

Introduction to Grasses, Sedges and Rushes



By Steve Eggers
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GOALS

- Understand basic plant taxonomy
- Learn common terms for plant descriptions
- Learn use of plant keys
- Differentiate grass/sedge/rush families
- Sight recognize some common sedges, grasses and rushes
- Become familiar with botanical texts

TAXONOMY

- **FAMILY** (e.g., Aster, Sedge, Rose, Grass)
- **GENUS** (always italicize)
- **SPECIES** (always italicize)
 - Subspecies (Speckled alder: *Alnus incana* ssp. *rugosa*)
 - Variety (Red raspberry: *Rubus idaeus* var. *strigosus*)

EXAMPLE

- **FAMILY:** Poaceae (Grass Family)
- **GENUS:** *Poa* (the bluegrasses)
- **SPECIES:** *pratensis* (Kentucky bluegrass)

Poa pratensis



SYNONYMS

- More than one scientific name for the same plant species
- *Salix interior* = *Salix exigua* (**sand-bar willow**)
- *Alnus rugosa* = *Alnus incana* ssp. *rugosa* (**speckled alder**)
- *Scirpus acutus* = *Schoenoplectus acutus* (**hardstem bulrush**)
- *Aster puniceus* = *Symphotrichum puniceum* (**redstem aster**)

TAXONOMY

alba = white	hastata = spear-shaped
rubra = red	latifolia = broad-leaved
nigra = black	glabra = smooth
palustris = wetland	arundinaceus = reed-like
lacustris = lake	repens = creeping
virginiana = of Virginia	verticillaris = whorled
canadensis = of Canada	intumescens = swollen
arvensis = of plowed fields	
pratensis = of meadows	
graminifolia = grass-like leaves	
candidum = shining white	
stricta = tightly wrapped	
maculata = spotted	

BOTANICAL TERMS

- **Inflorescence:** the entire flower structure including subtending bracts (modified leaves)
- **Annual:** a plant that completes its life cycle in one growing season and then dies
- **Biennial:** a plant that completes its life cycle in two years, usually flowering and producing fruit the second year, and then dies
- **Perennial:** a plant species living 3 or more years
- **Rhizome:** an underground, usually horizontal, stem
- **Stolon:** an above-ground, usually horizontal, stem

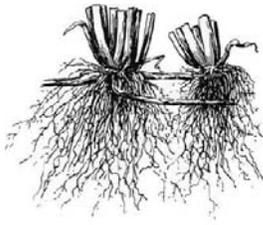
BOTANICAL TERMS

- **Glabrous:** smooth
- **Glaucous:** covered with a pale, waxy coating
- **Pubescent:** hairy
- **Scabrous:** rough
- **Pistil:** the seed producing organ of a flower, composed of an ovary and one or more styles and stigmas
- **Ovary:** the lower, often enlarged portion of the pistil in which the seeds are produced
- **Pistillate:** having only pistils (seed producing)
- **Staminate:** having only stamens (pollen producing)

BOTANICAL TERMS



Rhizomes



Rhizomes

Sedges vs. Grasses vs. Rushes

- **Sedges:** Solid, triangular stems ("*sedges have edges*") with some exceptions; leaves 3-ranked; fruit a nutlet subtended by a scale
- **Grasses:** Hollow (between the nodes), round stems; leaves 2-ranked; fruit a grain covered by two papery scales
- **Rushes:** Solid, round stems; leaves few; fruit a several to many-seeded capsule surrounded by 6 scale-like structures (tepals)

Stem Cross Sections



Sedge Stem
(*Carex, Scirpus, Schoenoplectus*)



Bulrush or Spike-Rush Stem
(*Schoenoplectus, Eleocharis*)



Grass Stem
(*Gramineae*)



BOTANICAL TERMS: RUSHES (*Juncus*)

- **Capsule:** fruit of rushes; contains three to dozens of seeds; in *Juncus* the seeds are tiny, barely visible with unaided eye
- **Tepals:** the six, star-like scales that surround the capsule

BOTANICAL TERMS: RUSHES

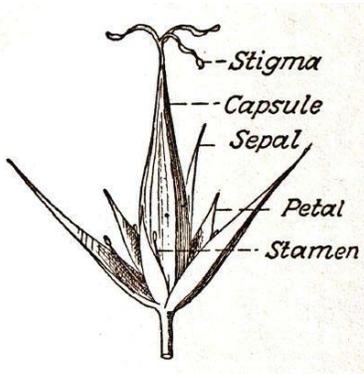


Illustration from *A Manual of Aquatic Plants* by Fassett (1957)

RUSHES

- Two major breaks in the keys:
 - Is inflorescence terminal or lateral?
 - Do leaves have hard cross-partitions?



