GOLDEN HILLS RC&D presents

SEDGE IDENTIFICATION

Online class via Zoom

Monday, March 1

7:00-8:00pm

Learn how to identify common species in the genus Carex (sedges) with Dr. Tom Rosburg

Pre-registration required. $5 registration fee. Learn more and sign up at

goldenhillsrcd.org/plantID

Open to the public. Project made possible through a grant from Gilchrist Foundation

GOLDEN HILLS RESOURCE CONSERVATION & DEVELOPMENT

GILCHRIST FOUNDATION

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Carex in the family Cyperaceae

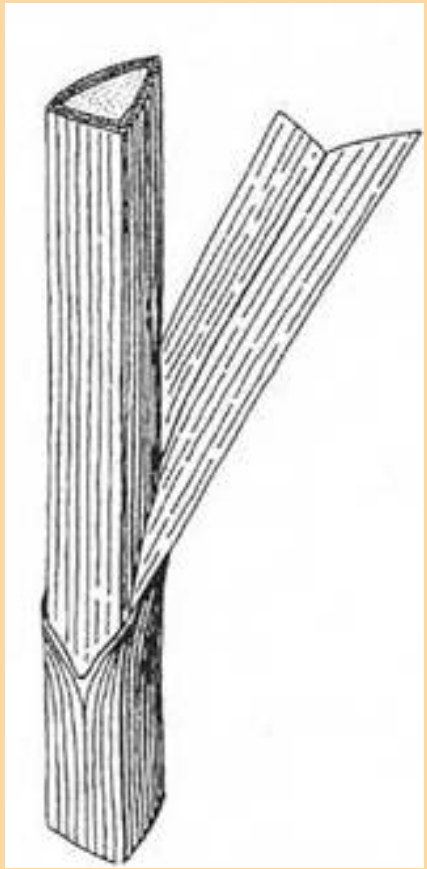
Cyperaceae

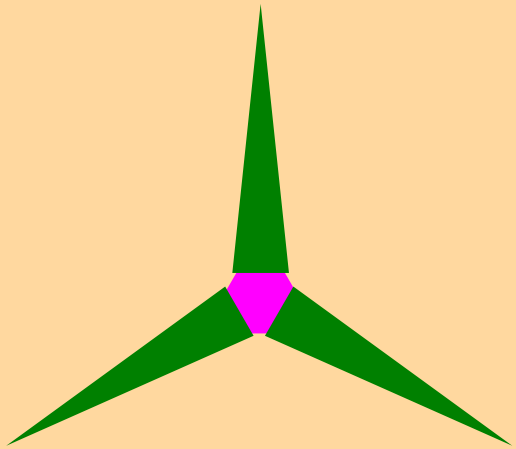
- usually triangular stems (trigonous)

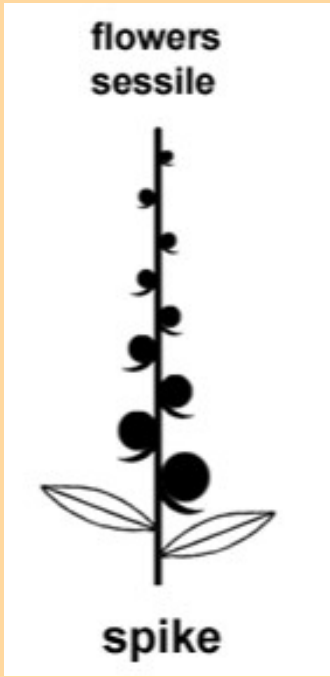
- leaves linear, entire, parallel venation
- petiole → closed leaf sheaths
- leaves often three ranked
- usually weakly developed ligule

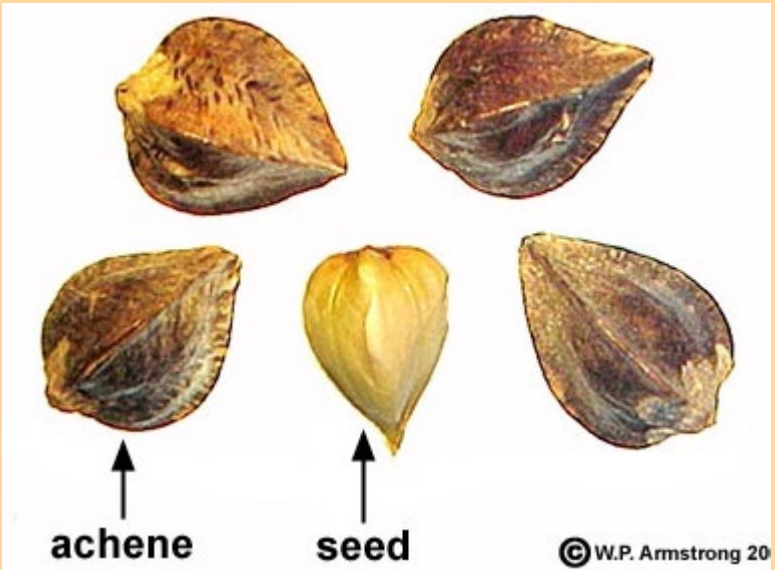
- flowers mostly bisexual (some unisexual)
- flowers reduced, perianth modified
- floral bracts = scales
- flowers in spikelets (primary inflores)
- no nectar

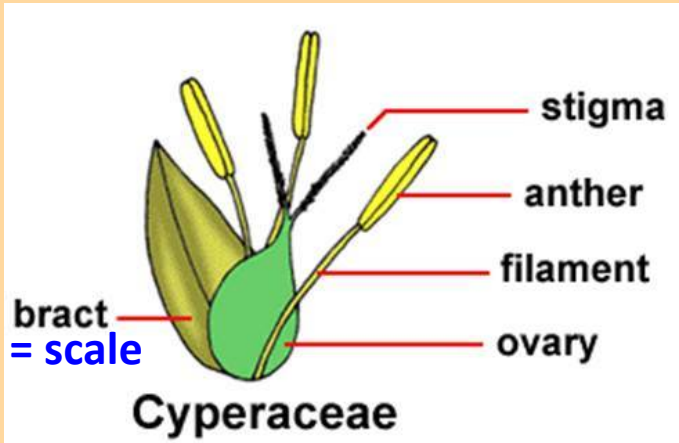
- fruit an achene











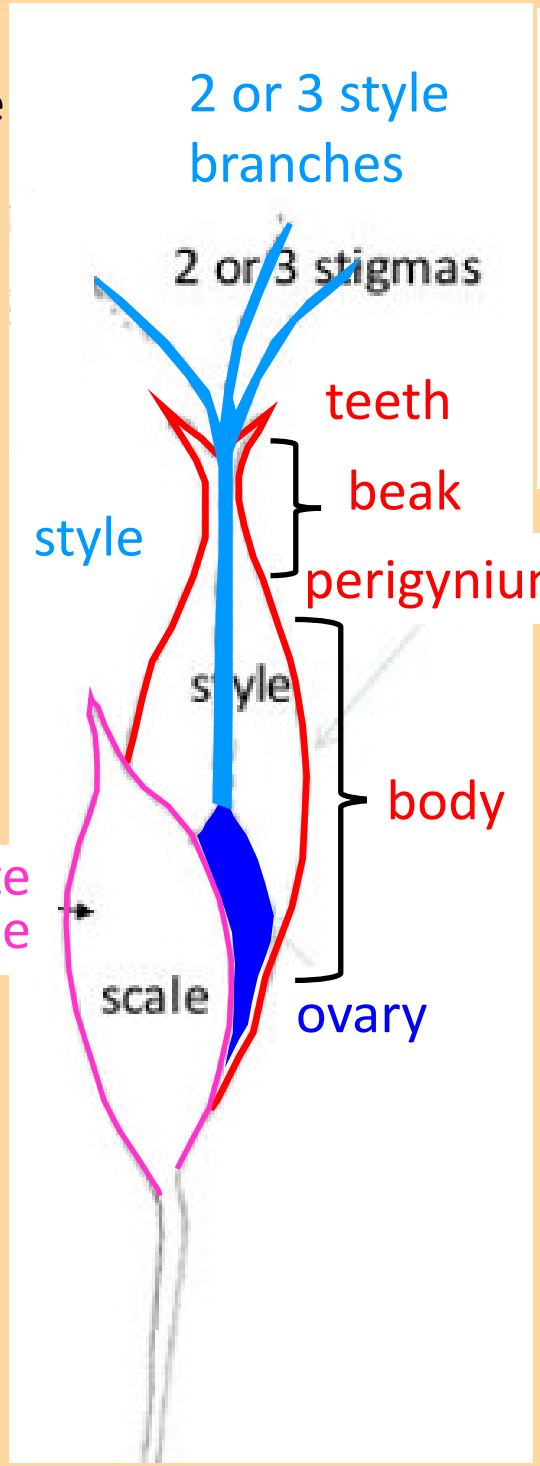
Characteristics of *Carex*

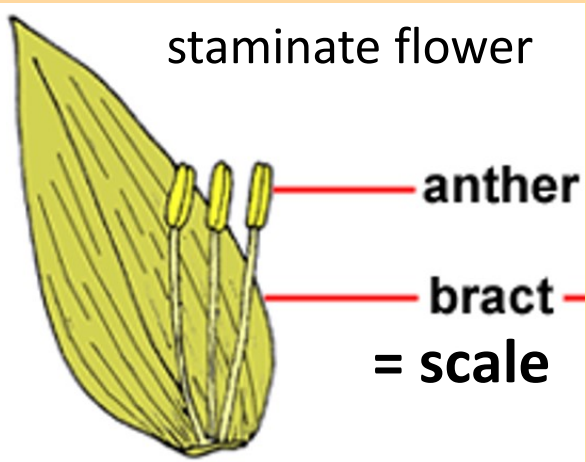
Carex

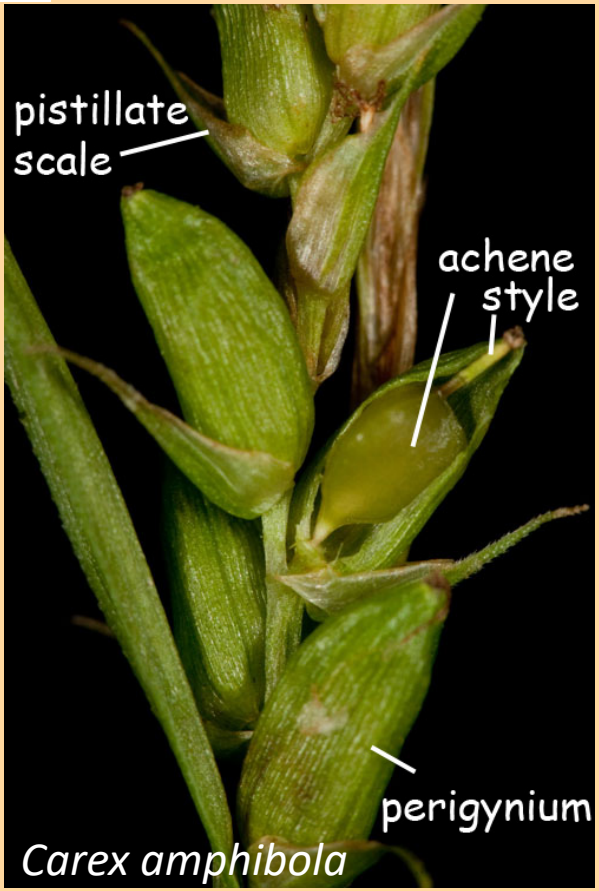
- stems usually trigonous, sometimes terete

