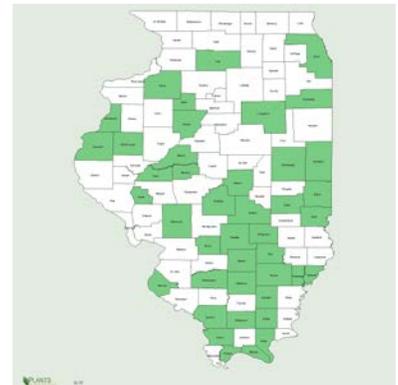
***Eleocharis tenuis*** (Willdenow) Schultes var ***verrucosa*** (Svenson) Svenson \*NJ, PA SLENDER SPIKERUSH, aka DOG’S HAIR, WARTY SPIKERUSH, (*verrucosus -a -um* verrucose, warty, from Latin *verrucōsus*, from *verruca*, wart.)

Habitat: Low wet ground, moist crevices on dry bluffs (m02). “Species is distributed in moist crevices on dry bluffs; prairie swales along railroads; roadside openings, ditches, and slough borders” (Ilpin). “Fresh, often calcareous, shores, wet woods, ditches; 10–600 m” (fna).

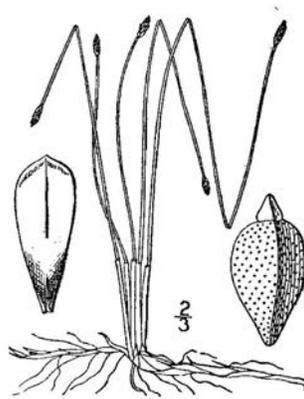
distribution/range: Occasional throughout most Illinois except for some of the northernmost counties.

Culture:

Description: Grasslike perennial; N 2n = 20. key features: “Versus all other Illinois *Eleocharis*, this species has: 1) 5 angled culm; 2) dark red or purple scales; 3) olivaceous-



yellow achenes with reticulate surfaces. In younger stages, it is similar to *E compressa*” (Ilpin).  
Comments: status: Endangered in New Jersey & Pennsylvania. phenology: Blooms May - September.  
 “Resembles the above (*E compressa*) but it is less robust. It is our earliest species.” (ewf55)  
VHFS: [*Scirpus tenuis* Willdenow, Enum. Pl. 1: 76. 1809, *Eleocharis capitata* (L) R Br var *verrucosa* Svenson, *Eleocharis verrucosa* (Svenson) LJ Harms]



*Eleocharis tenuis*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**Eleocharis wolfii** Gray \*IN, MN, OH, TN, WI WOLF’S SPIKERUSH, aka WOLF’S SPIKESEDGE, (*wolfii* for Dr Carl Brandt Wolf, 1905-1974, California botanist at Rancho Santa Ana Botanic Gardens & authority on oaks & cypresses.)

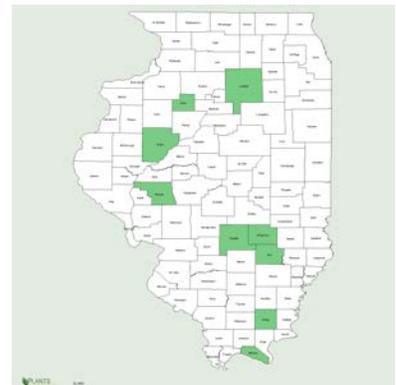
Habitat: Wet ground (m02). “Species is distributed along roadsides, and on swales in bottom prairies” (Ilpin). “Ephemeral pools in open grasslands, oak woodlands on river terraces, limestone barrens; 10–500 m” (fna). distribution/range: Rare & scattered in Illinois.

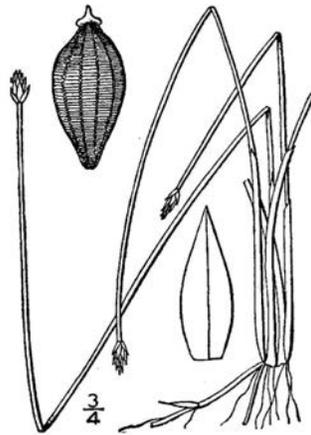
Culture:

Description: Perennial; N. key features: “Versus *Eleocharis acicularis*, *E. wolfii* has: 1) somewhat larger achenes; 2) wider culms, usually inrolled; 3) somewhat longer scales” (Ilpin).

Comments: status: Rare in Indiana. Endangered in Minnesota, Ohio, & Wisconsin. Special Concern in Tennessee. phenology: Blooms May - July.

VHFS: [*Scirpus wolfii* A Gray] Type collected by John Wolf from Fulton County, Illinois.





*Eleocharis wolfii*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

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**ERIOPHORUM** Linnaeus **COTTON GRASS, COTTONSEDGE, BOG-COTTON, BOGWOOL, LINAIGRETTE**

*Eriophorum* wool- or cotton-bearing, New Latin, from Greek εριον, *erion*, *erio-*, wool or cotton, & -*phorum*, -*phorus*, -bearing, from φερω (φερω), *phoreo*, (*phero*), to carry, bring, bearing. The slender bristles of “cotton” are modified sepals and petals of minute flowers. A genus of about 20 (25) species of herbs, mostly of cool north temperate, boreal, alpine, & arctic. 11 species in n North America. 5 species in Illinois.

*E. vaginatum* TUSOCK COTTONGRASS seeds are often abundant in seed banks and may remain viable for long periods. Sow at 18-22°C (64-71°F) for 2-4 wks, move to +2 to +4°C (34-39°F) for 4-6 wks, move to 5-12°C (41-53°F) for germination (tchn).



Photo USFWS - U.S. Fish and Wildlife Service. Rights: public domain

**Eriophorum angustifolium** Honckeny \*IN, NH NARROW-LEAVED COTTON GRASS, aka *LINAIGRETTE À FEUILLES ÉTROITES*, (*angustifolius* -a -um narrow leaved, from Latin *angustus*, adjective, drawn together; narrow, -i-, connective vowel used by botanical Latin, & *folius*, adjective, folium, leaf.) “Marshes, bogs, fens, meadows, shores; 0–3500 m” (fna). Cold swamps & bogs. distribution/range: Circumboreal. Illinois is at the southern limit of sp range.



Sow at 18-22°C (64-71°F) for 2-4 wks, move to +2 to +4°C (34-39°F) for 4-6 wks, move to 5-12°C (41-53°F) for germination (tchn). 688,000 (pm14) seeds per lb.

2n = 58. key features: “(in fruit, 2.5-5.0 cm long). Versus other Illinois *Eriophorum*, this species has a rounder, larger spikelet” (Ilpin).

“Rather common in the shallow bogs in Coon Creek bottom & uncommon in peaty areas in Kent Creek bottom.” (ewf55)

CaCO<sub>3</sub> tolerance low.

Rare in Indiana. Endangered in New Hampshire.

Illinois plants are subsp *angustifolium*.



*Eriophorum angustifolium*

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**Eriophorum species**

Cold moist stratify for 10 days (Wade)

**Eriophorum virginicum** Linnaeus \*IL, KY, TN TAWNY COTTON GRASS, aka *LINAIGRETTE DE VIRGINIE*, RUSTY COTTON GRASS,

Habitat: Swamps, bogs, & swales. distribution/range:

Culture: Full sun. pH 3.8-6.5.

Description: Bunch type?; roots 14” minimum depth; culms to 3’; leaves; sheaths; heads; capsules; achenes; N. key features: “Culms solitary or few together; spikelets crowded together into a at maturity; several nerved green scales glomerule; bristles tawny or white much elongate and conspicuous” Ilpin).

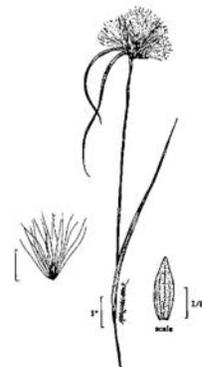
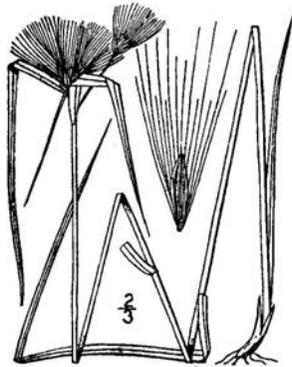
Comments: status: Endangered in Illinois, Kentucky, & Tennessee.

phenology: Blooms July to September. Fruiting mid summer–early fall. C3. 180,000 (ecs) seeds per pound.

“Less common than the above (*E angustifolium*) in the same places & blooms later than the preceding & the following (*E viridicarinatum*).” (ewf55)

Pollinated by wind.

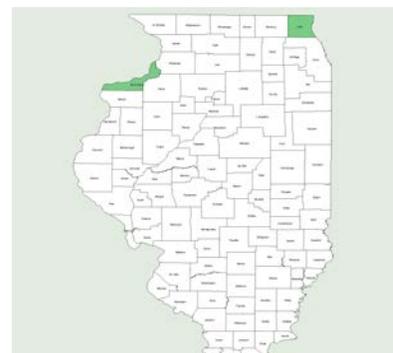
VHFS: [*Eriophorum virginicum* L f *album* (A Gray) Wiegand, *E virginicum* L f *virginicum*.]



