

# Systematic Botany. Lecture 17–19

Alexey Shipunov

Minot State University

October 14–18, 2013



# Outline

## Grass-like plants

Cyperaceae—sedge family

Juncaceae—rush family

Typhaceae—cattail family



# Outline

Grass-like plants

Cyperaceae—sedge family

Juncaceae—rush family

Typhaceae—cattail family



# Outline

Grass-like plants

Cyperaceae—sedge family

Juncaceae—rush family

Typhaceae—cattail family



# Outline

Grass-like plants

Cyperaceae—sedge family

Juncaceae—rush family

Typhaceae—cattail family



*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



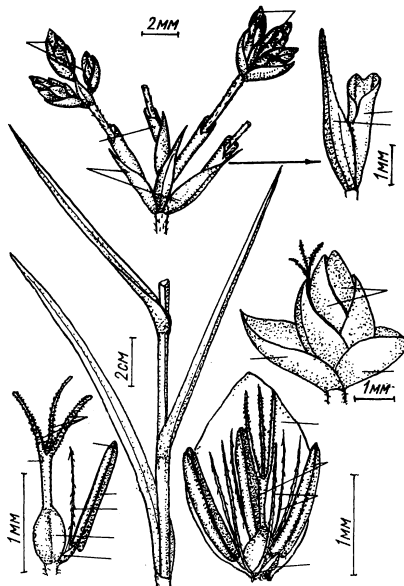


# Morphology of Cyperaceae

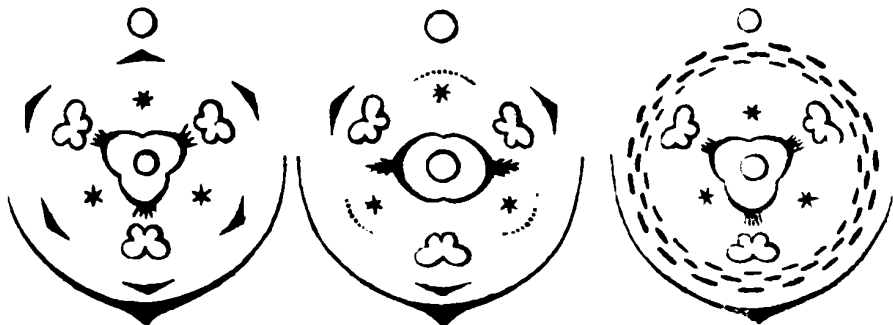
- ▶ Accumilate silica
- ▶ Leaves often in 3 ranks, stem is also a triangle on the cross-section
- ▶ Flowers small, wind-pollinated, unattractive, often unisexual, form spikes or spikelets and more complicated inflorescences
- ▶ Pollen grains in monads (from four microspores, only one survives)
- ▶ Perianth 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



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

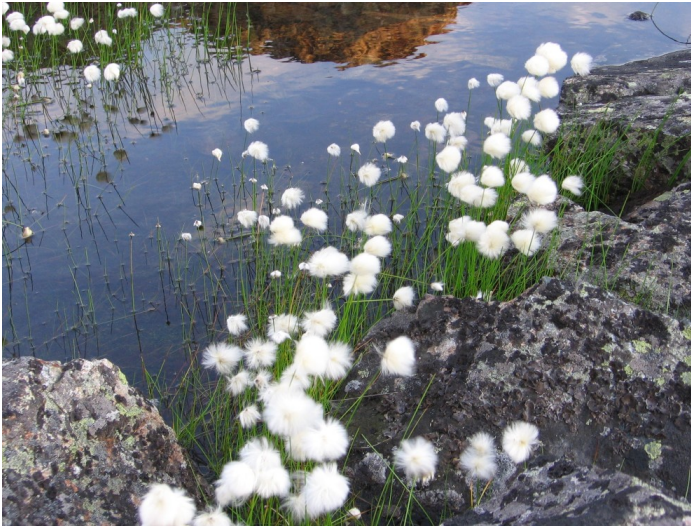
# Diversity of Cyperaceae

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.



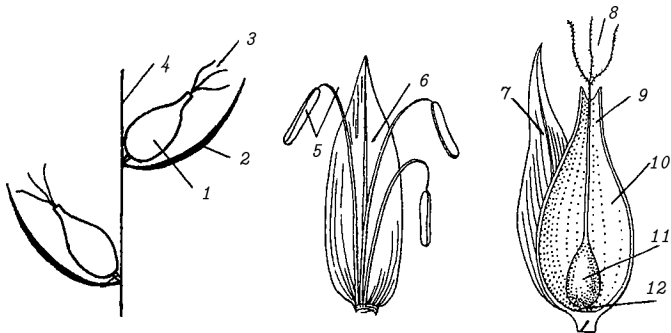
## *Eriophorum* sp.