- leaves basal and cauline (some only basal)
- ligule mostly fused to the leaf blade

- flowers unisexual
- pistillate spikelets reduced to one floret
- 1-flowered spikelets in **spikes**
- pistillate flowers subtended by two bracts
  * outer → scale
  * inner → **perigynium** (enclosed sac)
- perianth absent







Characteristics of *Carex* – factors for forming basic groups

1-Number of carpels in the ovary, number of style branches (stigma), shape of perigynia

two (bifid); flat, lens-shaped (biconvex, planoconvex)

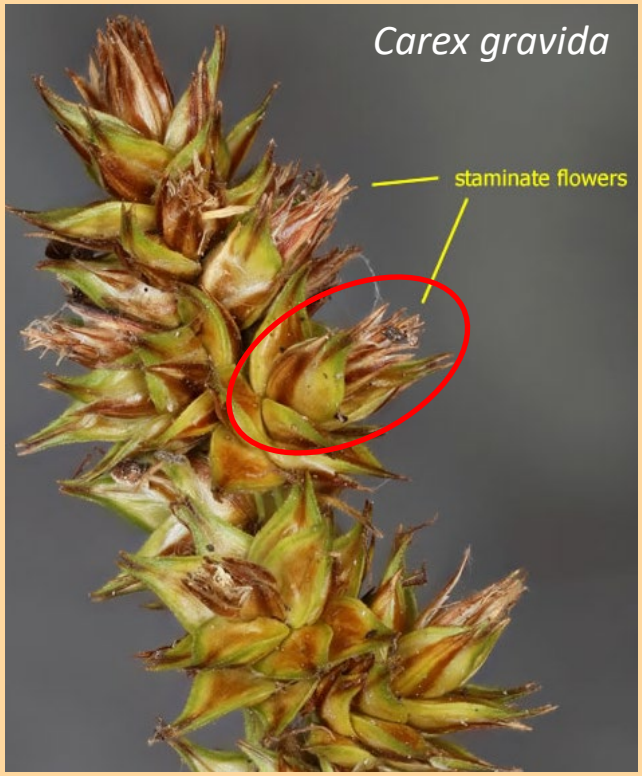
three (trifid); 3-sided or round (trigonous)

2-Perigynia surface, glabrous or pubescent

3-Sexuality of spikes, generally and the terminal spike specifically

all bisexual

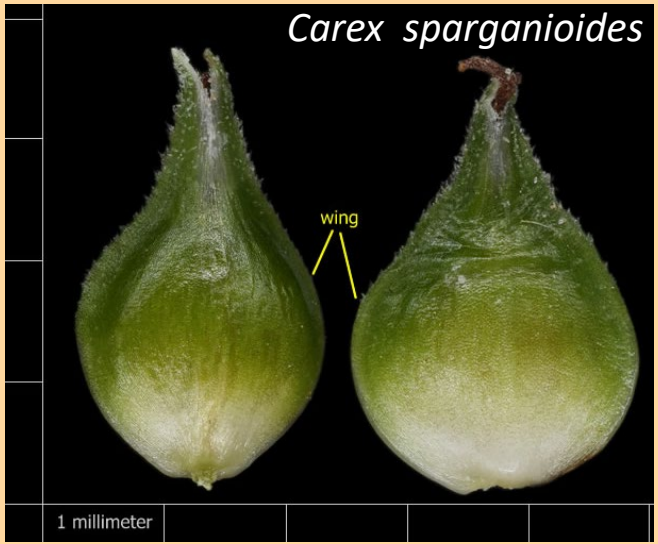
Carex muehlenbergii



bisexual & unisexual

all unisexual

4-Perigynia with or without teeth at the beak apex

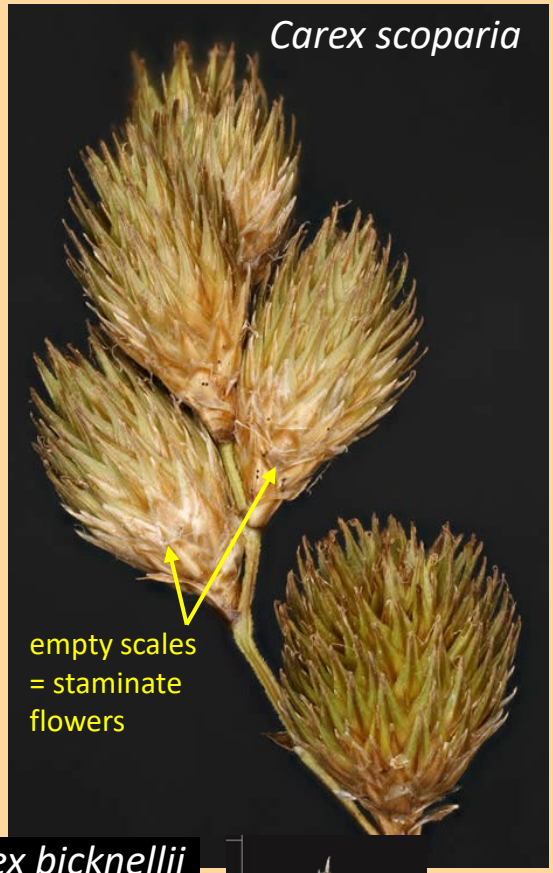


5-Gender of the florets in the top position of the terminal spike, or for bisexual spikes

male (staminate), unisexual

male (androgynous), bisexual

female (gynecandrous), bisexual



6-Perigynia width

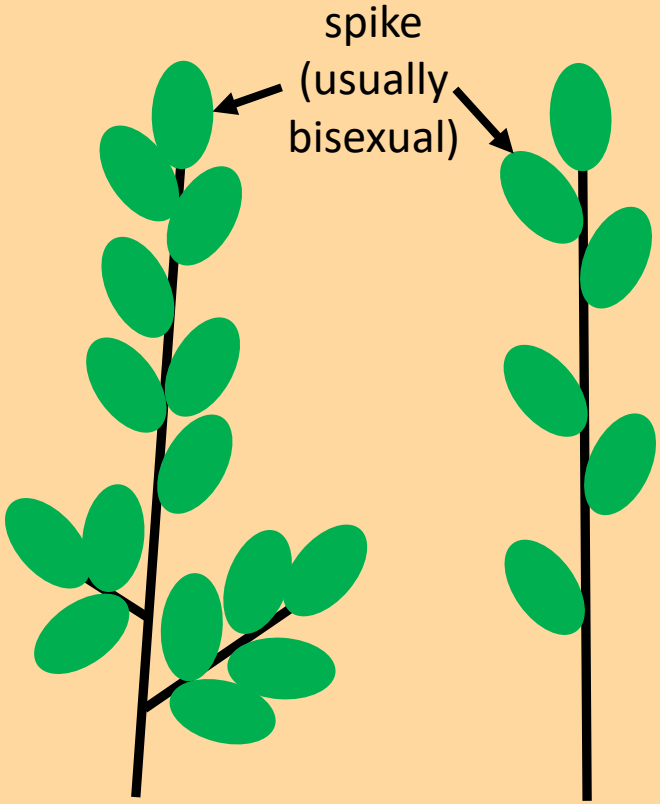
< 2 mm

> 2 mm

Carex lupulina

7-Lower portion of tertiary inflorescence with or without branches

inflorescence with some branches (compound)

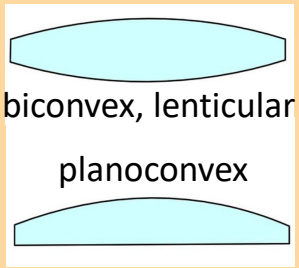


24 species of *Carex* you can learn to identify

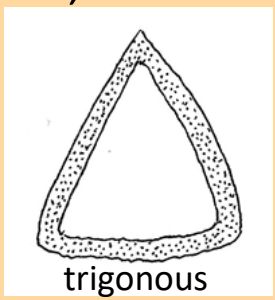
8 main groups based on 3 factors
- A. number of styles/stigmas (or perigynia shape) → 2 or 3
- B. sexuality of spikes (terminal) → bisexual or unisexual
- C. gender of florets at top of terminal spike → ♂ or ♀

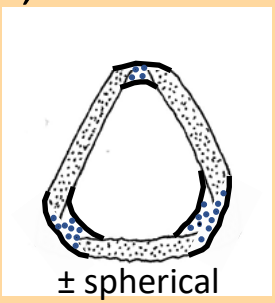
Carex vulpinoidea

11 species
<u>biconvex, planoconvex</u>
2, bisexual, male
2, bisexual, female
2, unisexual, male
2, unisexual, female



13 species
<u>trigonous, ± spherical</u>
3, bisexual, male
3, bisexual, female
3, unisexual, male
3, unisexual, female





Carex davisii

2, bisexual, male
branched inflorescence – *C. conjuncta, C. gravida, C. vulpinoidea*
unbranched inflorescence – *C. aggregata, C. gravida, C. rosea*

2, bisexual, female
perigynia < 2 mm wide – *C. cristatella, C. molesta, C. tribuloides*
perigynia > 2 mm wide – *C. bicknellii, C. brevior, C. molesta*