*Eriophorum virginicum*

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**Eriophorum viridicarinatum** (Engelmann) Fernald \*IN, PA, RI, WA TALL COTTON GRASS, aka BOG COTTON-GRASS, DARK-SCALE COTTON GRASS, GREEN-KEELED COTTONGRASS, *LINAIGRETTE VERTE*, TASSEL COTTONGRASS, THIN-LEAF COTTON-GRASS, THINLEAF COTTONSEDGE, (*viridicarinatus* -a -um New Latin, green-keeled, from Latin *viridis* green, blooming, vigorous, & *carinatus* keeled, with a keel or shell,



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like a boat, from Latin *carīnt-*, participle stem of *carīnāre*, to furnish with a keel (or shell), from *carīna -ae* f., the keel of a ship.)

Habitat: In Michigan, “fens, conifer swamps (tamarack, spruce, cedar, fir) especially in open areas and clearings, and wet meadows; in calcareous soils” (rvw11). “Marshes, meadows, bogs, fens, wet woods; 0–2000 m” (Ball & Wujek in fna). distribution/range:

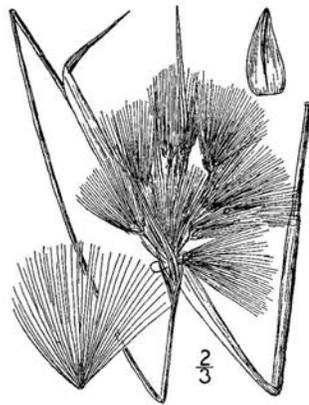
cultivation: pH 5.3-8.0.

key features: “The midnerve and margins of the scales in this species tend to be minutely scabrous or ciliate” (rvw11).

Comments: status: Extirpated in Illinois. Rare in Indiana. Threatened in Pennsylvania. Special Concern in Rhode Island. Sensitive in Washington. phenology: Blooms 5-8. “In Coon Creek bottom where it is much less common than *E angustifolium*.” (ewf55)

VHFS: [*Eriophorum latifolium* Hoppe var *viridicarinatum* Engelm, Amer. J. Sci. Arts 46: 103. 1844 (as *viridi-carinatum*), *Eriophorum viridi-carinatum* (Engelm) Fern orthographic variant]

RJ Innes, 2013. *Eriophorum viridicarinatum*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2014, May 29].



*Eriophorum viridicarinatum*

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### **FIMBRISTYLIS** Vahl 1806 **FIMBRY**

A genus of about 250-300 species, herbs, primarily warm temperate and tropical. Not known in restoration.



*Fimbristylis annua*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**FUIRENA** Rottbøll **UMBRELLA-SEDGE**

A genus of about 30 species, herbs, primarily in Africa and America, in tropical and warm temperate regions. 2 sp in Illinois. Genus is not known in restoration.

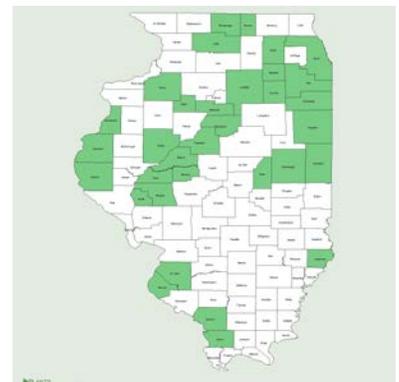


*Fuirena pumila*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**HEMICARPHA** Nees & Arnott **HALF-CHAFF SEDGE** *Hemicarpha* from Greek ἡμι-, *hemi-*, half, & κόρφος, *korphos*, straw chaff, (or κάρφος, *karphos*, twig, straw, a bit of wool). Often included in *Lipocarpa* R Brown. Genus is not known in restoration.

**Hemicarpha micrantha** (Vahl) Pax [New nomenclature this is *Lipocarpa micrantha* (Vahl) GC Tucker.] \*CT, ME, MD, MA, NJ, NY, OH, PA, RH DWARF BULRUSH, aka SMALL-FLOWERED HEMICARPHA, aka LIPOCARPHE À PETITES FLEURS, SMALLFLOWER HALFCHAF SEDGE, (*micranthus -a -um* with minute flowers, from Greek μικρο- *micro-*, small, & ανθος, *anthos*, flower.)



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“Emergent shorelines, rarely freshwater tidal shores; 0–1500 m” (Tucker in fna).  
 Native diminutive annual sedge. “Most common on the muddy or sandy banks of Rock River but also on other streams.” (ewf55, as *H micrantha* (Vahl) Britt)  
 Endangered in Connecticut, Maryland, New Jersey, New York, & Pennsylvania. Threatened in Maine, Ohio, & Rhode Island.

**VHFS:** [Vahl *Scirpus micranthus* Vahl, Enum Pl 2: 254. 1805, *Hemicarpha micrantha* (Vahl) Pax, *H micrantha* (Vahl) Pax var *minor* (Schrader) Friedland, *H subsquarrosa* (Muhlenberg) Nees, *H subsquarrosa* var *minor* (Schrader) Nees, *Isolepis subsquarrosa* (Muhlenberg) Schrader, *I subsquarrosa* var *minor* Schrader, *Scirpus micranthus* Vahl var *minor* (Schrader ex Roem & Schult) B Boivin, *S subsquarrosus* Muhlenberg]



*Lipocarpa micrantha*

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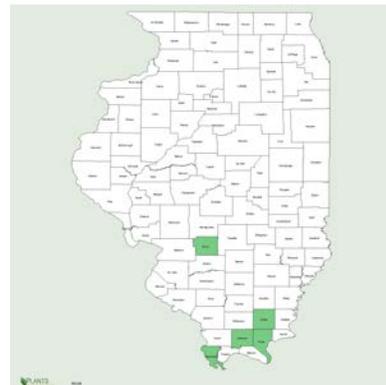
**ISOLEPIS** R Brown **Club-rush** *Isolepis* from Greek, *isos*, equal, similar, and *lepis* a flower bract. A genus of about 60 species, annual & perennial herbs, subcosmopolitan in distribution. “Since *Isolepis* is more closely related to *Cyperus* than to *Scirpus*, in which it has often been included, its separation from *Scirpus* is clearly warranted. The generic delimitation of *Isolepis* in relation to *Ficinia* and *Scirpoides* is uncertain.” (w12). 1 sp in Illinois, which is at the northern limit of the genus Midwestern range. Genus is not known in restoration.

***Isolepis carinata*** Hooker & Arnott ex Torrey **KEELED BULRUSH**,  
 “Wet, often drying, freshwater places in grasslands, rock barrens,  
 open woods, lawns, cultivated fields, waste places; 0–800 m”  
 (Smith in fna).

Annual

Fruiting spring.

[*Isolepis hookeri* Nees ex Boeckeler, *I koilolepis* Steud, *Scirpus carinatus* (Hook & Arn ex Torr) A Gray, nom illeg, *S carinatus* (Hook & Arn ex Torr) A Gray, non Sm, *S koilolepis* (Steud) Gleason, *Trichelostylis carinata* (Hook & Arn ex Torr) Alph Wood]

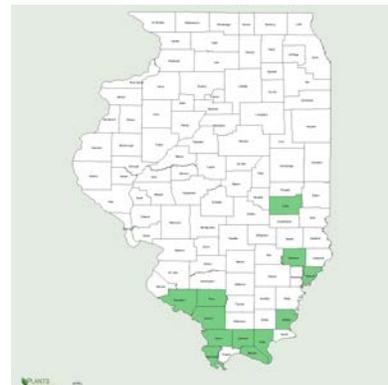


**KYLLINGA** Rottbøll **GREENHEAD SEDGE, SPIKESEDGE** *Kyllinga* for Peter Kylling, Danish botanist, d. 1696. A genus of about 60 (40-45) species of annual or perennial herbs, pantropical to warm temperate, especially in Africa. 5 sp in n North America. 1 species in Illinois. Not known in restoration.. Closely related to *Cyperus* and formerly treated as a subgenus, as *Cyperus* Linnaeus subg *Kyllinga* (Rottbøll) JV Suringar.

***Kyllinga pumila*** Michx \*MD, NJ **LOW SPIKESEDGE, aka ANNUAL GREENHEAD SEDGE, THIN-LEAVED FLATSEEDGE,** “Damp grasslands, shorelines, ditches, lawns, gardens; 0–200 m” (Tucker in fna).

Annual or perennial, cespitose,  
Endangered in Maryland & New Jersey. phenology: Fruiting summer.