BOTANICAL TERMS: GRASSES

- **Floret:** the highly reduced flower of grasses
- **Spikelet:** a small spike with reduced flowers on a central axis
- **Pedicel:** the stalk of the spikelet
- **Glumes:** the sterile, scale-like leaves at the base of a grass spikelet
- **Lemmas:** the lowermost, scale-like leaves at the base of a grass floret
- **Ligule:** in grasses, a papery, hairy or membrane-like extension at the summit of a leaf sheath

GRASS SPIKELET/FLORETS

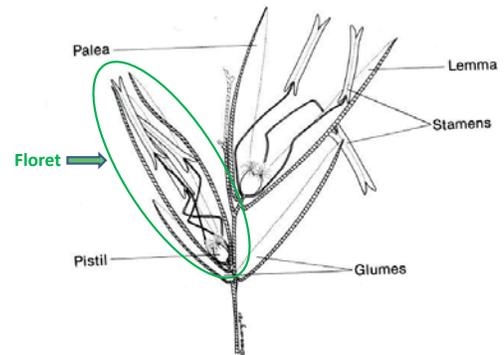
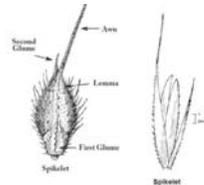


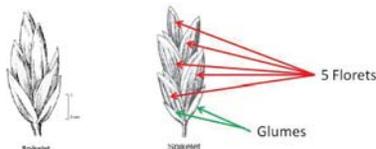
Illustration from *Wetland Plants and Plant Communities of Minnesota and Wisconsin, Version 3.1* by Eggers and Reed (2014)

BOTANICAL TERMS: GRASSES

- One-flowered spikelets

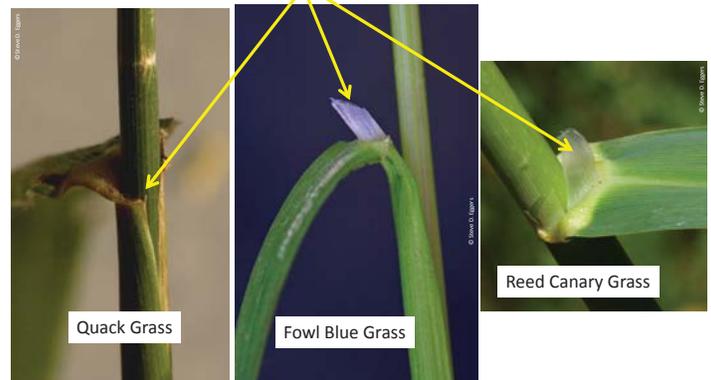


- Spikelets more than one-flowered



Illustrations from *Manual of the Grasses of the United States* by Hitchcock (1950) and *Grasses of Iowa* drawn by Froeschner (1966)

LIGULES



Quack Grass

Fowl Blue Grass

Reed Canary Grass

Grass Exercise



1. Stamens and pistils in different spikelets



1. Stamens and pistils in the same spikelet.....2

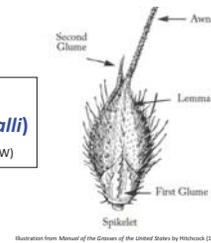
2. Plants 2-4 m. tall with pennant-like leaves, inflorescence feathery....

Common Reed
(Phragmites australis)
FACW



3. Spikelet covered with many little spines...

Wild Millet
(Echinochloa crus-galli)
FAC (NC/NE); FACW (MW)



2. Plants smaller, inflorescence not feathery.....3

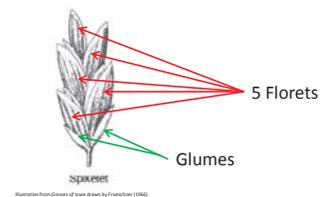
3. Spikelets without numerous spines...4

4. Spikelets all on one side (like a comb).....



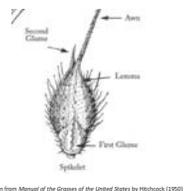
Prairie Cord-Grass
(Spartina pectinata)
FACW