2, unisexual, male – *C. haydenii*

2, unisexual, female – none

2, bisexual, male

branched inflorescence – *C. conjuncta, C. gravida, C. vulpinoidea*

unbranched inflorescence – *C. aggregata, C. gravida, C. rosea*

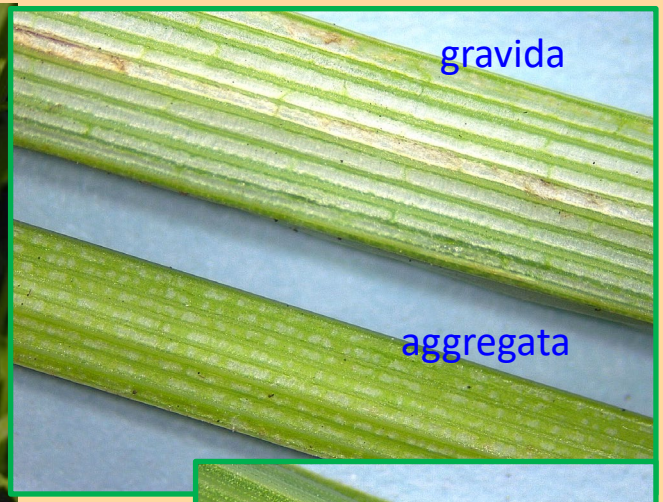
C. conjuncta soft fox sedge

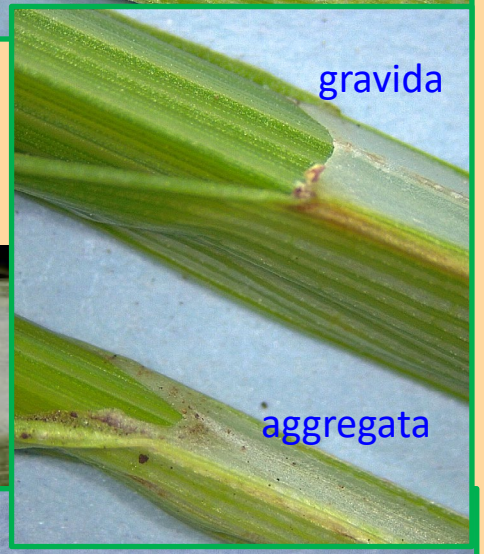
C. vulpinoidea brown fox sedge

2, bisexual, male

branched inflorescence – *C. conjuncta, C. gravida, C. vulpinoidea*

unbranched inflorescence – *C. aggregata, C. gravida, C. rosea*





C. gravida heavy sedge

C. aggregata clustered sedge

2, bisexual, male unbranched inflorescence – *C. rosea*

C. rosea
curly-style wood sedge

2, unisexual, male – *C. haydenii*

C. haydenii
Hayden's sedge

2, bisexual, female

perigynia < 2 mm wide – *C. cristatella, C. molesta, C. tribuloides*

perigynia > 2 mm wide – *C. bicknellii, C. brevior, C. molesta*

C. cristatella crested sedge

C. tribuloides blunt broom sedge

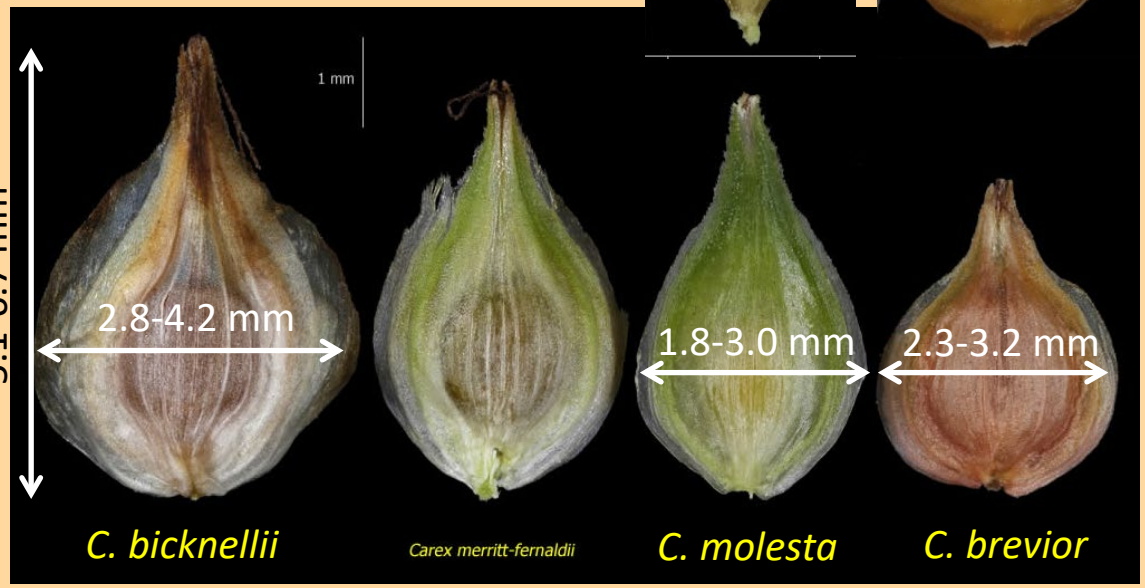
2, bisexual, female

perigynia < 2 mm wide – *C. cristatella, C. molesta, C. tribuloides*

perigynia > 2 mm wide – *C. bicknellii, C. brevior, C. molesta*

C. molesta
field oval sedge

C. bicknellii
Bicknell's sedge



C. brevior
plains oval sedge

24 species of *Carex* you can learn to identify

3, bisexual, male – *C. jamesii*

3, bisexual, female – *C. davisii, C. frankii*

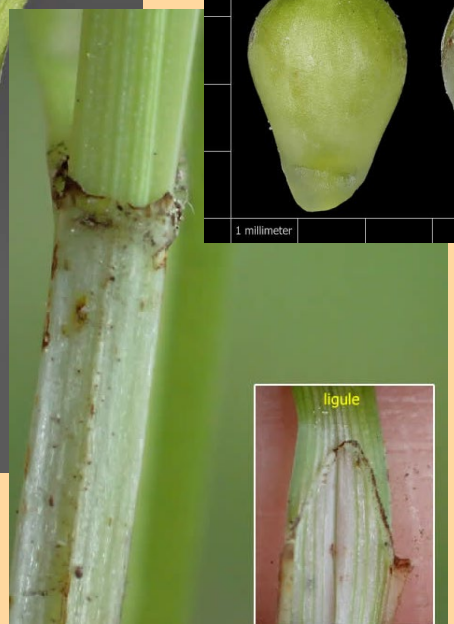
3, unisexual, male
glabrous, no beak teeth – *C. blanda, C. grisea*
glabrous, beak teeth – *C. frankii, C. hystericina, C. lupulina, C. sprengelii*

3, unisexual, male
glabrous/puberulent, no beak teeth – none
glabrous/puberulent, beak teeth – *C. grayi, C. laeviconica*

3, unisexual, male
pubescent, no beak teeth – none
pubescent, beak teeth – *C. pellita, C. pensylvanica, C. trichocarpa*

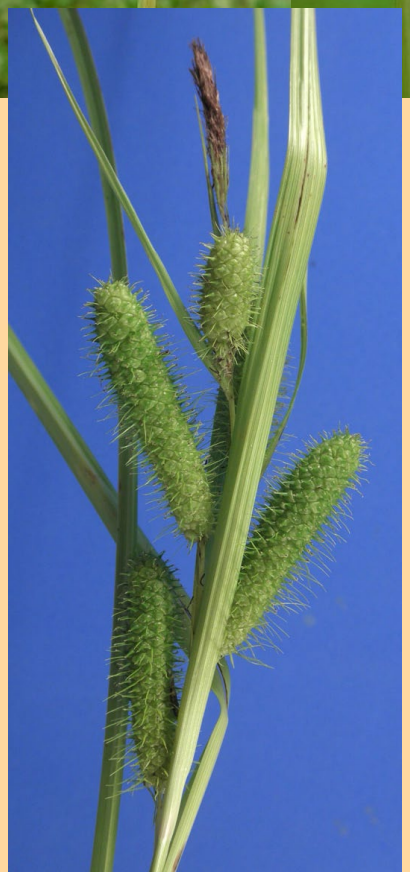
3, unisexual, female – none

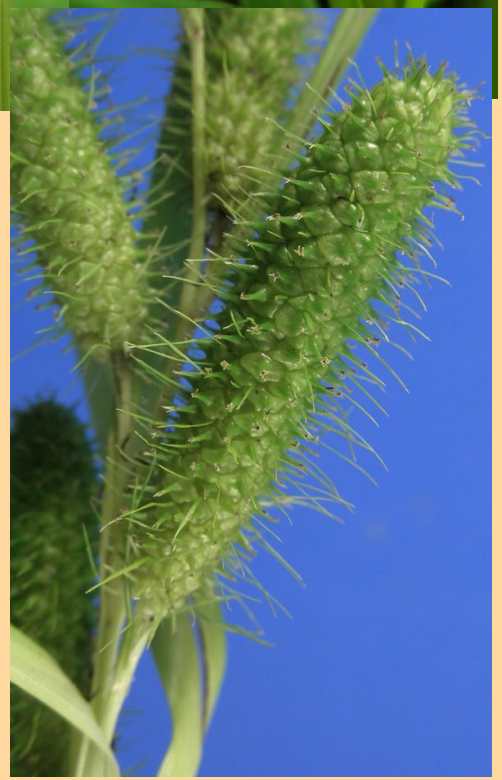
C. jamesii
James' sedge



3, bisexual, female – *C. davisii, C. frankii*

C. davisii
Davis' sedge

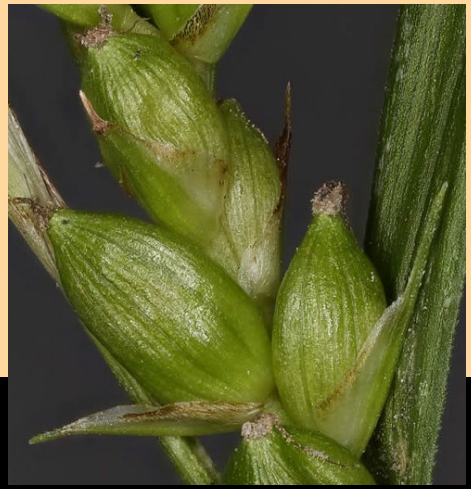




C. frankii Franks' sedge

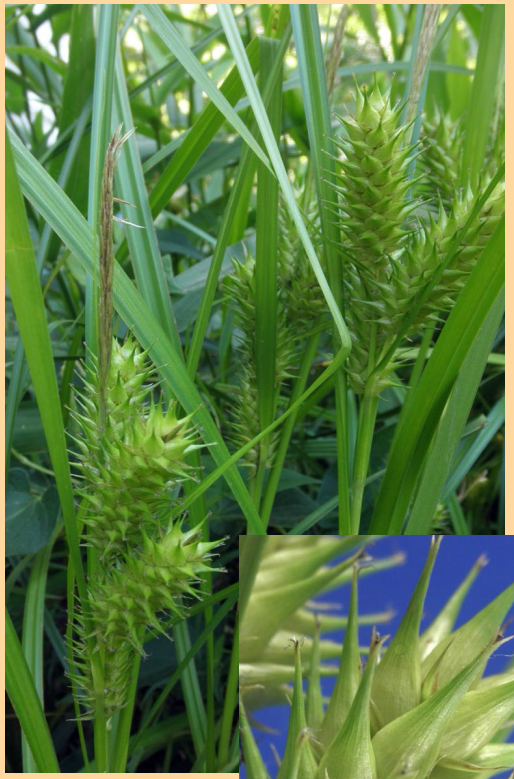
3, unisexual, male glabrous, no beak teeth – *C. blanda, C. grisea*