VHFS: Basionym *Kyllinga pumila* Michaux 1803. [*Cyperus densicaespitosus* Mattf & Kük ex Kük, *C densicaespitosus* Mattf & Kük ex Kük var *major* (Nees) Kük, *C tenuifolius* (Steud) Dandy, *Hedychloe fragrans* Raf, *Kyllinga pumila* Michx var *humilis* Kunth, *K tenuifolia* Steud, *Thryocephalum pumilum* (Michx) Nieuwland]



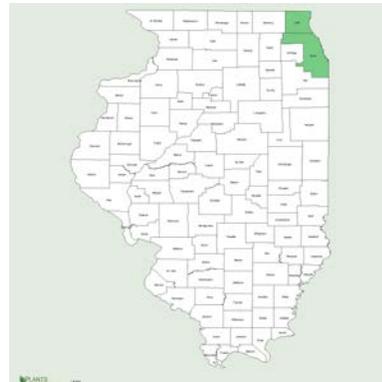
*Kyllinga pumila*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

**LIPOCARPHA** R Brown **HALFCHAFF SEDGE** *Lipocarpha* Greek, *leipo*, to fall, to be deficient, to be wanting, & *κόρφος*, *korphos*, straw chaff, referring to the flowers or the deciduous transparent inner secondary scale (squamae) of the spikelet in many species; alternately from Greek *λίπος*, *lipos*, fat, & *κόρφος*, *korphos*, straw chaff, in reference to the thickness of the inner scales of some species. A genus of about 35 species, herbs, pantropical and extending into warm temperate regions, 6 sp in n North America, 2 sp in Illinois. Several recent authors have advocated submerging *Hemicarpha* in *Lipocarpha*, including Tucker (1987). (w12) Genus is not known in restoration.

**Lipocarpha drummondii** (Nees) GC Tucker \*IN, OH  
 DRUMMOND'S HALFCHAFF SEDGE,  
 Emergent shorelines, usually sandy soils; 0–1200 m;  
 Annual; Extirpated in Indiana. Endangered in Ohio. Fruiting late summer–early fall.

[*Hemicarpha drummondii* Nees in CFP von Martius et al, Fl Bras 2(1): 62. 1842 (as *drummondi*), *Hemicarpha micrantha* (Vahl) Pax var. *aristulata* Coville, sensu Gleason & Cronquist (1991), *H micrantha* (Vahl) Pax var *drummondii* (Nees) Friedland, *Scirpus micranthus* Vahl var *drummondii* (Nees) Mohlenbr]



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**RHYNCHOSPORA** Vahl 1805 **BEAKSEEDGE, BEAKRUSH** *Rhynchospora* beaked-seed, New Latin, from Greek, *rynchos*, *rhynch-*, horn, beak, snout & *-spora*, *sporos*, seed, spore. Genus of ca 250 species, subcosmopolitan, primarily in tropical & warm temperate America. 6-8 species in Illinois. 1 sp in the native seed trade. Formerly *Dichromena* Michaux or *Psilocarya* A. Gray.

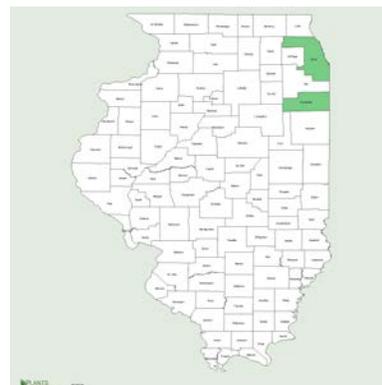
**Rhynchospora globularis** (Chapman) Small var **recognita** Gale \*IN OH GRASS BEAK RUSH, aka BEAKED RUSH, CYMOSE BEAKRUSH, GLOBE BEAKSEEDGE, FACW

Habitat: Moist sandy prairies & sedge meadows, wet sandy flat areas with coastal-plain vegetation. In the se USA, “Wet to dry low grounds, diabase glades, ditches, powerline corridors, savannas, moist seepage on rock outcrops, other wet areas” (w12b). “Sands, silts, clays, and peats of low meadows, ditches, low clearings, savannas; 0–400 m” (Kral in fna). distribution/range:

Description: Perennial, cespitose;

Comments: Endangered species in Indiana & Ohio. phenology: Fruiting spring–summer(–early fall). 1,600,000 (jfn04) seeds per pound

VHFS: According w12b & the pug14, this is *Rhynchospora recognita* (Gale) Kral, CYMOSE BEAKRUSH. [*Dichromena cymosa* (Elliott) J. F. Macbride; *Phaeocephalum cymosum* (Elliott) House, *Rhynchospora globularis* (Chapm.) Small var. *recognita* Gale, *R obliterated* Gale]





*Rhynchospora globularis* var *recognita*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

**SCHOENOPLECTIELLA** Lye **BULRUSH**

Coming soon! “Recently segregated from *Schoenoplectus*, this includes, in Michigan, all the annual, cespitose species. See Hayasaka (2012) and Shiels & Monfils (2012) for further information” (rvw11)

- Schoenoplectiella hallii* (A Gray) Lye Hall's bulrush
- Schoenoplectiella mucronata* (L) J Jung & HK Choi bog bulrush
- Schoenoplectiella purshiana* (Fernald) Lye weakstalk bulrush
- Schoenoplectiella smithii* (A Gray) Hayas Smith's Bulrush

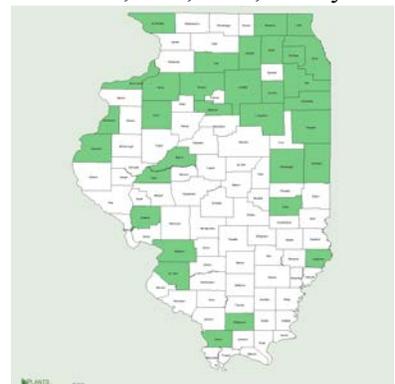
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**SCHOENOPLECTUS** (Reichenbach) Palla 1888 **BULRUSH, NAKED-STEMMED BULRUSHES, SCIRPES, SCHOENOPLECTE** *Schoenoplectus* from Greek σχοῖνος, *schoinos*, a rush, reed, or cord, &, *plektos*, plaited, twisted, woven, in reference to the use of culms in making useful object; 77 sp worldwide, 17 sp in n North America. In Weakley (2012), this is *Schoenoplectus* K Lye 2003. Formerly part of a broadly defined *Scirpus*.

**Schoenoplectus acutus** (Muhlenberg ex Bigelow) Á. Löve & D. Löve \*CT, PA **HARD-STEMMED BULRUSH**, aka **GREAT BULRUSH, SCIRPE AIGU**, (*acutus* acutely angled, sharp, pointed, tapering to a point, made pointed.) Obligate

Habitat: Wet meadows, minerotrophic waters, emergent in 3” to 3’ depths. Fresh, acid, marl, mildly alkaline, or slightly brackish water. Marshes, shores, pond margins, swamps. Standing water to wet muddy soils. Saturated soils of fens, or up to 3’ of water in marshes. “Fresh, often calcareous to brackish marshes, fens, lakes, slow streams, often emergent in water to 1.5 m; 0–2700 m” (Smith in fna). distribution/range:

Culture: propagation: “Moist cold treatment, or fall sow. Very light cover. Good to fair germination” (mfd93) No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). Seed cold moist stratified for 84 days germinated at alternating temperatures of 25°/10°C, with germination greater in the light than dark (cb03). Dormant seed or moist cold stratify (90 days),



seeds need light to germinate, scant soil cover, saturated soils. Us97 notes seeds need cold wet stratification for several months then light & warm temperatures.

Store fresh, undried seeds in water in refrigerator 6 months. Germinating seed in water at 86-90 degrees in continuous high light gives good results. (lbj)

Growth rate moderate. Seedling vigor medium. Vegetative spread rate moderate. Spreads moderately from seed. 206,000 (ecs), 206,400 (usda), 292,800 (aes10), 320,000 (pm, jfn04), 359,177 (gna08), 370,915 (gnh02), 373,509 (gnamr07), 373,970 (gnh03), 375,000 (gn), 377,600 (gran), 377,704 (gnh07), 402,700 (wns01), 408,273 (gna05), 557,993 (gna12), 615,176 (gna04), 749,794 (gna10) seeds per pound. Fresh seed can be dormant seeded on mudflats after drawdown for germination the following spring. For a monoculture, plant 5 lb pls per acre in fall or spring for pasture or reclamation, seeded alone, in fall or spring (gran). In diverse seed mixes, use 0.063-0.25 lbs pls per acre. Seeds, bare root, & plugs readily available from commercial sources.

cultivation: Anon 1981 says “plant in spring or fall. ...1000 roots / acre”. Bare root material in spring is favored over seeding for better establishment, but plugs are favored over bare root material. Plants need to be planted at the same depth they have been growing in soft, moist soils, on up to 3’ centers in no more than 4” of water. Bulrushes will grow into deeper water as the planting matures. It may take 3 growing seasons to develop a dense planting (us97). Moderately fine or fine textured soils. Established plants are tolerant of semi-permanent flooding. Nutrient load tolerance low to moderate. Siltation tolerance low to moderate. Anaerobic tolerance high. CaCO<sub>3</sub> tolerance medium. Drought tolerance medium. Fertility requirement medium. Salinity tolerance low to moderate or high. Shade intolerant, full sun. Basic to neutral soils. Alkaline tolerant. pH variously 5.2-8.5 (usda) or 6.7-9.1.

bottom line: Seeds have significant to strong requirement for dormant seeding for field establishment, but plant when wetland is accessible immediately after construction. Germ 3.1, 2.0, 10, sd 3.1, r0.0-12 (12)%. Dorm 75.7, 82, 79, sd 17.6, r35-93 (58)%. Test 33, 33, 40, r18-13 days.\*\*

Description: Stout, tall, cool-season, rhizomatous, “sod-forming” perennial emergent herb, 3.5-9.3’; .