5. Spikelets made up of several florets....6



4. Spikelets not all on one side.....5

5. Spikelets 1-flowered.....7



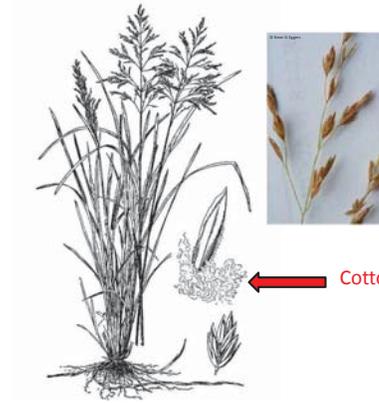
6. Lemmas deeply corrugated (nerved), lemma not cottony at base, leaf tips do not end in boat-shaped tip, spikelets not flattened

Manna Grasses
(*Glyceria* spp.)



6. Lemmas not corrugated,.....(next slide)

6. con't: ...lemma cottony at base, leaf tips end in boat-shaped tip, spikelets are flattened.....



Bluegrasses
(*Poa* spp.)

← Cottony hairs at base of lemma

Illustrations from Manual of the Grasses of the United States by Hitchcock (1950)

One flowered spikelets.....

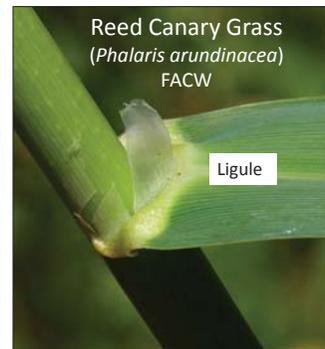
7. Spikelets with fringed margins, overlapping in a row.....

Rice Cut-Grass
(*Leersia oryzoides*)
OBL



7. Spikelets not as above.....8

8. Spikelets in close, irregular masses.....



Reed Canary Grass
(*Phalaris arundinacea*)
FACW

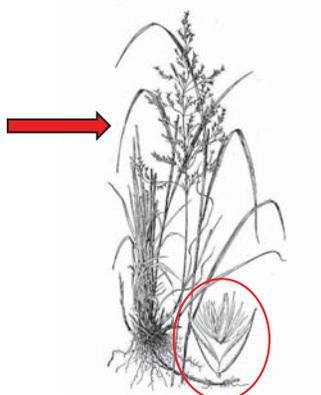
Ligule

Photos by Steve D. Eggen

8. Spikelets in loose, open arrangement.....9

9. Lemma surrounded by a tuft of straight, silky hairs.....

Canada blue-joint grass
(*Calamagrostis canadensis*)
OBL



9. Lemma without hairs.....
.....**Redtop** (next slide)

Illustrations from Manual of the Grasses of the United States by Hitchcock (1950)

Redtop (*Agrostis gigantea*) FACW



Single flowered spikelet, no hairs

© Steve D. Eggen

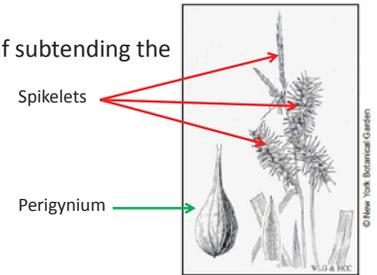
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SEDGE FAMILY

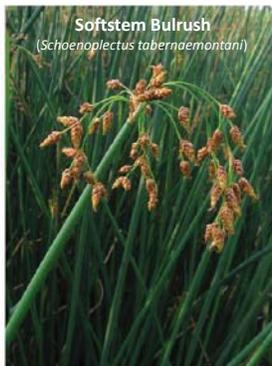


BOTANICAL TERMS: SEDGE FAMILY

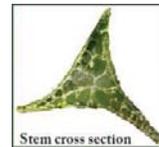
- **Spikelet:** a small spike with reduced flowers on a central axis
- **Perigynium:** the papery, flask-like structure that surrounds the ovary; unique to the genus *Carex*
- **Achene or nutlet:** a small, hard fruit that does not split open along a seam
- **Scale:** a highly reduced leaf subtending the flower



SEDGE FAMILY: Bulrushes (*Schoenoplectus* and *Scirpus*)



SEDGE FAMILY: Bulrush Stem Cross Sections

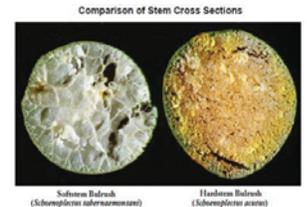


Three-Square Bulrush
(*Schoenoplectus pungens*)