C. blanda
woodland sedge

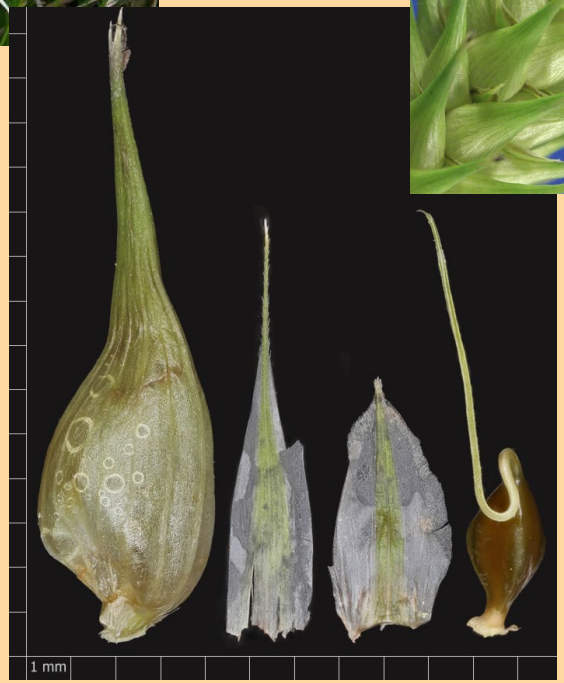


C. grisea wood gray sedge

3, unisexual, male glabrous, beak teeth – *C. frankii, C. hystericina, C. lupulina, C. sprengelii*



C. hystericina porcupine sedge



C. lupulina hop sedge

C. sprengelii Sprengel's sedge

3, unisexual, male glabrous/puberulent, beak teeth – *C. grayi, C. laeviconica*

C. grayi Gray's sedge

C. laeviconica plains slough sedge

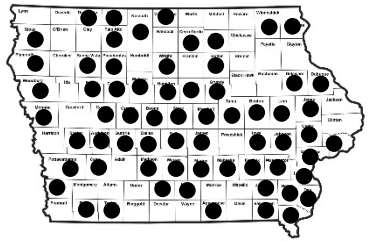
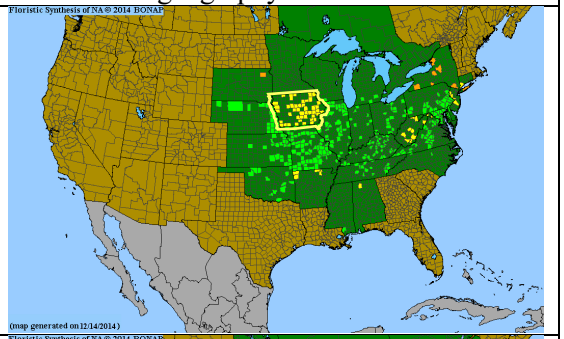
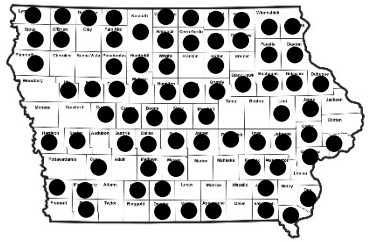
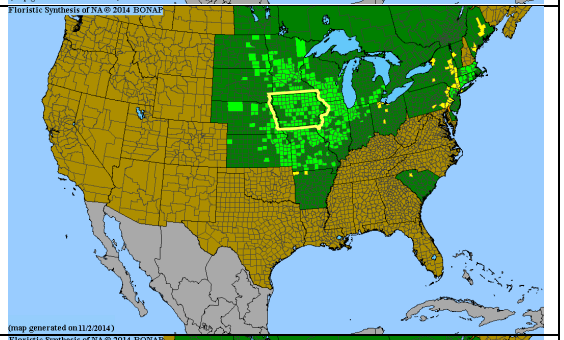
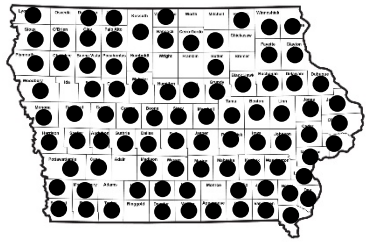
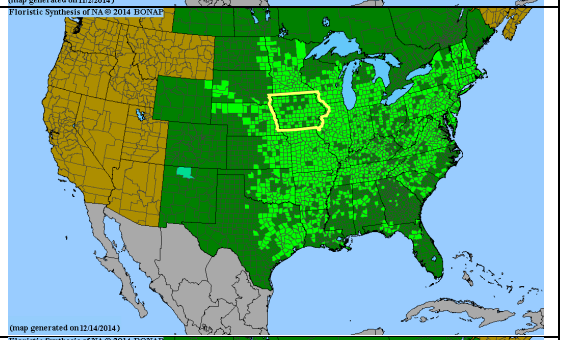
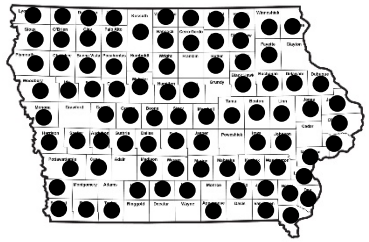
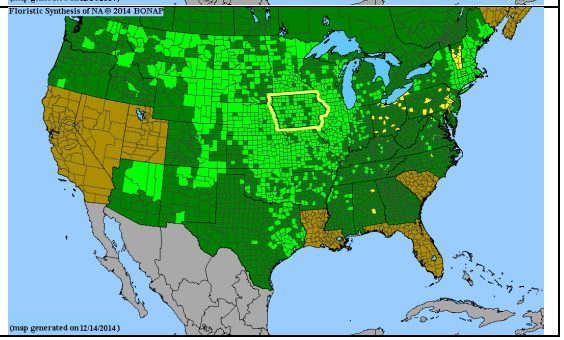
3, unisexual, male pubescent, beak teeth – *C. pellita, C. pensylvanica, C. trichocarpa*

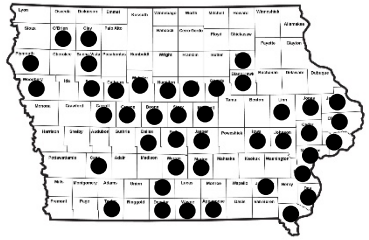
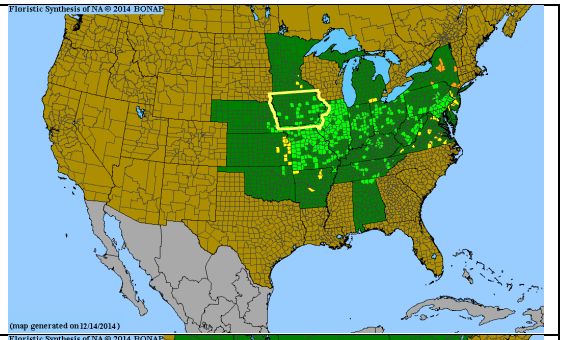
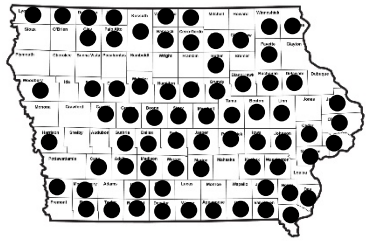
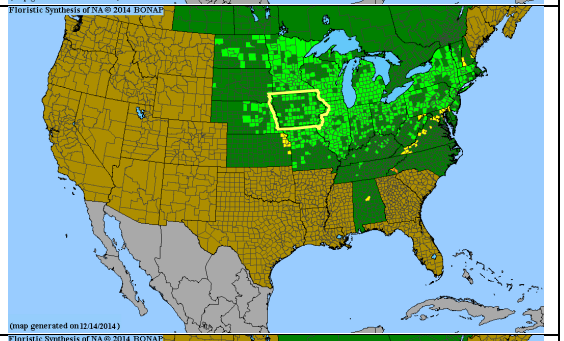
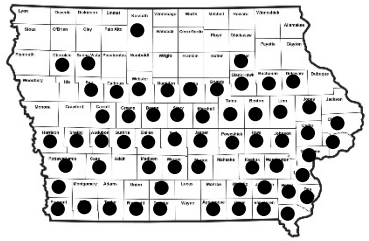
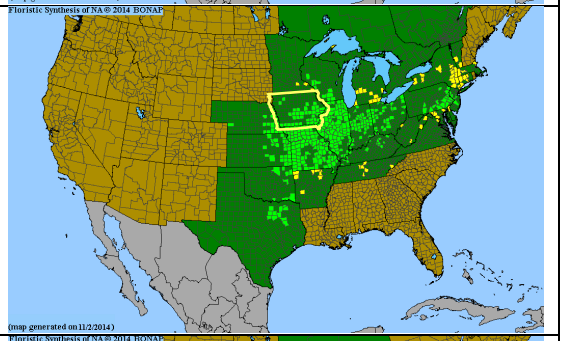
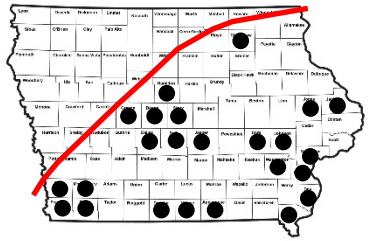
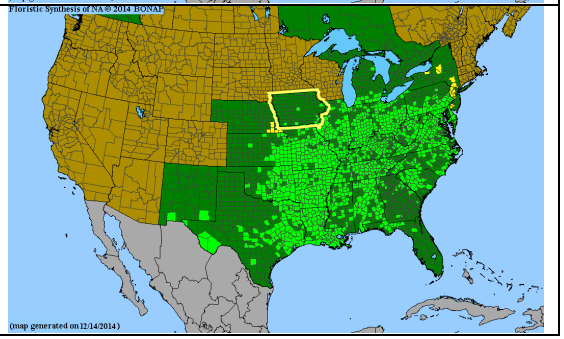
C. pellita
woolly sedge