Comments: status: Threatened in Connecticut, endangered in Pennsylvania, but this plant is considered invasive in some parts of the country. (SWWS 1998) phenology: Blooms May to August; Landscaping, wetland & riparian restoration, perpetually wet rain gardens, useful in lower shoreline zones & vegetative swales. Established plants tolerant of wave action & water level fluctuations. Seed source farmed wetlands, Greenville Twp, Bureau Co, & Hamilton Twp, Lee Co.

Associates: Provides food & cover for waterfowl & muskrats. Attracts waterfowl. Waterfowl & shorebirds eat achenes. Good nesting habitat for many species of birds & mammals, preferred nesting habitat for redhead & canvasback ducks. Provides spawning & nursery habitat for bluegills, large-mouth bass, northern pike & other fish.

VHFS: Formerly *Scirpus acutus* Muhlenberg (or Muhlenberg ex Bigelow). RHM **date** lists *f congestus* (Farw) Fern [*Schoenoplectus acutus* (Muhl ex Bigelow) A&D Löve var *acutus* (Muhl ex Bigelow) A&D Löve]. Variety *acutus* is restricted to eastern North America.

CC Baskin, 2003, Propagation protocol for production of container *Schoenoplectus acutus* (Muhl ex Bigelow) A&D Löve var *acutus* (Muhl ex Bigelow) A&D Löve plants: University of Kentucky, Lexington, Kentucky. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

Thullen & Eberts, 1995, Effects of temperature, stratification, scarification, & seed origin on the germination of *Scirpus acutus* seeds for use in constructed wetlands. Wetlands 15, 298-304.



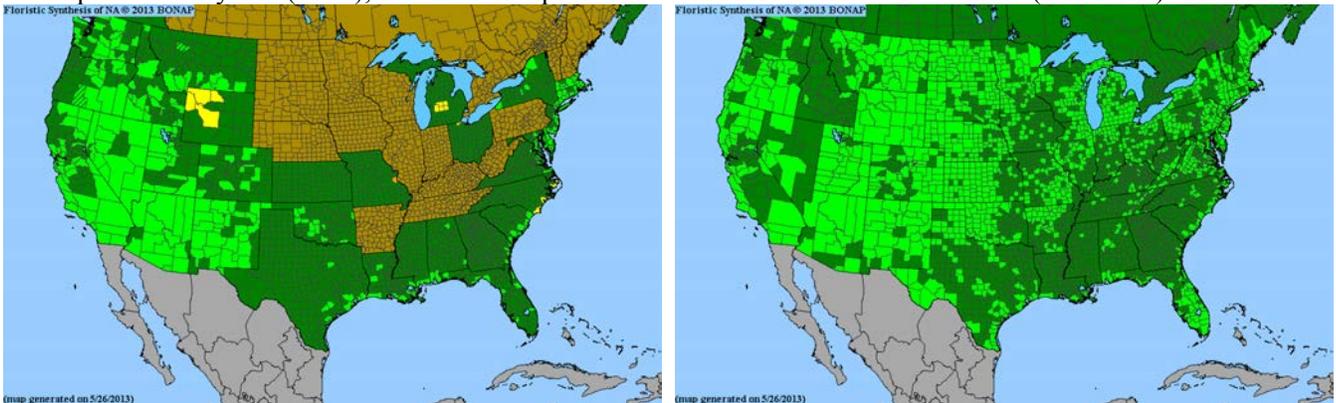
*Schoenoplectus acutus*

Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

*americanus* vs *pungens*

Mohlenbrock (2005) lists *S americanus* from KS, MO, & OH, and rare in the central Midwest, with *S pungens* known from IA, IL, IN, MO, KS, NE, KY, & OH. Mohlenbrock (2014) recognized both *S americanus* & *S pungens* in Illinois, respectively scattered throughout the state & rare, central counties. *Scirpus americanus* was the old name, but ca 1994, northern Illinois restorationists adopted the new name *Scirpus pungens*, generally without the knowledge that *S americanus* was still a valid taxon elsewhere. Where their ranges overlap, seed collectors & seed companies have not differentiated the 2 species, creating confusion. The recognition of both species in Illinois will eventually rattle a few brain cells. As of January 2014, Bonap (2013), fna, & plants.usda.gov map only *S pungens* from Illinois.

“*Schoenoplectus americanus*, *S pungens*, and *S deltarum* belong to the small “*Scirpus americanus* complex” T. Koyama (1963), in which the species are sometimes difficult to delimit” (Smith fna).



*Schoenoplectus americanus* & *S pungens*

**Schoenoplectus americanus** (Persoon) Volkart ex Schinz & R Keller THREE SQUARE BULRUSH, aka CHAIRMAKERS RUSH, OLNEY’S BULRUSH, OLNEY THREESQUARE, SALTMARSH BULSEDGE, Habitat: In the se USA, “Tidal freshwater to brackish marshes” (w12b). distribution/range: In Illinois, around ponds, rare; central cos (m14).

Culture: Seed cold moist stratified for 180 days germinated at 30°-32°C in light. Seed dormancy is physiological dormancy. (cb03) 300,000 (wns2001) seeds per pound.

Description: general form; roots; culms; leaves; sheaths; heads; capsules; achenes; N 2n = 78. key

features:

Comments: status: phenology:

VHFS: Formerly *Scirpus americanus* Persoon. [*Schoenoplectus americanus* (Persoon) Volkart ex Schinz & R Keller]

“Schuyler (1974) discusses the need to replace the name *S olneyi* (as traditionally applied) with *S americanus*, traditionally applied to what must now be called *S pungens*. Because of this nomenclatural change, the interpretation of much some information & records is now uncertain.” (w12)

CC Baskin, 2003, Propagation protocol for production of container *Schoenoplectus americanus* (Pers) Volk ex Schinz & R Keller plants: University of Kentucky, Lexington, Kentucky. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.



### *Schoenoplectus americanus*

Line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Carol Ritchie USDA-NRCS PLANTS Database. - Not copyrighted image.

Leaves relatively short, less than half as long as the culms; styles bifid or less often trifid

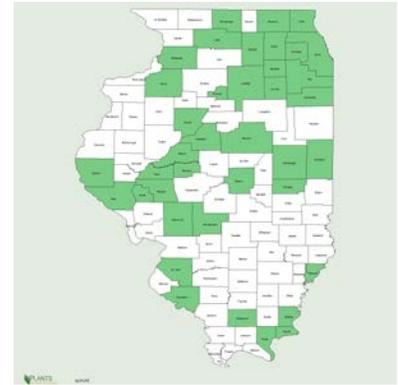
*Scirpus americanus* Sides of the culm strongly concave (sharply triquetrous), wing-angled; culms 3-10 mm in diameter; involucre bract solitary, 1-2.5 (-6) cm long; spikelet scale with apical notch 0.1-0.4 mm deep

*Scirpus pungens pungens* Sides of the culm flat, slightly concave, or slightly convex (merely trigonous); culms 1-6 mm in diameter; bracts 2 or 3, main involucre bract (1-) 3-20 cm long, the 2<sup>nd</sup> & 3<sup>rd</sup> ones resembling enlarged scales of the spikelet, but empty; spikelet scale with apical notch (0.3-) 0.5-1 mm deep. Spikelets 1-5 (-10); achenes (2.0-) 2.5-3.5 mm long, biconvex or trigonous; styles 2-3-fid. After W12b & G&C91.

**Scirpus mucronatus**, sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn). Aka *Schoenoplectiella mucronata* (L) J Jung & HK Choi BOG BULRUSH  
*Schoenoplectus mucronatus* (L.) Palla, *Scirpus mucronatus* L.

**Schoenoplectus pungens** (Vahl) Palla CHAIRMAKER'S RUSH, aka COMMON THREE SQUARE, COMMON THREE SQUARE BULRUSH, OLNEY THREESQUARE, *SCIRPE ACERE*, SWORDGRASS, (*pungens* sharp, pointed, pungent, piercing, ending in a hard, sharp point, as the points of the holly-leaf, from Latin *pungens*, piercing, sharp pointed, from *pungo*, *pungere*, *pepugi* (or *pupugi*), *punctus*, Latin verb, prick, puncture; sting of an insect; jab or poke; mark with points or pricks; vex or trouble.) Obligate

**Habitat:** Marshes, stream borders, along shores, & in marshes. Wet meadows, marshes, & other low-lying sites. Moist shores, riverbanks, & mud flats. Marshes & low wet ground, tolerant of alkali (cg91). In the se USA, marshes & rocky river beds (w12b). **distribution/range:** “Along shores, in marshes; scattered throughout the state (m14). “The species is circumboreal, ranging in North America from NL (Newfoundland) west to AK, south to South America; var *pungens* is widespread (w12). Map is var *pungens*.



