

Systematic Botany. Lecture 20–21

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Outline

Grass-like plants

Cyperaceae—sedge family

Juncaceae—rush family

Typhaceae—cattail family



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Graminioid syndrome: discussion



Graminioid families

- ▶ Gramineae
- ▶ Cyperaceae
- ▶ Juncaceae
- ▶ And also Restionaceae, Ecdeiocolaceae, Joinvilleaceae, Flagellariaceae, Mapaniaceae, Typhaceae, Xyridaceae



Main features of Cyperaceae

- ▶ 4,000 species, \approx 1,000 belongs to sedges, *Carex*
- ▶ Grasslike plants, distributed mostly in temperate and Arctic regions
- ▶ Prefer wet places

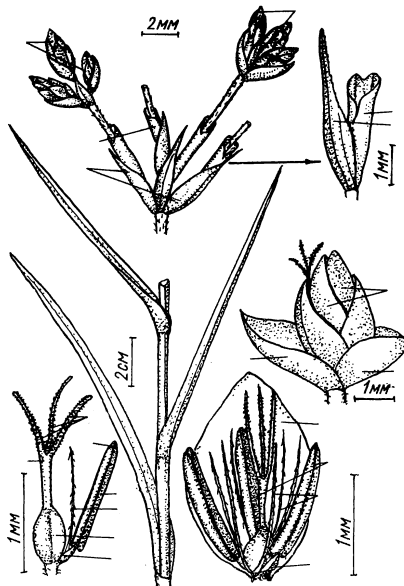


Morphology of Cyperaceae

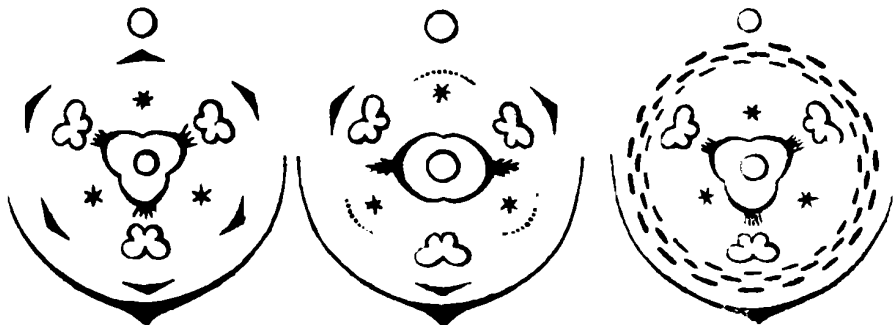
- ▶ Accumilate silica
- ▶ Leaves often in 3 ranks, stem is also a triangle on the cross-section
- ▶ Flowers small, wind-pollinated, unattractive, often unisexual, form spikes or spikelets and more complicated inflorescences
- ▶ Pollen grains in monads (from four microspores, only one survives)
- ▶ Perianth often reduced, stamens three, one pistil with one ovule but three carpels
- ▶ *Carex* flowers have specific bag-like perigynium
- ▶ Fruit is an achene



Scirpus sylvaticus floral parts



Cyperaceae flower diagram



$*P_{3+3} \vee 0 A_3 \underline{G_{(2-3)}}$

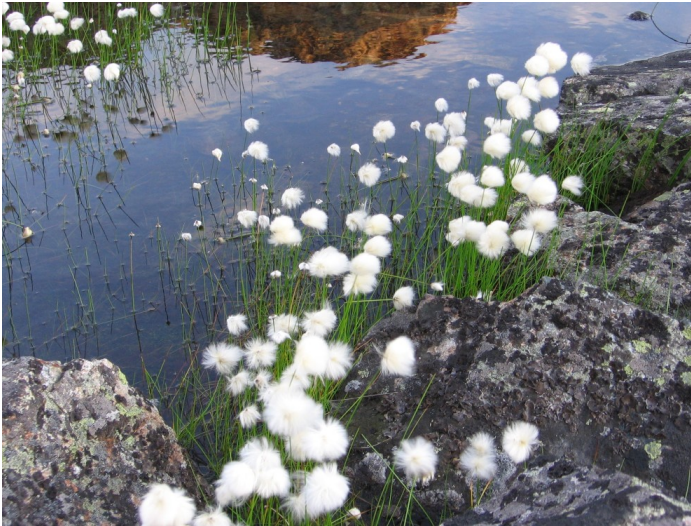
Diversity of Cyperaceae

Importance: Sometimes food, weaving materials, ornamentals

- ▶ *Eleocharis*—spikerush: base of style enlarged. *E. dulcis* is a Chinese water-chestnut. 7 species in ND.
- ▶ *Scirpus*—bulrush: scales are spirally arranged. 9 species in ND.
- ▶ *Eriophorum*, cottongrass was used as fiber source
- ▶ *Cyperus*—cyperus: spikelets with two rows of scales. *C. papyrus* was used for famous Egyptian papyrus, *C. esculentus* (chufa) has edible corms (occurred in Fargo region), 7 species in ND.