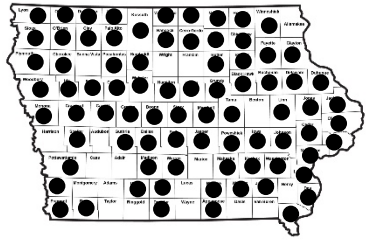
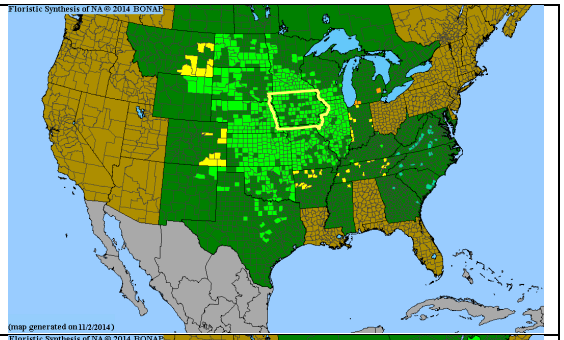
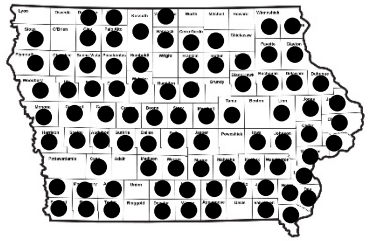
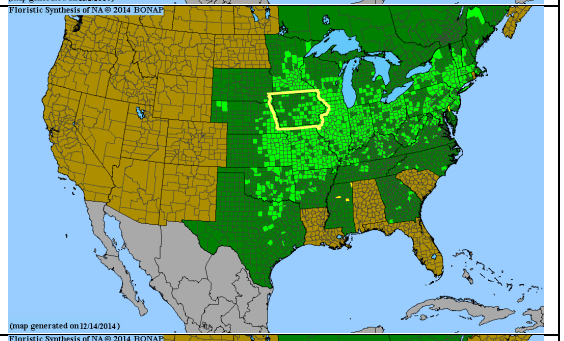
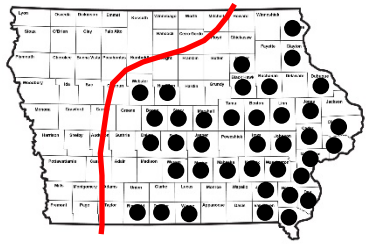
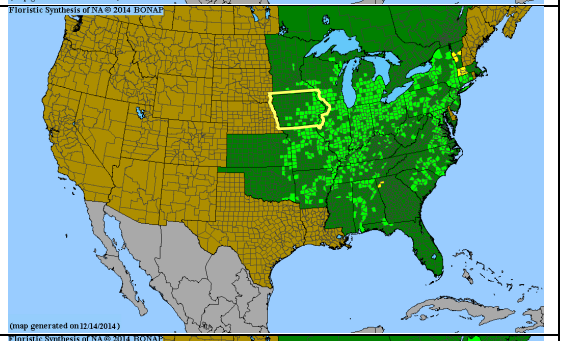
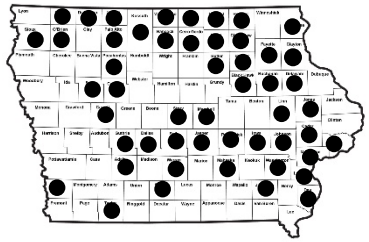
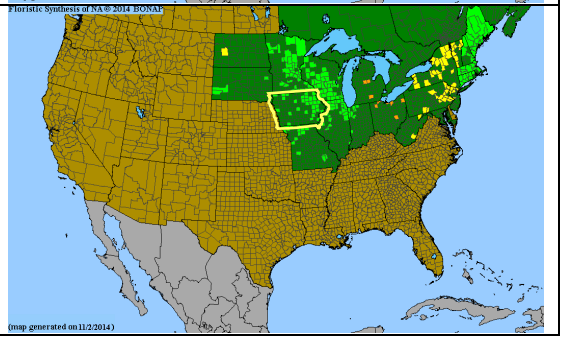
C. pensylvanica
PA sedge

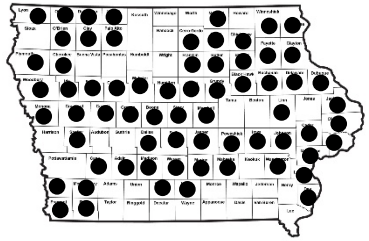
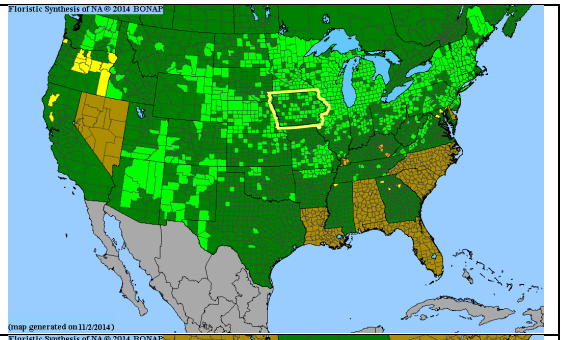
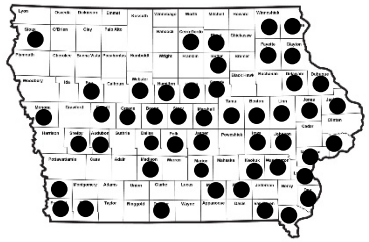
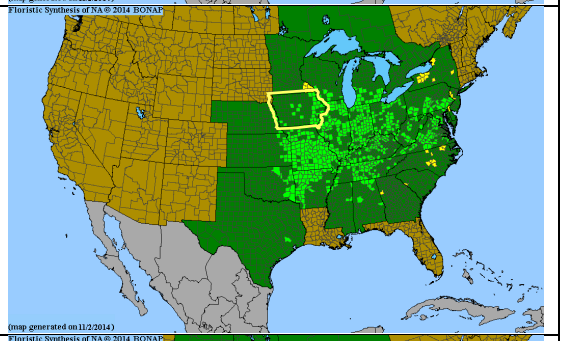
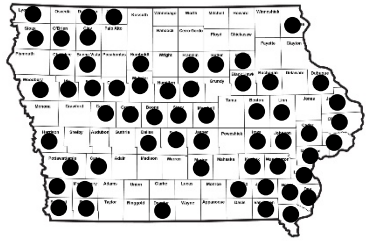
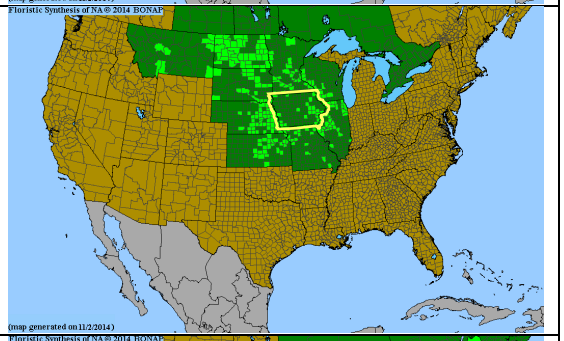
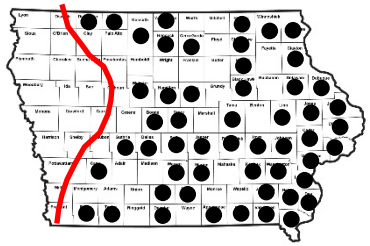
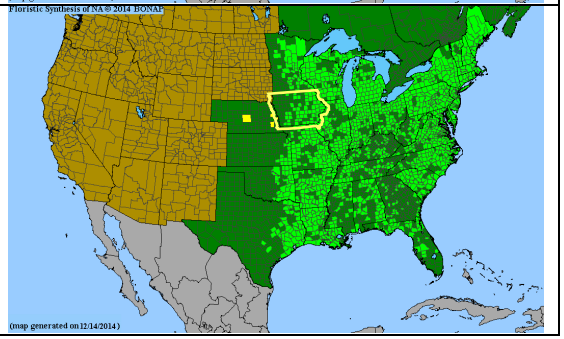
C. trichocarpa
hairy-fruit sedge

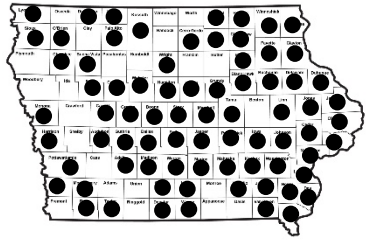
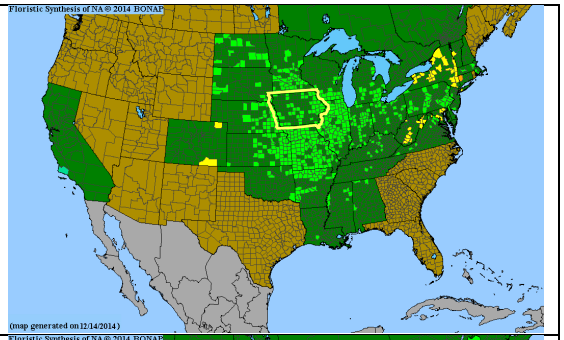
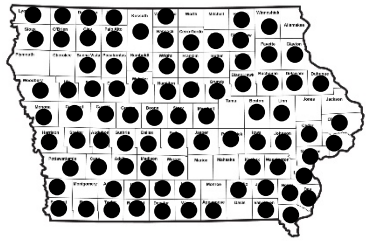
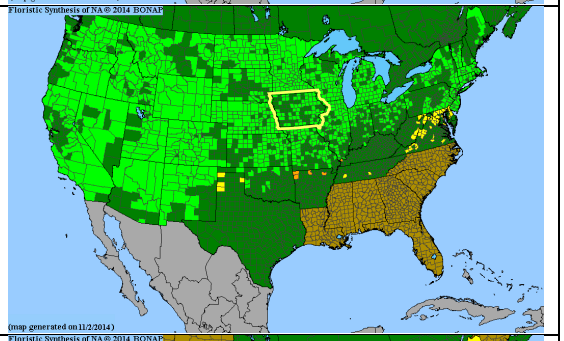
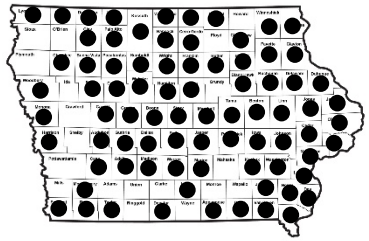
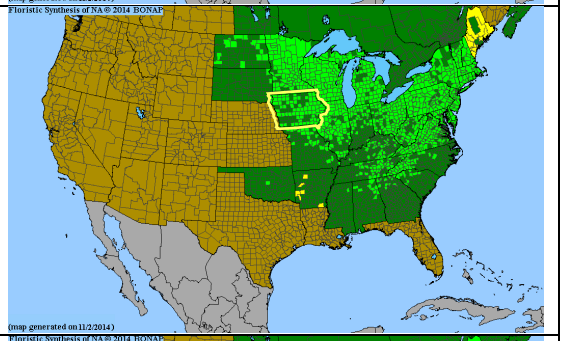
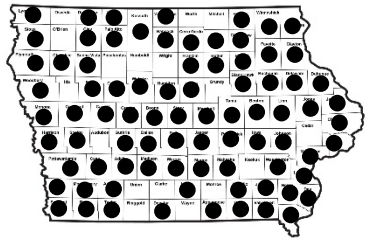
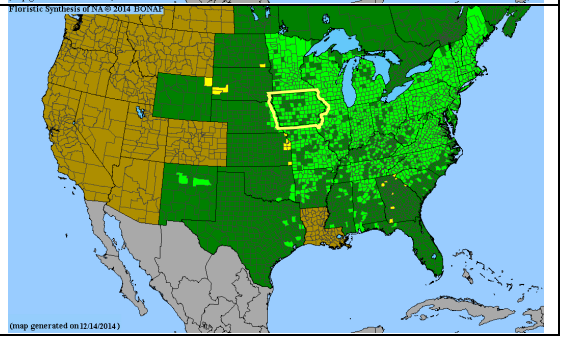
Table 1. Iowa *Carex* Reference Table - 24 common species. Data compiled by Dr. Thomas Rosburg (see References for sources).