**Culture: propagation:** 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09). “Fall plant or cold stratify for 1 to 2 months for best results. Sow seeds on soil surface at 70°F & water.” (ew12) Dormant seed or moist cold stratify (90 days), light. Some say seeds need cold (34-36° F) wet stratification for 6-12 months followed by warm temperatures (75-80°F). Fall seeding with natural stratification gives better results than spring seeding. Better germination with light & alternating temperatures. Growth rate moderate. Seedling vigor medium. Vegetative spread rate moderate. 126,000, 159,410 (gnh07), 165,512 (gnamr07), 179,800 (gran), 178,354 (gn09), 180,445 (gnh12), 180,800 (ew12), 192,000 (pm02), 260,000 (ecs), 260,400 (usda), 317,704 (gnh03), 324,286 (gnh01), 328,623 (gna05), 400,000 (wns01), 2,000,000 (jfn04, aes10) seeds per pound. Seeded alone plant 8 lb pls per acre in fall or spring (Granite). In mixes plant 0.06 to 0.125 lbs pls per acre. Seeds, bare root, & plugs available commercially. Plugs may sell out early. There is confusion over what is sold as *S pungens* & as *S americanus*. Some populations along railroads may be western. Where both taxa occur, some seed collectors may not differentiate.

**cultivation:** Space plants 2.0-6.0'. Plant rhizomes 2-5" deep on 2-6' centers. Permanently wet soils to 3" H<sub>2</sub>O. Bare root plants can have good survival planted spring to early summer. In favored locations, growth is rapid. Newly established plants are not flood tolerant. Plants suffer 50% mortality in > 20" H<sub>2</sub>O. Water levels may need to be left drawn down for some time. Sensitive to oxygen depletion. Best in medium fine to fine textured soils., saturated soil to 18" inundation. Tolerates seasonally flooded conditions. Nutrient load tolerance low. Siltation tolerance low to moderate. Anaerobic tolerance high. CaCO<sub>3</sub> tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance medium to high. Shade intolerant, full sun. Neutral or basic soils. Tolerant of alkalinity but does not require it. pH 6.7-8.9 or 3.7-7.5 (usda).

**bottom line:** Seeds have significant to strong requirement for dormant seeding for field establishment, but plant when wetland is accessible immediately after construction. Germ 5.5, 3.0, 2.0, sd 4.7, r1.0-14 (13)%. Dorm 79.5, 82, 91, sd 13.6, r48-83 (35)%. Test 35, 35, 29 r27-47 days. (#16)\*\*

**Description:** Cool-season, rhizomatous, grasslike perennial emergent herb. 3.0-4.0(5.0)', 14" minimum root depth. N 2n = 74, 78. “Sessile spikelets, scales 2 cleft at apex to various degrees, bristles short. Stout rhizomes. Versus *S subterminalis* & *S torreyi*; versus *S acutus* f *congestus* - 1) absence of red-dotted viscid scales; 2) sharp triangular culms.” (Ilpin as *S americanus*) “Distinguished by its triangular stems, notched scales of the spikelets, and usually only -4(-8) spokelets in a cluster” (m05).

**Comments: status: phenology:** Blooms May to September. Fruits May - August. Wetland & riparian restoration. Useful in lower shoreline zones, stream bank stabilization, rain gardens, & vegetated swales. Rhizomatous, the strong root system resists wave action & water level fluctuations. Seed source nursery plantings Seed source nursery plantings, genetic seed source sedge meadow, Morrison, Whiteside Co & wetland remnant Shaw Station, Lee Co.

“Very common on the banks of rivers, creeks, & sloughs.” (ewf55 as *S americanus* Pers.)

**Associates:** Important wildlife food. Provides food & cover for muskrats & waterfowl. Seed eaten by pintail, lesser scaup, gadwall, canvasback, ringneck duck, rails, & shorebirds. Muskrats eat stems & rhizomes. Stems provide cover & habitat for ducks & small mammals, & spawning grounds for bluegill & bass.

**VHFS:** Formerly *Scirpus pungens* Vahl or *Scirpus americanus* auct non Pers [misapplied].

[*Bolboschoenus maritimus* (L) Palla var *polyphyllus* (Boeckl) Dorn, *Schoenoplectus pungens* (Vahl) Palla

var *pungens*, *S americanus* Pers, *Scirpus americanus* auct non Pers [misapplied], *S americanus* Pers var *polyphyllus* (Boeckl) Beetle, *S pungens* Vahl, *S pungens* Vahl var *polyphyllus* Boeckl.]

For the variety *pungens*, this taxon has traditionally had the name *Scirpus americanus* applied to it; this name, however, is properly applied to the traditional *Scirpus olneyi*. *Scirpus pungens* (or *Schoenoplectus pungens*) becomes the correct name for this plant. (Schuyler 1974 in w12).

Illinois has var *pungens* & var *longispicatus* (Britton) S.G. Sm.

Synonyms for var *pungens* are: [*Bolboschoenus maritimus* (L) Palla var *polyphyllus* (Boeckeler) Dorn, *Schoenoplectus pungens* (Vahl) Palla var *polyphyllus* (Boeckeler) Dorn, *Scirpus americanus* auct non Pers, *S americanus* Pers var *polyphyllus* (Boeckeler) Beetle, *S pungens* Vahl, *S pungens* Vahl var *polyphyllus* Boeckeler] Synonyms for var *longispicatus* (Britton) SG Sm are: [*Scirpus pungens* Vahl var *longispicatus* (Britton) Roy L Taylor & MacBryde, *Scirpus americanus* Pers var *longispicatus* Britton]



*Scirpus pungens*

1<sup>st</sup> photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image.

***Schoenoplectus tabernaemontani*** (KC Gmelin) Palla SOFT STEM BULRUSH, aka BULRUSH, GREAT BULRUSH, *Ana'kun* (Ojibwa) (Medieval Latin *validus* strong, from Latin *valere*, to be strong, & *crebrus*, close, frequent, repeated.) (*tabernaemontani* (ta-ber-nie-mon-TAH-nee) after Jakob Theodore Mueller von Bergzabern of Heidelberg (1520-1590), self-Latinized as *Tabernaemontanus*, 16<sup>th</sup> century physician & herbalist, born in Bergzabern, Rhineland-Palatinate, Germany. *Tabernaemontanus* is a Latinization of *Bregzabern*, mountain-tavern.) ( M14 uses KC Gmelin while w12 uses CC Gmelim. Hmm.) Obligate Habitat: Wet meadows, upland swamps, marshes, shallow water, brackish or fresh shallow water & marshes. In the se USA, “Marshes, sedge meadows, streambeds, riverbeds, calcareous fens” (w12b). Established colonies may be found in 12-20” water (maximum 48”, minimum saturated soil to 6” water.).

distribution/range: Throughout temperate North America south into tropical America.

Culture: Dormant seed or moist cold stratify-light. 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09). “Fall plant or cold stratify for 1 to 2 months for best results. Sow seeds on soil surface at 70°F & water.” (ew12) Sow at 22°C (72°F) in muddy compost (tchn). Fall seeding more successful than spring seeding. Sow seed on wet mudflats in fall. Seeded area must be kept wet to covered with 1-2” water, followed by drawdown in mid to late spring. New seedlings are not tolerant of flooding.

Grabowski (2001) achieved 30% germination after 4 weeks with two treatments; 1) cold moist stratification for 5 to 7 months, & 2) dry cold for 2-3 months followed by 3 to 4 months cold moist stratification. Seeds germinate best in saturated soils such as commercial ebb & flow greenhouse bench with greenhouse temperatures from 55° to 100°F.

Seed cold moist stratified for 80 days germinated at alternating temperatures of 30°/5°C, with germination greater in the light than dark. Seed cold moist stratified for 180 days germinated at 30 to 32°C, with germination greater in the light than dark (cb03).

With Matanuska Valley seed, dried seed was hydrated & sown on Cornell wetland mix & exposed to winter temperatures, giving spotty, 25%, germination. Ross et al (2004) are now experimenting with keeping seed moist until sown & surface sowing.

Growth rate rapid. Seedling vigor low. Vegetative spread rate rapid. 496,000 (pm02, ecs), 505,009 (gnh09), 508,969 (gnh07), 530,374 (gnh15), 536,171 (gnh12), 545,345 (gna05), 550,000 (wns01), 550,400 (ew12), 559,803 (gna05), 595,020 (gnawn08), 600,000 (gn00), 604,800, 605,008 (jfn04), 606,952 (gna10), 608,000 (aes10), 622,344 (gna04), 722, 930 (gnhc15) seeds per pound. In mixes plant 0.06 to 0.25 lbs pls per acre (us97). Seeds, bare root & potted plants are available.

cultivation: Space plants 2.0-6.0' centers. Permanently moist soils to 3" H<sub>2</sub>O, full sun. Nutrient load tolerance moderate. Siltation tolerance moderate. Anaerobic tolerance high. CaCO<sub>3</sub> tolerance medium. Drought tolerance none. Fertility requirement low. Salinity tolerance low to moderate (& noted by AES (2010). Shade intolerant, full sun. pH 5.4-7.5, or 6.5-8.5.