Eriophorum sp.



Cyperus papyrus



Carex flowers

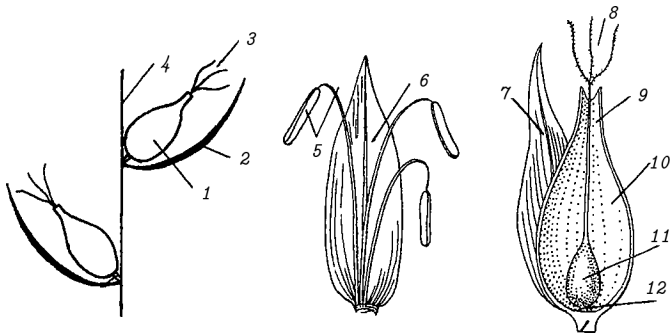
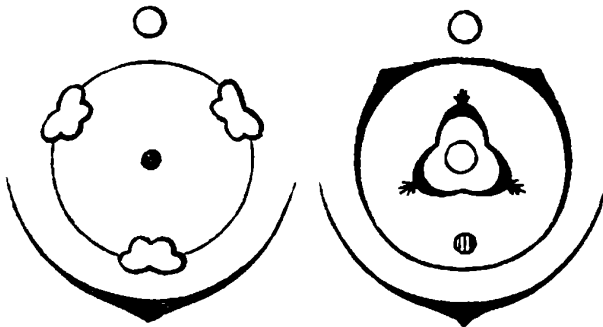


Diagram of *Carex* flower



$*P_0A_3$ or $\uparrow P_0G_{\underline{(2-3)}}$

Diversity of sedges (*Carex*)

Carex covers almost half of wet places in Arctic and northern temperate region. 3-ranked leaves, female flowers enclosed in perigynium.

Main groups:

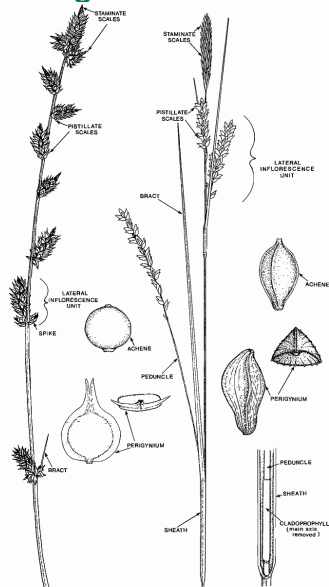
1 spike Subgenus Psyllophora, e.g. *Carex filifolia*

Bisexual spikes Subgenus Vignea (and also tropical subg. Indocarex),
e.g. *Carex brevior*

Unisexual spikes Subgenus Carex, e.g. *Carex retrorsa*



Subg. Vignea vs. subg. Carex



Carex filifolia



Carex brevior



Carex retrorsa

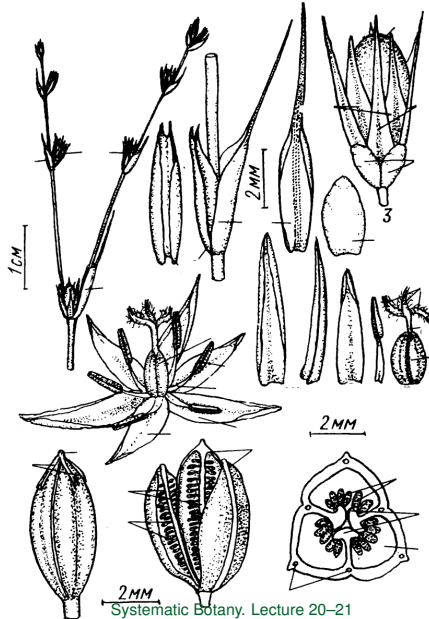


Juncaceae—rush family

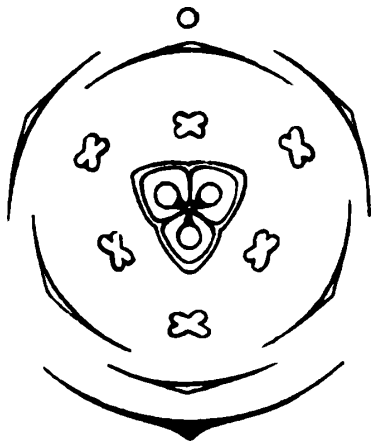
- ▶ \approx 300 species
- ▶ Distributed in temperate and montane regions, growing in dump places
- ▶ Life forms: grass-like herbs
- ▶ Leaves flat to cylindric, with open sheath, sometimes reduced
- ▶ Flowers actinomorphic, 3-merous, perianth of 6 tepals, 6 stamens
- ▶ Pistil has 3 carpels
- ▶ Fruit is a capsule