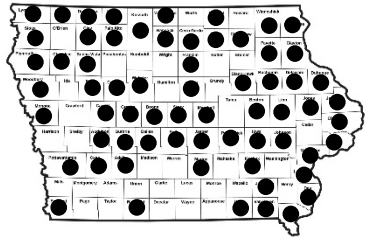
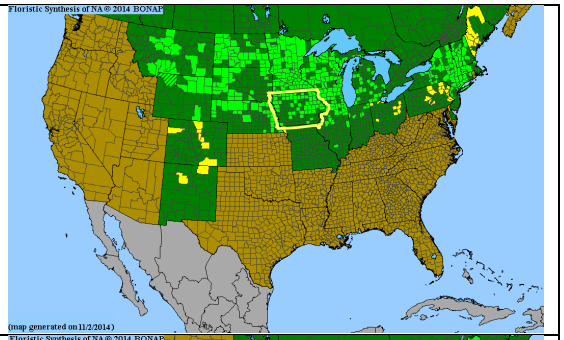
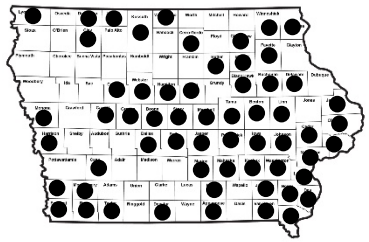
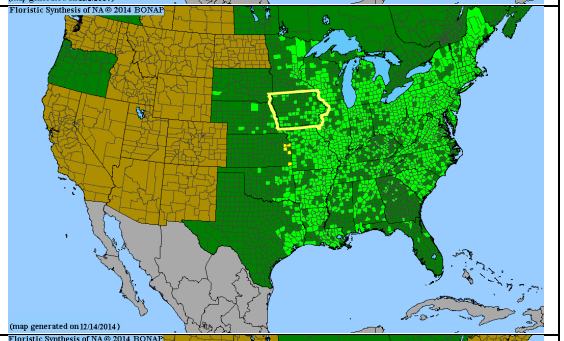
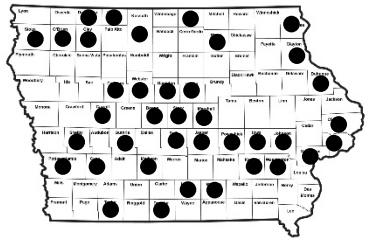
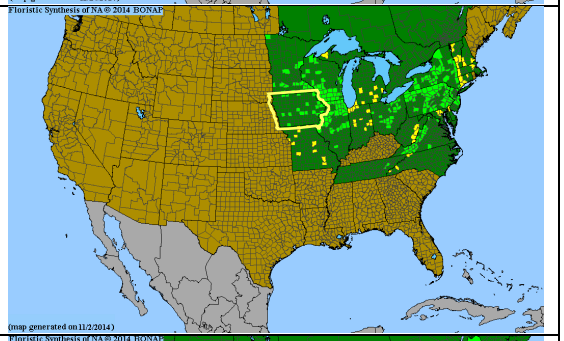
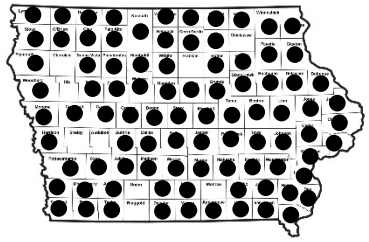
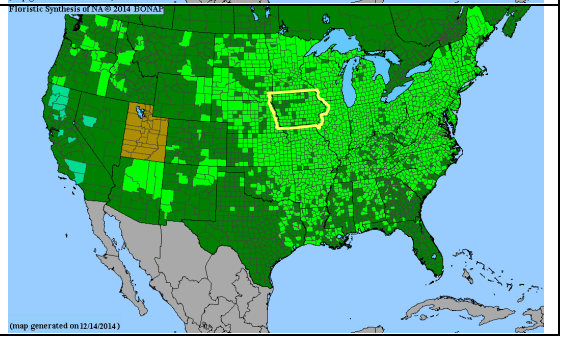
Flora of North America	Eilers and Roosa 1994	Habitat	Iowa Biogeography (N&Z)	BONAP Biogeography
Carex aggregata Status: Special Concern Iowa CC: 5 to 2 H	*Carex aggregata* clustered sedge <u>similar species:</u> *C. gravida* *C. cephaloidea*	lowland and upland woodland and forest; mesic meadows and grassland		
Carex bicknellii Status: native Iowa CC: 10 to 7 M	*Carex bicknellii* Bicknell's sedge <u>similar species:</u> *C. brevior* *C. molesta* *C. festucacea* *C.. suberecta*	dry-mesic to wet-mesic prairie and savanna, grassy open woodlands, deep to thin, rocky soils		
Carex blanda Status: native Iowa CC: 2 to 3 H	*Carex blanda* *= C. laxiflora* var. *blanda* woodland sedge <u>similar species:</u> *C. albursina* *C. grisea* *C. gracilescens*	dry-mesic to wet-mesic woodland and forests, woodland and forest edges, mesic prairie and savanna, grasslands, pastures, roadsides, early successional habitats		
Carex brevior Status: native Iowa CC: 4 to 4 H	*Carex brevior* plains oval sedge <u>similar species:</u> *C. molesta* *C. bicknellii* *C. festucacea* *C. suberecta*	dry to mesic prairie, savannas and open woodland, pastures, roadsides, early successional grassland		

Carex conjuncta Status: native Iowa CC: 7 to 5 H	*Carex conjuncta* soft fox sedge similar species: *C. stipata* *C. laevivaginata*	floodplain forests, woodlands, and prairies; alluvial soils, wet meadows, shaded streambanks		
Carex cristatella Status: native Iowa CC: 5 to 4 M	*Carex cristatella* crested sedge similar species: *C. bebbii* *C. tribuloides* *C. crawfordii* *C. projecta* *C. scoparia*	wet prairies, open floodplain woodlands, sedge meadows, streambanks, shallow sloughs, disturbed alluvial soils, ditches		
Carex davisii Status: native Iowa CC: 4 to 4 H	*Carex davisii* Davis' sedge similar species: *C. gracillima* *C. grisea*	mesic prairie, woodland and forest edges, woodland and forest canopy gaps, alluvial meadows, woodland trails, old fields		
Carex frankii Status: native Iowa CC: 8 to 5 L	*Carex frankii* Frank's sedge similar species: *C. squarrosa* *C. typhina*	shallow marshes, wet seeps, alluvial soils, open floodplain woodlands, shorelines, ditches, wet old fields		

Carex gravida Status: native Iowa CC: 1 to 3 H	*Carex gravida* = *C. lunelliana* heavy sedge <u>similar species:</u> *C. aggregata* *C. cephaloidea* *C. sparganioides*	dry to mesic prairie, sand and gravel prairies, pastures, savannas and open woodlands, roadsides, old fields		
Carex grisea Status: native Iowa CC: 4 to 4 H	*Carex amphibola* var. *turgida* wood gray sedge <u>similar species:</u> *C. blanda* *C. oligocarpa* *C. conoidea*	floodplain and mesic upland forests and woodlands, shaded roadsides		
Carex grayi Status: native Iowa CC: 7 to 7 H	*Carex grayi* Gray's sedge <u>similar species:</u> *C. intumescens* *C. lupulina*	floodplain woodlands and forests, swamps, shaded streambanks and wet seeps		
Carex haydenii Status: native Iowa CC: 5 to 7 H	*Carex haydenii* Hayden's sedge <u>similar species:</u> *C. stricta* *C. aquatilis* *C. emoryi*	mesic and wet-mesic prairie, sedge meadows, open floodplain woodlands, wet sandy soils		

Carex hystericina Status: native Iowa CC: 5 to 4 H	*Carex hystericina* porcupine sedge <u>similar species:</u> *C. lurida* *C. comosa* *C. vesicaria*	shallow marshes, wet prairies, fens, open floodplain forests and woodlands, sedge meadows, calcareous seeps, ditches		
Carex jamesii Status: native Iowa CC: 6 to 4 M	*Carex jamesii* James' sedge <u>similar species:</u> *C. backii* *C. saximontana*	floodplain and upland forests, alluvial soils, open woodland, pasture woodlands, forest and woodland trails, shaded to semi-shaded disturbed sites		
Carex laeviconica Status: native Iowa CC: 6 to 5 M	*Carex laeviconica* = *C. atherodes* var. *longo-lanceolata* = *C. trichocarpa* var. *deweyi* plains slough sedge <u>similar species:</u> *C. atherodes* *C. trichocarpa*	sedge meadows and swales, wet-mesic prairie, shallow marshes, sloughs, open floodplain woodlands, shorelines and streambanks, ditches		
Carex lupulina Status: native Iowa CC: 6 to 5 H	*Carex lupulina* hop sedge <u>similar species:</u> *C. grayi* *C. lupuliformis*	floodplain woodlands and forests, wet prairies, prairie swales, sedge meadows, shorelines, swamps, streambanks, ditches		

Carex molesta Status: native Iowa CC: 2 to 3 M	*Carex molesta* field oval sedge <u>similar species:</u> *C. brevior* *C. bicknellii* *C. suberecta* *C. festucacea*	dry to mesic prairies, savanna, pastures, upland woodland, old fields, disturbed wet soils, roadsides		
Carex pellita Status: native Iowa CC: 4 to 3 H	*Carex lanuginosa* = *C. lasiocarpa* var. *latifolia* woolly sedge <u>similar species:</u> *C. lasiocarpa*	wet to mesic prairies, sedge meadows, wet seeps, swamps, open floodplain woodlands, shallow shorelines, streambanks, wet old fields, roadsides, favors disturbed habitats		
Carex pensylvanica Status: native Iowa CC: 6 to 5 H	*Carex pensylvanica* Pennsylvania sedge <u>similar species:</u> *C. pedunculata* *C. inops*	upland forest and woodland, savannas, bluffs, hill prairies		
Carex rosea Status: native Iowa CC: 6 to 6 M	*Carex convoluta* = *C. flaccidula* = *C. rosea* var. *pusilla* curly style wood sedge rosy sedge <u>similar species:</u> *C. radiata* *C. retroflexa*	mesic upland forests and woodlands		

Carex sprengelii Status: native Iowa CC: 4 to 5 M	*Carex sprengelii* Sprengel's sedge <u>similar species:</u> *C. davisii* *C. gracillima*	dry-mesic to mesic open woodland and forest, mesic savanna		
Carex tribuloides Status: native Iowa CC: 3 to 3 H	*Carex tribuloides* blunt broom sedge <u>similar species:</u> *C. scoparia* *C. projecta* *C. crawfordii* *C. bebbii*	marshes, sedge meadows, swamps, open floodplain woodlands, wet prairies, bogs, seeps, shorelines, ditches		
Carex trichocarpa Status: native Iowa CC: 8 to 6 H	*Carex trichocarpa* hairy-fruited sedge <u>similar species:</u> *C. laeviconica* *C. atherodes*	wet seeps, prairie swales, fens, sedge meadows, streambanks, roadsides		
Carex vulpinoidea Status: native Iowa CC: 3 to 3 H	*Carex vulpinoidea* brown fox sedge <u>similar species:</u> *C. annectans*	open floodplain woodlands, swamps, wet to mesic prairies, prairie swales, sedge meadows, shorelines seeps, streambanks, ditches, early successional wetlands		

Fields in the *Carex* Reference Table
1-Currently accepted scientific name in Flora of North America. Iowa status. Iowa Coefficient of Conservatism.
General habitat codes (yellow → grassland, green → forest, blue → wetland, no shading → variable)
2-Nomenclature in Eilers and Roosa 1994 and synonyms. Common names. Similar species.
3-General habitat description
4-Iowa distribution and expected native range, based on Norris and Zager 2013
5-Biogeographical range in the United States according to BONAP (Kartesz 2015)

References

Eilers, L.J. and D.M. Roosa. 1994. The Vascular Plants of Iowa: An Annotated Checklist and Natural History. University of Iowa Press, Iowa City, IA
Hilty, J. 2002-2020. Illinois Wildflowers. https://www.illinoiswildflowers.info/index.htm
Kartesz, J.T. 2015. The Biota of North America Program (BONAP). North American Plant Atlas. http://bonap.net/napa. Chapel Hill, NC.
Norris, W. and S. Zager. 2001. A guide to the identification of sedges in the genus *Carex* (Iowa species).
Norris, W. and S. Zager. 2013. Distribution maps of the genus *Carex* in Iowa
Voss, E.G. and A.A. Reznicek. 2012. Field Manual of Michigan Flora. University of Michigan Press, Ann Arbor, MI.
Yatskievych, G. 1999. Steyermark's Flora of Missouri Volume 1. Missouri Department of Conservation, Jefferson City, MO and Missouri Botanical Garden Press, St. Louis MO.