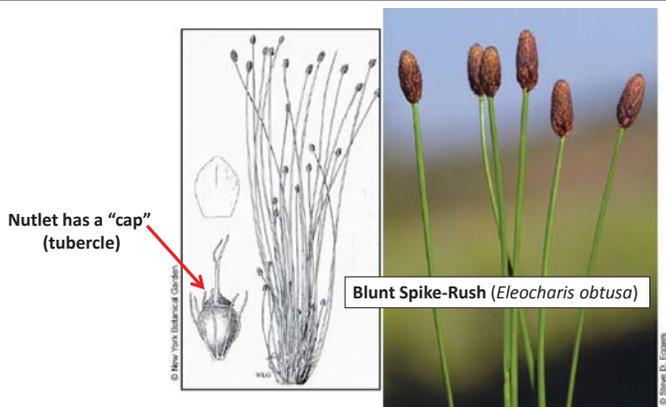


River Bulrush
(*Schoenoplectus fluviatilis*)

Softstem vs. Hardstem Bulrush
(*Schoenoplectus tabernaemontani*)
vs. *S. acutus*)



SEDGE FAMILY: Spike-Rushes (*Eleocharis*)



SEDGE FAMILY: Cottongrasses (*Eriophorum*)

Nutlets have many, long, silky bristles

Narrow-leaved Cottongrass
(*Eriophorum angustifolium*)

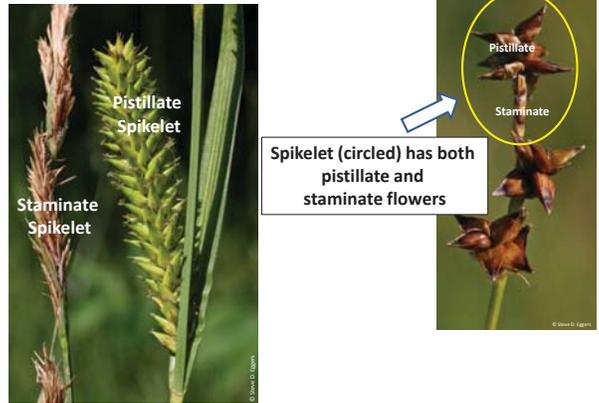


SEDGE FAMILY: Flat-Sedges (*Cyperus*)

Spikelets are flattened (2-sided)
Also called nutgrasses

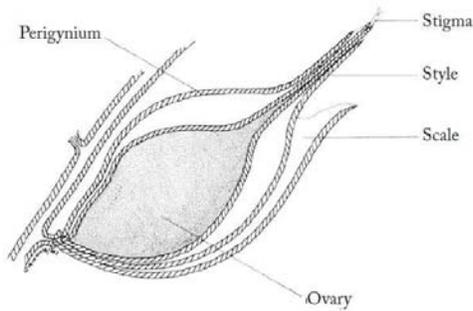


SEDGE FAMILY: Sedges (*Carex*)



Spikelet (circled) has both pistillate and staminate flowers

Carex: Perigynium



Cross Section of a Perigynium (*Carex*)

Illustration from Wetland Plants and Plant Communities of Minnesota and Wisconsin, Version 3.1 by Eggers and Reed (2014)

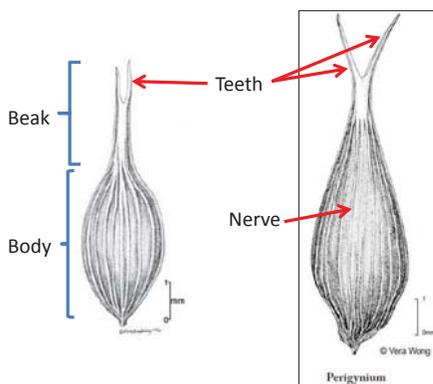
Carex: Flower Structure

Perigynia = *peri* (around) + *gynia* (gynoecium, female portion of flower)