Bare root or potted materials are more reliable than seeding. Bare root materials may be planted in up to 6" of mud, but always try to plant things at the depth they had been growing previously. You will kill some species by planting them too deeply. Us97 recommends planting in up to 12", but we recommend 3-4" maximum, & let them colonize into deeper water.

Drawdown is essential to establish seedlings & helps promote vegetative establishment. Draw down in late spring & keep the water level down until fall. New plantings must be fenced to exclude carp, muskrats & Canada geese. Sensitive to oxygen depletion.

bottom line: Seeds have significant to strong requirement for dormant seeding for field establishment, but plant when wetland is accessible immediately after construction. Germ 4.8, 3.0, 3.0, sd 4.1, r0.0-14 (14)%. Dorm 84.1, 85, 85, sd 6.8, r65-94 (29)%. Test 35, 38, na, r21-53 days. (#28).\*\*

Description: Perennial, rhizomatous, emergent herb, 3.0-10'.

Comments: status: phenology: Blooms 5,6,7,8, June to August. Pond landscaping, wetland restoration, very wet rain gardens, waterfowl habitat, very good for lower shoreline zone & used in saturated vegetated swales. Seed source drainage ditches, Lee Co.

"Common on the banks of Rock & other rivers & Kent & on other creeks." (ewf55)

Associates: Seeds eaten by waterfowl, shorebirds, & rails. Plants are eaten by muskrats. Colonies provide nesting cover for waterfowl & habitat for insects & young fish. Reported as deer resistant.

Ethnobotany: Stems were collected in midsummer. Rootstocks are available in autumn & early spring. Stem bases are available in May to June. Rootstocks used for food by Ojibwa & Iroquois (Densmore 1928, Parker 1910). Stems used for weaving large mats & baskets by Ojibwa, Menominee, & Pottawatomie (Kinietz & Jones 1942, Smith 1923, 1933). Found in Ash & Canter's caves & South Park village in Ohio (Yarnell).

VHFS: Formerly *Scirpus validus* Vahl *creber* or *Scirpus tabernaemontani* KC Gmelin. [*Schoenoplectus tabernaemontani* (KC Gmel) Palla, *Scirpus taebarnaemontanii* KC Gmel] *Schoenoplectus lacustris* (L Palla ssp *creber* (Fern) A&D Löve, *S lacustris* (L) Palla ssp *tabernaemontani* (KC Gmel) A&D Löve, *S lacustris* (L) Palla ssp *validus* (Vahl) T Koyama, *S validus* (Vahl) A&D Löve, *S validus* (Vahl) A&D Löve ssp *creber* (Fern) A&D Löve, *S validus* (Vahl) A&D Löve ssp *luxurians* (Miq) Soják, *Scirpus lacustris* L ssp *creber* (Fern) T Koyama, *S lacustris* L ssp *glaucus* (Reichenb) Hartman, *S lacustris* L ssp *tabernaemontani* (KC Gmel) Syme, *S lacustris* L ssp *validus* (Vahl) T Koyama, *S tabernaemontani* KC Gmel, *S validus* Vahl, *S validus* Vahl var *creber* Fern]

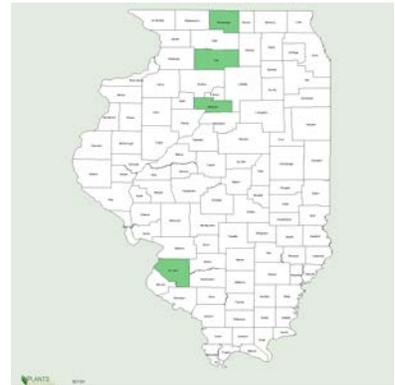
CC Baskin, 2003, Propagation protocol for production of container *Schoenoplectus tabernaemontani* (KC Gmel) Palla plants: University of Kentucky, Lexington, Kentucky. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

JM Grabowski, 2001, Propagation protocol for production of container *Schoenoplectus taebarnaemontanii* (KC Gmel) Palla, plants: Jamie L Whitten Plant Materials Center, Coffeerville,

Mississippi. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

D Ross, N Moore, & J VanZant, 2004, Propagation protocol for production of container *Schoenoplectus tabernaemontani* (KC Gmel) Palla plants: State of Alaska, Dept of Natural Resources, Div of Agriculture, Palmer, Alaska. In; [URL://www.nativeplantnetwork.org](http://www.nativeplantnetwork.org) (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

**Schoenoplectus torreyi** (Olney) Palla \*CT, IA?, IL?, IN, MD, MI?, NJ, OH, PA, RH, WI TORREY'S BULRUSH, AKA TORREY'S CLUBRUSH, TORREY'S THREE-SQUARE, TORREY'S THREE-SQUARE BULRUSH, *SCIRPE DE TORREY*, (*torreyi* tor'reyi (TOR-ee-eye) for Dr. John Torrey (1796-1873), a chemist & leading American botanist & with Asa Gray, co-author and significant contributor to *The Flora of North America*) obl



Habitat: Shores of ponds. Sp is known from an alkaline median on I-74 in Knox Co near Rio Road, growing with *Carex nebraskensis*, *C. praegracilis*, & *Juncus compressus*. In the se USA, sinkhole ponds (w12b). “Emergent in fresh ponds and marshes, often with fluctuating water levels; 10–200 m) (Smith in fna).

distribution/range: Distribution is local, extirpated at many historical sites.

Culture: Dormant seed or moist cold stratify-light. Successional restoration. 249,120 seeds per pound. Sp is not available in the native seed or plant trade.

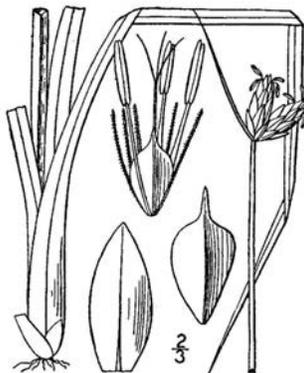
Description: Erect perennial. semi aquatic, rhizomes soft, mat-forming; 0.5-1.0(5.0)'; stems triangular; leaves reduced to short sheaths at stem base; inflorescence tight clustered spikelet from side of bract at stem top, spikelet of sharp-pointed yellow-brown scales; fruit is a nutlet, with 2 bristles, blunt beak;  $N 2n = 70$ . key features: “Three-angled culm; 2-3 leaves; spikelets ovoid-cylindric; scales ovate; bristles longer than long beaked achene-brown” (Ilpin).

Comments: status: Threatened in Connecticut. Endangered in Indiana, New Jersey, & Pennsylvania.

Endangered & Extirpated in Maryland. Presumed Extirpated in Ohio. Special Concern in Rhode Island & Wisconsin. phenology: Blooms 6,7,8. Fruiting summer (August). C3. Wetland restoration.

Associates: Wind pollinated. Seeds distributed by wind & water.

VHFS: Formerly *Scirpus torreyi* Olney.



*Schoenoplectus torreyi*

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**SCIRPUS** Linnaeus [or (Reichenbach) Palla] **BULRUSHES, TULE** (Also spelled BULLRUSH.) *Scirpus* New Latin, from the classical Latin name for rush, bulrush. Bulrush from Middle English *bulrysche*, *bolroysche*, perhaps from *bule* bull & *rysche*, *roysche*, *rusche*, rush. RHM (2005) introduced the name Bulsedge since *Scirpi* are in the sedge family not the rush family. Widely distributed large genus of annual or perennial sedges bearing solitary or much-clustered spikelets containing perfect flowers with a perianth of six bristles. Fruits are achenes, wind pollinated. Waterfowl, marsh birds, shorebirds, upland game birds, & songbirds eat seeds. Aquatic furbearers eat rootstocks & aerial stems. Small mammals eat stems. Radical name changes are here, with the traditional genus split into 3-4 genera locally. Formerly included *Bolboschoenus* Palla 1905, *Schoenoplectiella* K Lye 2003, *Schoenoplectus* (Reichenbach) Palla 1888, &c. (*Scirpus* x = 14, )

Isley, 1944, A study of the conditions that affect the germination of *Scirpus* seeds. Cornell Univ Agric Expt Station Mem 257

AE Schuyler, 1974. Typification & application of the names *Scirpus americanus* Pers, *S olneyi* Gray, & *S pungens* Vahl. *Rhodora* 76: 51-52.

*atrovirens* 5-6 bristles surrounding achenes; spikelets ovoid; septate foliage; achenes about the same lengths as bristles; 8 or less leaves on culm; lower sheaths green.

*georgianus* 0-3 bristles surrounding the achene; spikelets oblongoid.

*hattorianus* leafblades lack cross-venation; achenes longer than their bristles.