CLASSIFICATION OF 24 COMMON SEDGES INTO BASIC GROUPS

Primary characteristics: Number styles/carpels **Sexuality of spikes (terminal)** **Gender of terminal florets**
Secondary characteristic: Inflorescence branching Perigynia width Perigynia surface Beak tip (teeth?)

2, bisexual, male, branched inflorescence – *C. conjuncta, C. gravida, C. vulpinoidea*
2, bisexual, male, unbranched inflorescence – *C. aggregata, C. gravida, C. rosea*

2, bisexual, female, perigynia < 2 mm wide – *C. cristatella, C. molesta, C. tribuloides*
2, bisexual, female, perigynia > 2 mm wide – *C. bicknellii, C. brevior, C. molesta*

2, unisexual, male – *C. haydenii*

2, unisexual, female NONE

==========

3, bisexual, male – *C. jamesii*

3, bisexual, female – *C. davisii, C. frankii*

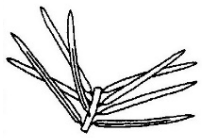
3, unisexual, male, perigynia glabrous, no beak teeth – *C. blanda, C. grisea*
3, unisexual, male, perigynia glabrous, beak teeth – *C. frankii, C. hystericina, C. lupulina, C. sprengelii*

3, unisexual, male, perigynia glabrous/puberulent, no beak teeth NONE
3, unisexual, male, perigynia glabrous/puberulent, beak teeth – *C. grayi, C. laeviconica*

3, unisexual, male, perigynia pubescent, no beak teeth NONE
3, unisexual, male, perigynia pubescent, beak teeth – *C. pellita, C. pensylvanica, C. trichocarpa*