Juncus bufonius flower parts



Juncaceae flower



$*P_{3+3}A_{3+3}\underline{G_{(3)}}$

Representatives of Juncaceae

Importance: weaving materials

- ▶ *Juncus*—rush: cylindric leaves
- ▶ *Luzula*—wood-rush: “normal” grass-like flat leaves



Juncus effusus



Luzula parviflora

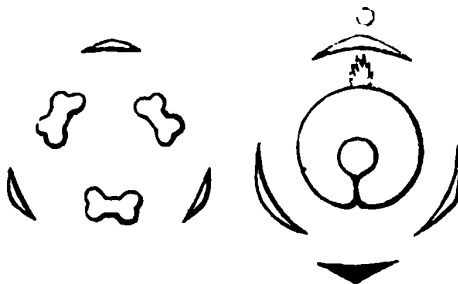


Typhaceae—cattail family

- ▶ \approx 40 species
- ▶ Distribution: widespread
- ▶ Life forms: grass-like coastal or water plants
- ▶ Leaves distichous, linear, mostly basal
- ▶ Dense inflorescences
- ▶ Flowers very reduced, male with one or 3 stamens
- ▶ Pistil unicarpellate, with one ovule
- ▶ Fruit an achene or drupe

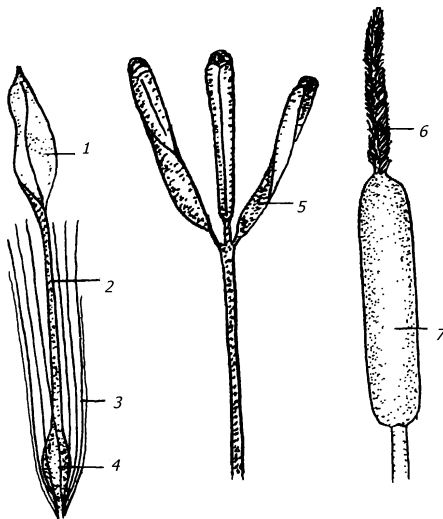


Typhaceae flowers



♂*P₃A₃; ♀*P₃G₁

Typha latifolia flower parts



Representatives of Typhaceae

Importance: mating and weaving material, edible pollen and rhizomes, sometimes ornamental.

- ▶ *Sparganium*—bur-reed (sometimes separated to its own family)
- ▶ *Typha*—cattail



Sparganium eurycarpum



Summary

| CHARACTER | JUNCACEAE (RUSHES) | CYPERACEAE (SEDGES) | POACEAE (GRASSES) |
|---|---------------------------------------|---|---|
| GENERA/SPECIES | 8/300 | 146/5,315 | 650–785/10,000 |
| HABITAT | wet areas | wet areas or sterile soils | dry to moist areas |
| STEM CROSS SECTION | terete | triangular | terete or ellipsoid |
| INTERNODES | solid, with large pith | usually solid | usually hollow, or less commonly solid |
| NODES | not jointed | not jointed | jointed |
| LEAF RANKS | 3 | 3 | 2 |
| LEAF BLADE | flat to terete | flat | flat |
| LEAF SHEATH | open | closed | open and with ligule |
| INFLORESCENCE | basically cymose, and often congested | arranged in spikelets | arranged in spikelets |
| NUMBER OF BRACTS SUBTENDING EACH FLOWER | 2 or more | 1 (glume, scale) | usually 2 (palea and lemma) |
| PERIANTH | usually 6 chaffy tepals | absent, or reduced to a varying number of bristles or scales | reduced to 2 (or sometimes 3) lodicules |
| ANTHER ATTACHMENT | basifixed | basifixed | basifixed, but deeply sagittate and appearing versatile |
| POLLEN | in tetrads | single, but each grain ("pseudomonad") representing a degraded tetrad | single |
| FRUIT TYPE | loculicidal capsule | achene | caryopsis (grain) |
| EMBRYO | surrounded by endosperm | embedded in base of endosperm | outside of endosperm |



For Further Reading



A. Shipunov.

Systematic Botany [Electronic resource].

2011—onwards.

Mode of access:

http://ashipunov.info/shipunov/school/biol_448



Van Bruggen, Th.

The vascular plants of South Dakota.

1996. 3rd ed.

University of South Dakota, Vermillion, SD.