*microcarpus* 4 bristles surrounding achene; lower sheaths reddish.

*polyphyllus* 10 or more leaves on culm.

**Scirpus acutus** Muhlenberg see *Schoenoplectus acutus* (Muhl ex Bigelow) A&D Löve]

**Scirpus americanus** Persoon see *Schoenoplectus americanus* (Persoon) Volkart ex Schinz & R Keller

**Scirpus atrocinctus** Fernald BLACKGIRDLE BULRUSH, (*atrocinctus -a -um atro-* extreme, dark & *cinctus* girded or girdled.)

Habitat: As in *S cyperinus*. distribution/range: Known from Lake Co, Illinois, & apparently somewhere out here in northwest Illinois.

Culture:

Description: lateral spikelets of each ultimate group usually pedicillate, involucels & spikelets usually pedicillate; capsules achenes; N. key features:

Comments: status: phenology: Blooms ? seeds per pound. Some of our *S cyperinus* production stock is this species. (Joan O'Shaugnessy, personal communication)

VHFS: *Scirpus cyperinus* (L) Kunth var *brachypodus* (Fern) Gilly.

**Scirpus atrovirens** Willdenow DARK GREEN RUSH, aka DARK GREEN BULRUSH, GREEN BULRUSH, (*atrovirens*, *atro-virens* atrovi'rens (a-tro-VIE-rens) dark green, from Latin *atro-*, from *ater*, dark, black, & *viresco*, *virescere*, to grow green.) obl

Habitat: Wet meadows, wet soil. Lake & pond shores, stream banks, marshes, wet meadows.

distribution/range: Maine west to Minnesota, North Dakota, & eastern Montana, south to Georgia, Louisiana, Oklahoma & north Texas. Throughout Illinois.

Culture: "Fall sow, or moist cold treatment. May be beneficial to cold store fresh seed if not immediately sowing. Very light to no cover. Excellent germination" (mfd 1993). 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Best planted outdoors in the fall. (pm09). "Fall plant or cold stratify for 1 to 2 months for best results. Sow seeds on soil

surface at 70°F & water.” (ew12) Dormant seed or moist cold stratify, light. Growth rate moderate. Seedling vigor medium. Vegetative spread rate none. 1,460,000 (wns01), 2,240,000 (pn02), 3,000,000 (jfn04), 4,536,000, 6,486,000 (usda, ecs), 7,038,759 (gna04), 7,200,000 (ew12), 7,360,000 (pm01), 7,558,333 (gnam06), 7,895,625 (gna06), 8,000,000 (gni), 8,100,050 (gnh13), 8,566,032 (agr07), 8,566,037 (gnh03), 9,869,565 (gnh09), 10,436,781 (gnh02), 11,936,842 (gnh13) seeds per pound.

Cultivation: Space plants 1.5-2.0'. Wet to moist soils, full sun. Anaerobic tolerance medium. CaCO<sub>3</sub> tolerance medium. Drought tolerance low to medium. Fertility requirement medium. Salinity tolerance none. Shade intolerant. pH 4.0-8.0.

Bottom Line: Dormant seeding is best, the dormancy mechanisms vary widely from year to year, from 92% germ and zero% dorm to zero% germ and 98% dorm. Flipflop species. Small seeds need light to germinate, surface sow or very shallow cover. Germ 41.8, 43, 3.0, sd 33.9, r0.0-92 (90)%. Dorm 44.4, 40, 0.0, sd 36.9, r0.0-98 (98)%. Test 33, 34, 26, r14-51 days. (#29).\*\*

Description: Dark green, perennial, bunch type bulrush, 2.0-5.9',

Comments: status: phenology: Blooms 6,7,8. Aggressive, bunching, cool season. Useful in wetland plantings, wetland erosion control, & rain gardens, ornamental in fruit. Seed sources farm plantings, genetic source farmed wetlands, Hannaman Twp, Whiteside Co, & drainage ditches, Green River Lowland, Hamilton Twp, Lee Co.

“Common in marshy places, var *georgianus* (Harper) Fern being the most frequent. Proliferous plants are uncommon.” (ewf55)

Associates: Provides cover for wildlife. Reported as deer resistant.

VHFS: *S georgianus* Harper formerly listed as *S atrovirens* Willd var *georgianus* (Harper) Fern.

**Scirpus cyperinus** (Linnaeus) Kunth WOOL GRASS, AKA COTTONGRASS BULRUSH, MARSH BULRUSH, WOOLRUSH, (*cyperinus -a -um* similar to a *Cyperus*) obl

Habitat: Wet meadows & swamps, wet meadows, & upland swamps. Marshes, wet meadows, swamps, shores & ditches (ecs). distribution/range:

Culture: 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Best planted outdoors in the fall. (pm09). “Fall plant or cold stratify for 1 to 2 months for best results. Sow seeds on soil surface at 70°F & water.” (ew12) Dormant seed or moist cold stratify, light.

Seed from Michigan’s upper peninsula was stratified at 33-42°F for 30 days (Schultz et al 2001). Seed can be stored dry in ziplock bags for 6 months or cold moist for 3 to 4 months without affecting germination. Pretreat seed in ziplocks containing sphagnum at 42°F or in cold water at 42°F. Germination is greatest on saturated medium with green house temperatures 55° to 100°F. (Grabowski 2001). Growth rate moderate. Seedling vigor medium. Vegetative spread rate none. 2,880,000 (pn02), 4,536,000, 7,093,750 (gnh13), 9,000,000 (jfn04), 16,814,815 (gnh09), 22,146,341 (gna04), 23,282,051 (gna06b), 23,868,421 (gna06), 24,000,000 (aes10), 24,540,540 (gnh02), 25,222,222 (gna09), 27,200,000 (pm, ecs, ew12), 37,804,115 (gnh12) seeds per pound.

Cultivation: Space plants 1.5-2.0'. Wet soils, full sun to partial shade. Anaerobic tolerance medium. CaCO<sub>3</sub> tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance none, but some tolerance noted by AES (2010). Shade tolerant intermediate. pH 4.8-7.2.

bottom line: Dormant seeding is best, the dormancy mechanisms vary widely from year to year; some lots totally dormant & some lots totally nondormant. Flipflop species. Small seeds need light to germinate, surface sow or very shallow cover. Germ 36.2, 24, 0.0, sd 33.7, r0.0-97 (97)%. Dorm 50, 69, 0.0, sd 33.4 r0.0-88 (88)%. Test 32, 31, 41, r21-47 days. (#16).\*\*

Description: Native, erect, perennial sedge; densely tufted; culms 3.0-5.0';

Comments: status: phenology: Blooms 7,8,9. Ethnobotanical uses, landscaping. Wetland restoration, provides food & cover for waterfowl & muskrats. Seed source nursery production with genetic source McHenry Co, & drainage ditches, Green River Lowland, Amboy Twp, Lee Co.

“Common in marshy & other low wet places.” (ewf55)

Associates: Larval host *Euphyes dion* DION SKIPPER. Reported as deer resistant.

Ethnobotany: Stems used for weaving mats & storage bags by Ojibwa (sm32)

VHFS: RHM includes var *pelius* Fern, var *rubricosus* (Fern) Gilly, [*S eriophorum* Michx]

JM Grabowski, 2001, Propagation protocol for production of container *Scirpus cyperinus* (L)

Kunth, plants: (1+0 container) Jamie L Whitten Plant Materials Center, Coffeerville, Mississippi In;

<http://www.nativeplantnetwork.org> (accessed 21 July 2006). Moscow (ID); University of Idaho, College of Natural Resources, Forest Research Nursery.

J Schultz, P Beyer, & J Williams 2001 Propagation protocol for production of container *Scirpus cyperinus* (L) Kunth plants (160 ml conetainer): Hiawatha National Forest, Marquette, Michigan. In Native Plant Network URL: <http://www.nativeplantnetwork.org> (accessed 9 July 2002). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

**Scirpus expansus** Fernald \*IN, KY, OH WOODLAND BULRUSH, aka Woodland Beak-Rush, Wood Bulrush,

Habitat: Marshes & wet meadows. distribution/range: Native ne, e, & se of Illinois.

Culture:

Description: roots long, reddish rhizomes, with conspicuous nodes & internodes; culms 3-6'; leaves 5-8 per culm, sheaths, heads; achenes pale brown; N. key features:

Comments: status: Endangered in Indiana & Kentucky, threatened in Ohio. phenology: Fruits July - August. Provides cover for wildlife.

VHFS: [*Scirpus sylvaticus* L pp]

**Scirpus fluviatilis** (Torrey) A Gray see *Bolboschoenus fluviatilis*

**Scirpus maritimus** Linnaeus see *Bolboschoenus maritimus*

**Scirpus microcarpus** J & K Presl BARBERPOLE SEDGE, aka SMALL FRUITED BULRUSH, (*microcarpus*, small-fruited)

Habitat: distribution/range:

Culture: 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Best planted outdoors in the fall. (pm09).

Description: 7,128,000 (wns01), 7,360,000 (pm) seeds per pound.