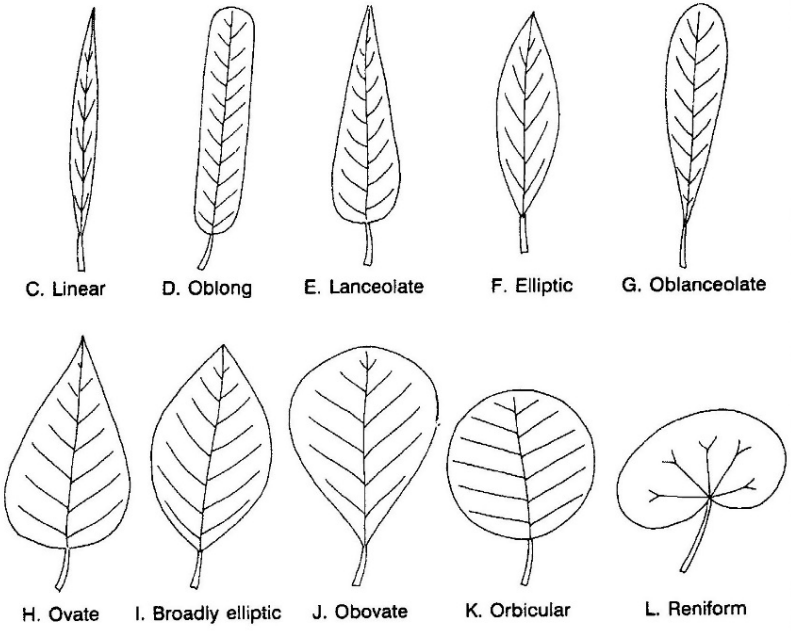
3, unisexual, female NONE

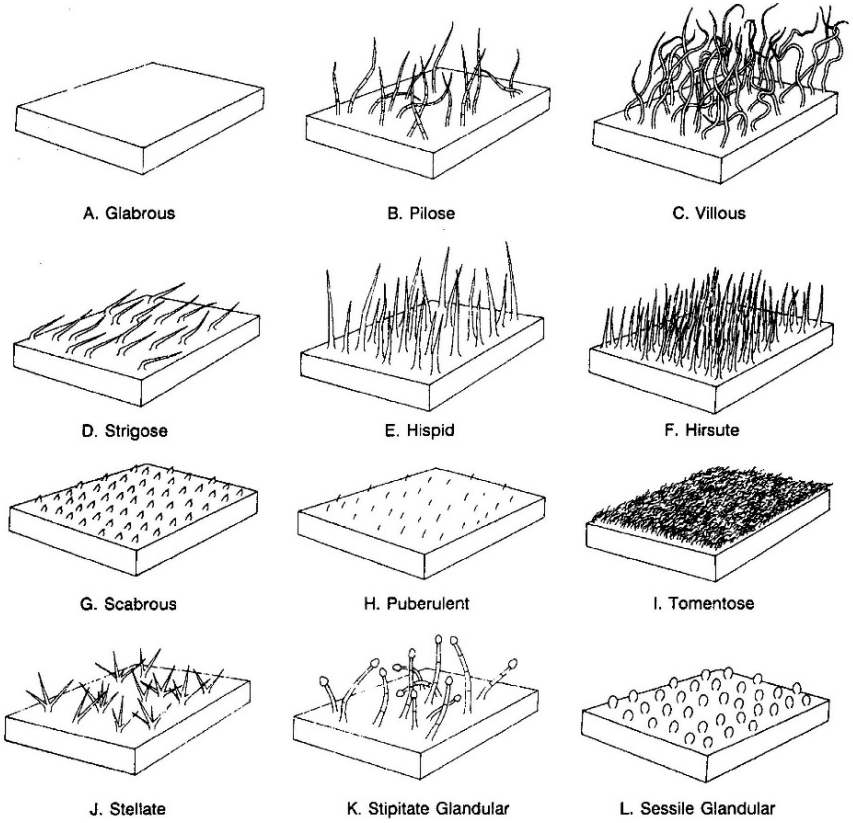
Plant Glossary

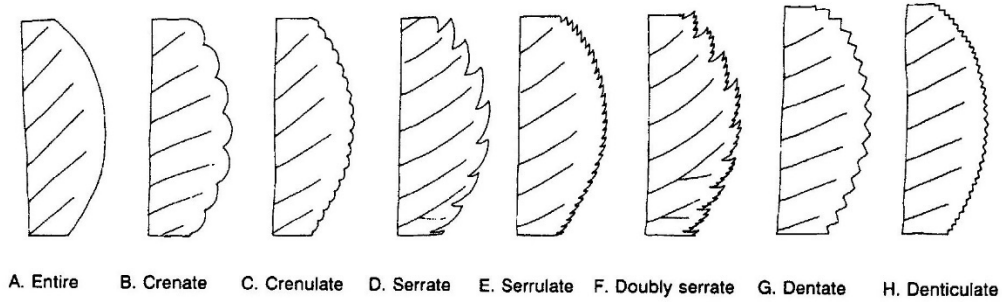


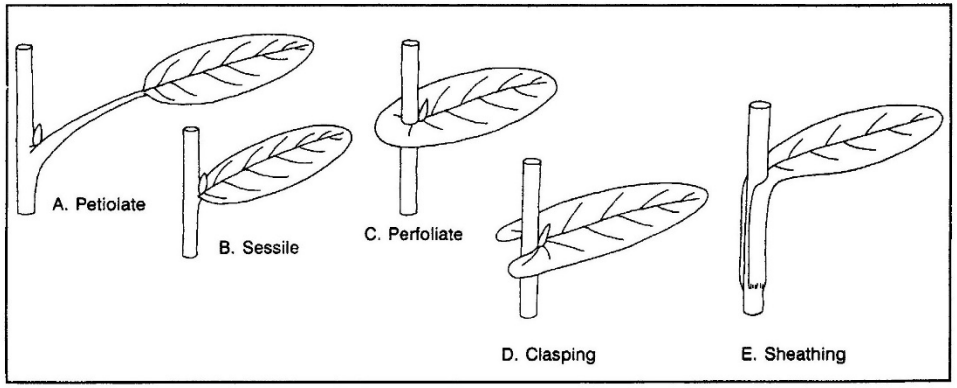
A. Needlelike

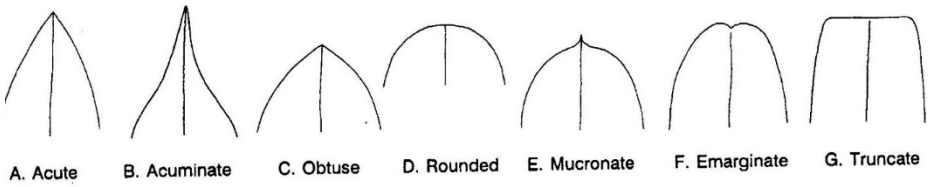
B. Scalelike

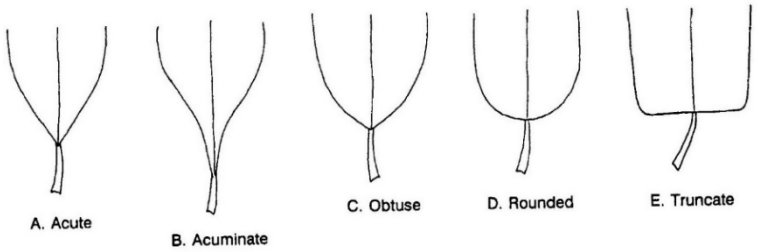


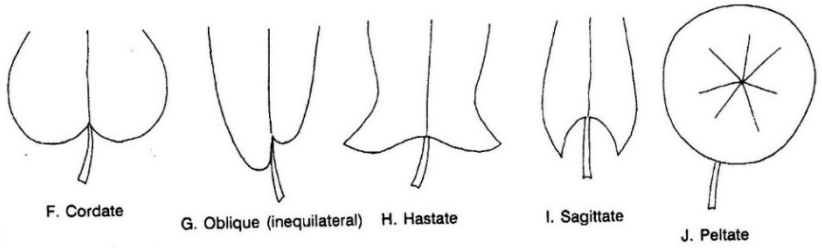


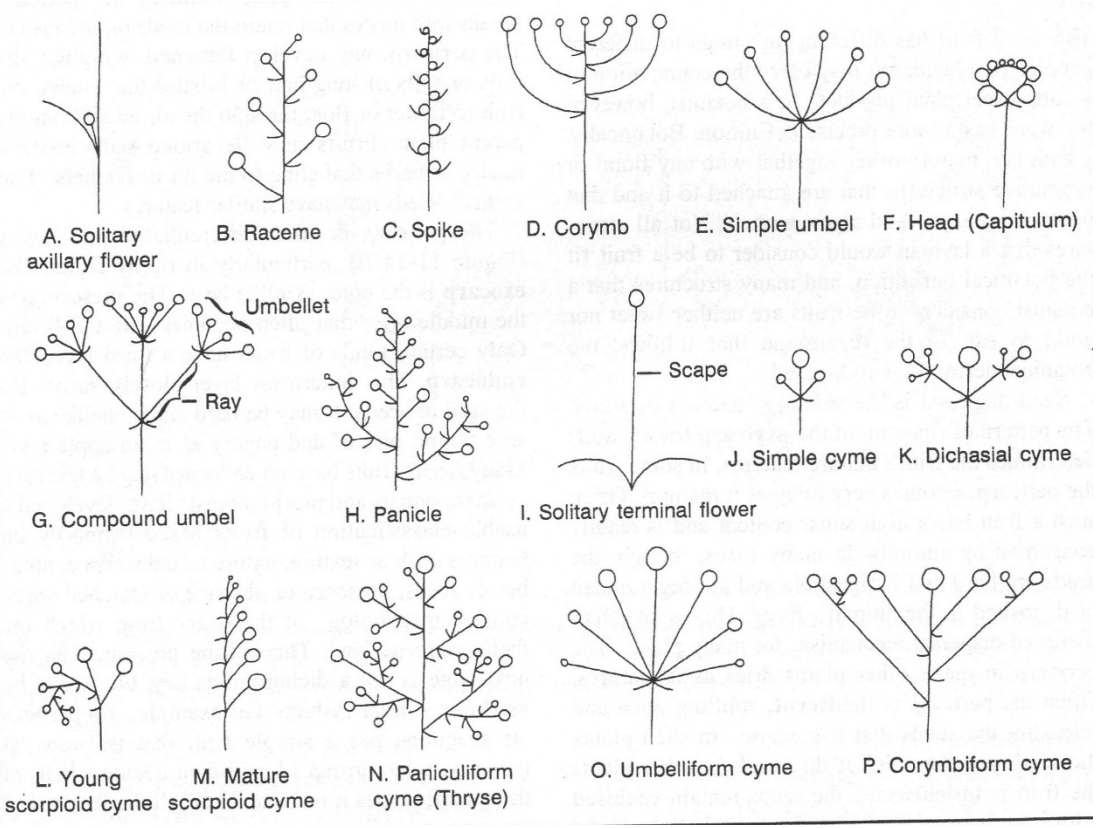


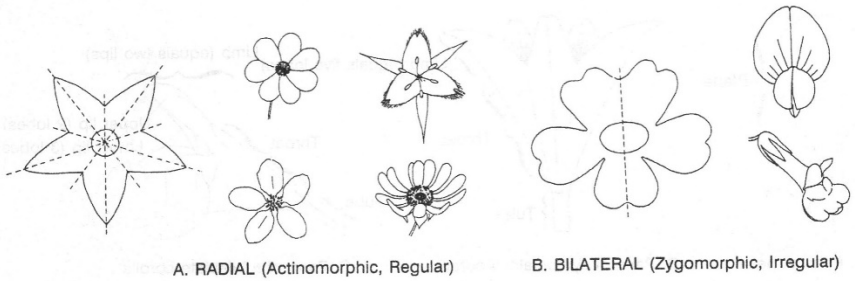


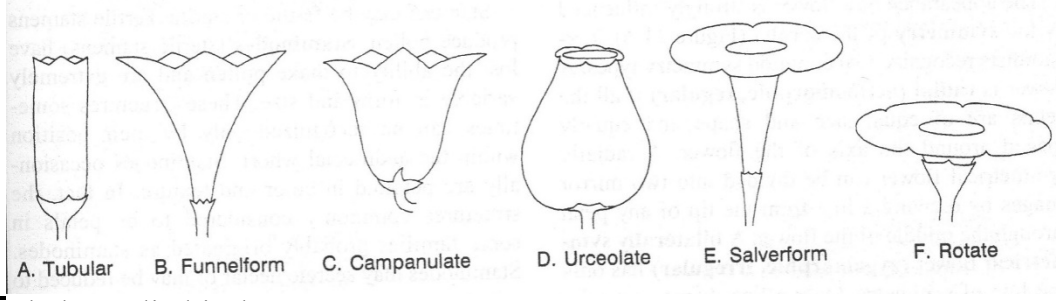












tubular=cylindrical

Reproductive Terms

Achene – a single seeded indehiscent dry fruit with the seed free from the pericarp except at the funicule (the stalk of an ovule attaching it to the placenta of the ovary)
Actinomorphic – radially symmetrical, regular; referring to a perianth with 2 or more lines of symmetry
Androgynous – describes bisexual spikes of *Carex* that have staminate flowers at the top and pistillate flowers below
Bilabiate – shape of a sympetalous corolla or synsepalous calyx with its lobes oriented into two groups; two lipped
Bract – a modified leaf associated with flowers (subtend flowers), it differs from foliage leaves by size (smaller), shape, color, texture, or other features
Calyx – collective term for the sepals of a flower, the lower and outermost (or first) whorl of flower parts
Corolla – collective term for the petals of a flower, the second whorl of flower parts
Corona – an apparent third sterile whorl of a perianth derived from appendages of either petals or filaments
Cypsella – a certain type of achene characteristic of the Asteraceae, developed from an inferior ovary and usually bearing a pappus; dry, one-seeded, indehiscent
Epipetalous – referring to stamens that are individually adnate to the corolla
Follicle – a dry, dehiscent fruit derived from a single carpel that dehisces either along the suture or along the midrib but not both (1 line of dehiscence)
Gynecandrous – describes bisexual spikes of *Carex* that have pistillate flowers at the top and staminate flowers below
Gynobasic style – a style that appears to arise directly from the receptacle or the base of the ovary rather than from the apex of the ovary (e.g., Lamiaceae, Boraginaceae)
Gynostegium – a structure in Apocynaceae and some Aristolochiaceae formed from adnation of the stamens to the stigma; fusion of the androecium and gynoecium
Inflorescence – the part of a shoot above the uppermost node with foliage leaves that bears flowers, also, the groupings or arrangements in which these flowers are borne
Involucre – one or more whorls of bracts immediately subtending a flower or inflorescence, often forming a cup-like structure
Nutlet – a very small nut, an indehiscent, usually 1-seeded fruit with a hard, bony pericarp (fruit wall)
Pappus – specialized and modified calyx consisting of scales, bristles, or awns characteristic of the Asteraceae
Pedicel – the stalk of an individual flower
Perianth – the collective term for all of the outer (lower) sterile parts of a flower, comprising the calyx and corolla when both are present
Pericarp – the wall of a ripened, mature ovary; the wall of a fruit
Perigynium – sac-like, hollow bract (scale) that encloses a pistillate flower in *Carex* (Cyperaceae) and its close relatives
Phyllary – one of the involucral bracts present in the involucre of a head (or capitulum) inflorescence in Asteraceae
Pollinium – a coherent mass of pollen shed as a unit in some Apocynaceae and Orchidaceae
Primary inflorescence – the arrangement of individual flowers or florets
Raceme – an unbranched indeterminate inflorescence with a rachis and pedicellate flowers
Radial head – inflorescence in the Asteraceae bearing disk flowers in the center and ray florets around the periphery
Schizocarp – a fruit derived from a compound ovary that breaks apart into indehiscent 1-carpellate units (=mericarps), each containing 1 or more seeds
Secondary inflorescence – the arrangement of the primary inflorescences
Spike – an unbranched indeterminate inflorescence with sessile flowers attached directly to a rachis
Spikelet – primary inflorescence in the Cyperaceae and Poaceae, composed of a series of scale-like bractlets attached to a rachilla and subtending tiny, sessile, apetalous flowers (florets)
Verticil – a whorl of flowers (inflorescence in many Lamiaceae)
Zygomorphic – bilaterally symmetrical, irregular; referring to a perianth divisible into equal halves only along one plane

Vegetative Terms

Areole – the non-vascularized spaces or tissue between the veins and veinlets of a net-veined leaf
Cauline – describing leaves borne on an aerial stem, usually separated by elongated internodes
Caulescent – possessing a stem visible above the ground
Clasping – a sessile leaf with lobes of blade tissue projecting around either side of the stem
Crenate – margin with regular rounded teeth making a scalloped margin
Crenulate – minutely crenate, with very small rounded teeth
Entire – a margin that is smooth or of unbroken outline, without teeth

Glabrous – surface smooth or lacking trichomes (plant hairs, or epidermal outgrowths)
Glaucous – a bluish-green, pale gray/whitish waxy surface covering
Hispid – pubescent with stiff bristle-like hairs
Involute – the margins of a flat surface rolled inward toward the upper surface
Node – the joint (or transverse plane) of a stem at which one or more leaves and associated axillary buds arise
Petiolate – a leaf possessing a stalk or petiole, attached by a leaf stalk
Puberulent – pubescent with very short hairs, minutely pubescent
Pubescent – surface with trichomes present
Retrorse – bent or turned backward or downward, used to describe prickles or hairs
Scabrous – pubescent with short, stout hairs making the surface feel like sandpaper
Serrate – sawtooth margin with sharp teeth bent toward the leaf apex
Serrulate – minutely serrate, with very small teeth bent toward the leaf apex
Sessile – a leaf blade attached directly to a node, lacking a petiole; a flower lacking a pedicel
Sheathing – a modified petiole that is prolonged into a tube that partially or completely surrounds the stem above the node to which the leaf is attached
Striate – with several parallel longitudinal lines or ridges, often rather fine and close, usually separated by grooves
Strigose – pubescent with short hairs that lie flat against the surface
Subentire – nearly or almost entire
Subsessile – a leaf with a very short, or barely perceptible petiole

Adnate – fusion of unlike parts (e.g., stamens adnate to petals)
Connate – fusion of two or more structures of the same kind (e.g., a sympetalous corolla results from the fusion of petals to one another)
Distal – remote from the point of origin or attachment (e.g., in regard to leaves near the top of the stem)
Distinct – not fused to parts of the same type or whorl
Free – not fused to other kinds of structures
Proximal – near to the point of origin or attachment (e.g., in regard to leaves near the base of the stem)