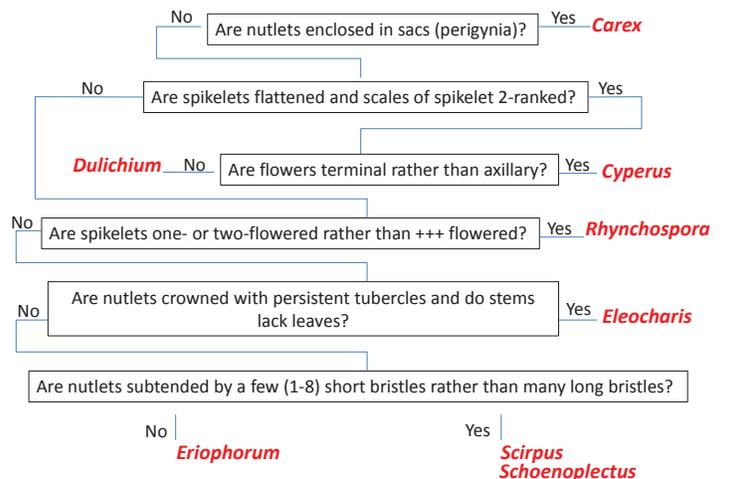
Sedge pistils with 2 carpels produce lens-shaped nutlets (*lenticular*) 

Sedge pistils with 3 carpels produce triangular-shaped nutlets (*trigonous*) 

Carex: Perigynium



Illustrations from Wetland Plants and Plant Communities of Minnesota and Wisconsin, Version 3.1 by Eggers and Reed (2014)



Modified from S. Galatowitsch, U of MN, 1994

Common Sedges

BLADDER SEDGE (*Carex intumescens*) FACW

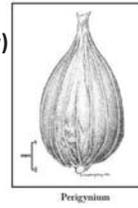


- Unmistakable
- Very large (bladder-like) perigynia

(Page 355) [Page numbers refer to *Wetland Plants and Plant Communities of MN and WI, Version 3.1* by Eggers and Reed (2014)].

Common Sedges

BOG SEDGE (*Carex oligosperma*) OBL

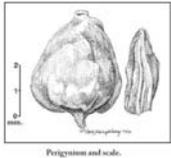


- Leaves wiry, less than 3 mm. wide
- Forms extensive stands

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Common Sedges

TUSSOCK SEDGE (*Carex stricta*) OBL



- Forms tussocks
- W-shaped leaf shape
- Base reddened, has pinnate fibers
- Stem diameter smaller than a pencil

(Pages 138-139)

Common Sedges

LAKE SEDGE (*Carex lacustris*) OBL

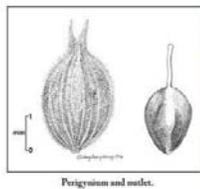


- Does not form tussocks
- W-shaped leaf shape
- Base reddened, has pinnate fibers
- Stem diameter larger than a pencil

(Pages 112-113)

Common Sedges

WOOLY SEDGE (*Carex pellita*) OBL

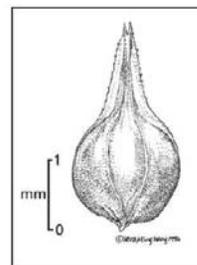


- Perigynia pubescent (e.g., woolly)
- Leaves flat, greater than 2.5 mm. wide
- Very common, good colonizer of disturbed sites (e.g., wetland restorations)

(Page 140)

Common Sedges

FOX SEDGE (*Carex vulpinoidea*) OBL



- "Foxtail" inflorescence
- Leaf sheaths with cross wrinkles
- Stems hard, stiff

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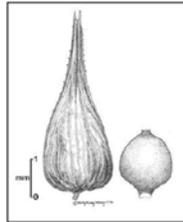
Common Sedges



STALK-GRAIN SEDGE

(*Carex stipata*)

OBL



Perigynium and nutlet.

- Leaf sheaths with cross wrinkles
- Stems soft, winged, deeply concave, three-angled

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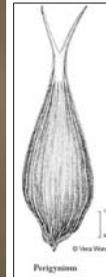
Common Sedges



SLOUGH SEDGE

(*Carex atherodes*)

OBL



Perigynium

- Large, robust sedge
- Perigynia with 2 widely spreading teeth
- Pubescent leaf sheaths

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Common Sedges

RETRORSE SEDGE

(*Carex retrorsa*)

OBL

- Lowest perigynia are backward (retro) facing



© New York Botanical Garden



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Common Sedges

PORCUPINE SEDGE

(*Carex hystericina*)

OBL



Perigynium



- Perigynia with ultra-long, straight beak with closed teeth, strongly nerved
- Lower spikelets pendant

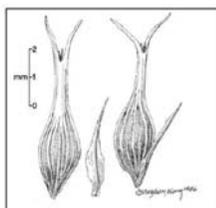
(Page 111)

Common Sedges

BOTTLEBRUSH SEDGE

(*Carex comosa*)

OBL



Perigynia and scale.



- Similar to Porcupine Sedge except teeth of perigynia are widely spreading

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