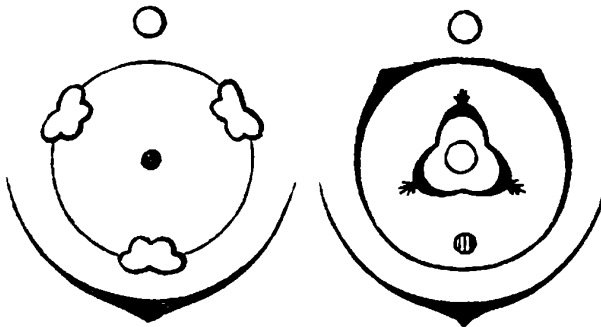
# *Cyperus papyrus*



## 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:

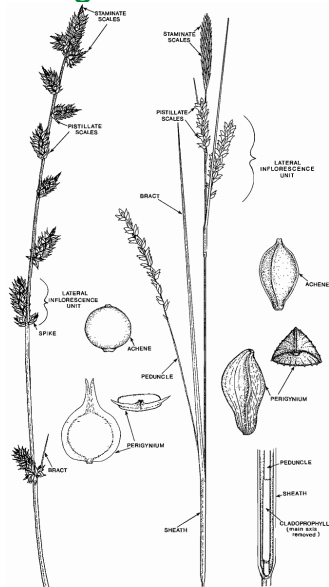
**1 spike** Subgenus *Psyllophora*, e.g. *Carex filifolia*

**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*

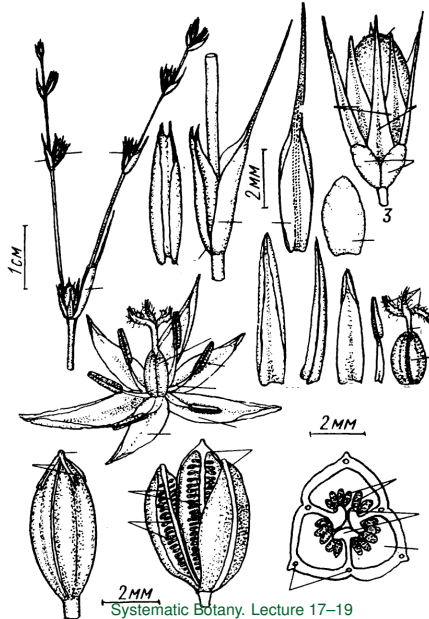


## Juncaceae—rush family

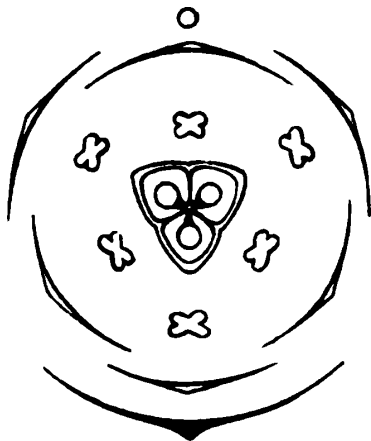
- ▶  $\approx$  300 species
- ▶ Distributed in temperate and montane regions, growing in dump places
- ▶ Life forms: grass-like herbs
- ▶ Leaves flat to cylindric, with open sheath, sometimes reduced
- ▶ Flowers actinomorphic, 3-merous, perianth of 6 tepals, 6 stamens
- ▶ Pistil has 3 carpels
- ▶ Fruit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

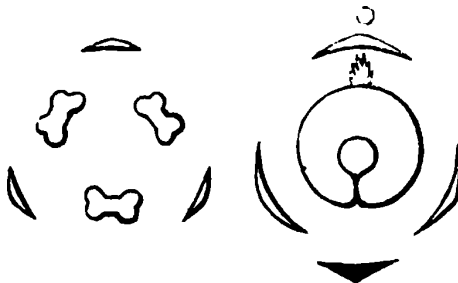


# Typhaceae—cattail family

- ▶  $\approx$  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

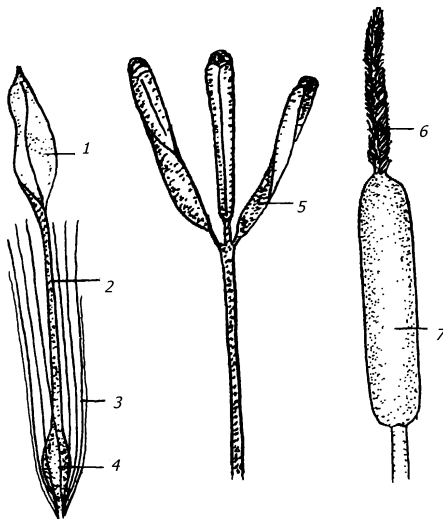


# Typhaceae flowers



$\sigma^*P_3A_3; \text{♀}^*P_3G_1$

## *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](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.