**Scirpus pendulus** Muhlenberg [historically *S lineatus* Michaux] \*ME, NH HANGING BULRUSH, aka DROOPING BULRUSH, RED BULRUSH, RUFIOUS BULRUSH, BULRUSH, *SCIRPE PENDANT*, (*pendulus*, pendulous, hanging) obligate wetland

Habitat: Wet meadows, mesic prairies, low woods & along streams. In the se USA, wet ground over limestone, diabase, or other circumneutral rocks; rare (w12). distribution/range:

Culture: Dormant seed or moist cold stratify-light. "Fall plant or cold stratify for 1 to 2 months for best results. Sow seeds on soil surface at 70°F & water." (ew12)

culture: Space plants 1.5-2.0'. Wet to wet mesic soils, full sun to partial shade.

bottom line: Seeds have a strong requirement for dormant seeding. Small seeds need light to germinate, surface sow or very shallow cover. Germ 6.1, 5.0, 0.0, sd 5.2, r0.0-14 (14)%. Dorm 77.7, 80, 80, sd 10, r56-94 (38)%. Test 31, 27, na, r23-49 days. (#14)\*\*

Description: 1.5-3.0', N 2n = 40.

Comments: status: Endangered in Maine, threatened in New Hampshire. phenology: Blooms 5,6.

Wetland restoration, wet raingardens. 1,065,600 (agr07), 4,800,000 (aes10), 5,531,707 (gnhm11), 5,973,684 (gnh09, gnh13), 6,013,245 (gnaa07), 6,048,000, 6,050,000 (jfn04), 6,135,135 (gna10), 6,725,925 (gnh02), 1,500,000 (ew12) seeds per pound. Seed source nursery plantings, genetic source wet roadsides, Greenville Twp, Bureau Co, Green River Lowland, Hamilton Twp, Lee Co, & CBG, Cook Co. Good nesting cover, some "almost mesic" populations may not manifest themselves in dry years. "Uncommon.

Kishwaukee River bank at Shirley bridge below Cherry Valley & on drainage ditches in Otter Creek bottom in Laona Twp.” (ewf55 as *S lineatus* Michx)

*S lineatus* ranges from Virginia to Florida, west to Louisiana.



*Scirpus pendulus*

**Scirpus polyphyllus** Vahl LEAFY BULRUSH, aka MANY LEAVED BULRUSH, MANY-LEAVED SEDGE,

Habitat: Wooded streams & swampy shaded areas. Moderate shade tolerance. distribution/range:

Culture:

Description: Cespitose, with short, tough rhizomes; roots; culms nodes occasionally with axillary bulblets; leaves 14-22(-26) per culm; sheaths; heads spikelets in dense clusters of 3-9; capsules; achenes pale brown, obovate or orbtriangular;  $N 2n = 58$ . key features:

Comments: status: phenology: Blooms July – August. ? seeds per pound.

VHFS: *Scirpus polyphyllus* occasionally hybridizes with *S atrovirens*.

**Scirpus pungens** Vahl see *Schoenoplectus pungens* (Vahl) Palla

**Scirpus rubrotinctus** (*ruber*, red)

Dormant seed on top of the ground or cold moist stratify for 60 days (Wade)

**Scirpus torreyi** Olney see *Schoenoplectus torreyi* (Olney) Palla

**Scirpus validus** Vahl **creber** see *Schoenoplectus tabernaemontani* (KC Gmelin) Palla

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**SCLERIA** P.J Bergius 1765 NUT RUSH

**Scleria triglomerata** Michaux TALL NUT RUSH, aka WHIP NUTRUSH, (*tri-*, three, & *glomeratus*, glomerate, clustered) fac

Habitat: Wet meadows, dry & sand prairies, moist or dry woods, calcareous soils. “Does well in dry rocky upland forests, disturbed rocky areas” (AES 2010) distribution/range:

Culture: No treatment.

Description: 1.0-2.0'

“Found only in a shallow bog west of South Beloit in Rockton Township.” (ewf55)

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*Quidquid Latine dictum sit altum viditur.*

*Valeas, lacerta!*

This manuscript has been approved by the Midwest Institute for Alternative & Creative Spellin.  
End of the noncarice sedge section.

Endnotes & abbreviations. The following math functions violate Abbey's 1<sup>st</sup> Law, which see.

++ The listed numbers are seed count mean, seed count median, seed count mode, seed count standard deviation, seed count max, seed count min, seed count range.

\*\* The listed numbers are Germ mean, germ median, germ mode, germ standard deviation, germ range (range); Dorm mean, dorm median, dorm mode, dorm standard deviation, dorm range (range); Test mean, test median, test mode, test range. (#germ test : tz etc)

Reference abbreviations May 04 2014

CEPPC California Exotic Pest Plant Council  
CIPC California Invasive Plant Council  
SEPPC Southeast Exotic Pest Plant Council  
SWSS Southern Weed Science Society  
RBG Kew RBG Kew, Wakehurst Place  
aes10 (AES 2010)  
afvp (Atlas of Florida Vascular Plants)  
anef (Angelo & Boufford: Atlas of New England flora)  
apl (Applewood)  
asfg (Audubon Society Field Guide)  
wade (Alan Wade, nd, various years, 95, &c)  
bsh (Baker Seed Herbarium, California)  
bb02 (Baskin & Baskin 2002, 2001, &c.)  
nlb05 Britton 1905  
cb03 (CC Baskin 2003, 2001, &c.)  
crfg California Rare Fruit Growers  
csvd (Currah, Smreciu, & Van Dyk 1983)  
tchn tomclothier.hort.net (-4°C 24°F stratification being corrected)  
cu00 (or cu02, &c, Cullina 2000, 2002, 2008)  
nd91 (Norm Deno, 1991, 1993)  
den28 (Densmore 1928)  
do63 (Dobbs 1963)  
mfd93 (Mary Fisher Dunham 1993)  
dh87 (Dirr & Heusser 1987)  
drwfp (Directory of Resources on Wildflower Propagation)  
ecs (Ernst Conservation Seeds catalog)  
ew12 (Everwilde 2012) also ew11  
ewf55 (Egbert W Fell 1955)  
ewf59 (Egbert W Fell 1959)  
fh (Robert W Freckmann Herbarium)  
fna (Flora of North America project)  
foc (Flora of China online)  
fop (Flora of Pakistan online)  
gni (Genesis Nursery, Inc)  
gc63 (Gleason & Cronquist 1963, 1991)

gran (Granite Seeds)  
 he99 (Heon et al 1999)  
 hk83 (Hartman & Kester 1983)  
 hpi (Hill Prairies of Illinois  
 (Hilty website))  
 Ilpin (Illinois Plant Information network)  
 jf55 (Jones & Fuller 1955)  
 jlh (JL Hudson, Seedsman, (if the phone doesn't ring its me))  
 kpw (Kansas Prairie Wildflowers)  
 krr (Kenneth R Robertson)  
 lbj (Lady Bird Johnson Wildflower Center Native Plant Information Network)  
 m14 (Mohlenbrock 2014) also m86, m99, m02, m05, m06, &c  
 mbg (Missouri Botanic Garden)  
 msue (Michigan State University Extension)  
 nae Native American Ethnobotany (Moerman, University of Michigan Dearborn)  
 now36 (Nowosad et al 1936)  
 nyfa (New York Flora Atlas)  
 orghp (Ontario Rock Garden Hardy Plant Society)  
 ppc (Philips Petroleum Company)  
 pots (Plants of the Southwest 2000)  
 pm09 (Prairie Moon 2009) also pm02, pm11, &c  
 pnnd (Prairie Nursery no date)  
 pph (Prairie Propagation Handbook)  
 ppi (Prairie Plants of Illinois)  
 psdg (Plants of South Dakota Grasslands)  
 pug13 (plants.usda.gov accessed 2013, 2014)  
 oed Oxford English Dictionary online  
 rain (Ranier Seeds)  
 rrn97 (Reeseville Ridge Nursery 1997)  
 rvw11 (Reznicek et al 2011)  
 rs ma (Ray Schulenburg Morton Arboretum)  
 rhs Royal Horticultural Society  
 sh94 (Shirley Shirley 1994) & don't call me Shirley  
 sk08 (Stuppy & Kessler 2008)  
 sm23 (Smith 1923) also sm32, sm33, sm28, &c.  
 sw79 (Swink & Wilhelm 1979)  
 sw94 (Swink & Wilhelm 1994)  
 tlp (Time Life Perennials)  
 tlw (Time Life Wildflowers)  
 tpg The Prairie Garden  
 uconn (UConn Plant Database)  
 us97 (USDA 1997)  
 w12b (Weakley Nov 2012 ) also w07-12  
 wfatp (Vance & Vance 1979)  
 wfn (Wildflowers of Nebraska)  
 wfnp Wildflowers northern prairies)

ws92 (Wilhelm & Swink 1992)  
w73 (Alphonso Wood 1873)  
ry64 (Richard Yarnell 1964)  
yy92 (Young & Young 1992)  
*Reliquum etiam non scriptum est.*