Poales

cattails, rushes, sedges

Poales II: wind pollinated families

4 main groups:

- Acorales - sister to all monocots
- Alismatids
  - inc. Arums - jack in the pulpit
- Lilioids (lilies, orchids, yams)
  - non-monophyletic
  - petaloid
- Commelinites
  - Arecales - palms
  - Commelinales - spiderwort
  - Zingiberales - banana
  - Poales
    - pineapple
    - grasses & sedges

Poales II: wind pollinated families

- showy flowers, insect or bird pollinated
- +/- reduced flowers, insect or wind pollinated
- reduced flowers, wind pollinated

Evolutionary trends:

- nectar to pollen gathering to wind pollination
- reduced flowers - loss of perianth
- unisexuality sometimes
- bracts become important
- flowers to florets in spikelets

Poales II: wind pollinated families

- showy flowers, insect or bird pollinated
- +/- reduced flowers, insect or wind pollinated
- reduced flowers, wind pollinated
Poales II: wind pollinated families

- "grade" centered in the Guayana Shield and distinctive in tepui-top flora
- +/- reduced flowers, insect or wind pollinated

Xyridaceae - yellow eye grass
Small family (5/260) of rush-like leaves with terminal spike of small but showy yellow (or blue) petalled-flowers with no nectar. Inflorescence with spirally arranged bracts.

Xyridaceae - yellow eye grass
Subfamily with Xyris is widespread and includes northern hemisphere species.

Xyridaceae - yellow eye grass
Other subfamily is diverse only on Guayana Shield and Brazilian cerrados
Eriocaulaceae - pipewort

Small family (10/1400) of aquatic emergents, often rosette-leaved.

Primarily pantropical, centered in Guayana Shield and Brazilian cerrados, with 1 species in Great Lakes.

Eriocaulaceae - pipewort

Flowers dimerous, unisexual, but crowded together on whitish terminal head of an elongated scape - “pipebrush” inflorescence

Various Eriocaulon - pipeworts

Eriocaulaceae - pipewort

Paepalanthus
Brazilian cerrados

Rhodonanthus
Roraima tepui

Syngonanthus Floridanus
sand wetland

Mayacaceae - bog moss

Mayacaceae are small herbs (10 species) of marshes looking like a club-moss

Flowers are pink to white with differentiated calyx and corolla

Mayaca fluviatilis
Poales II: wind pollinated families

- Look at cattails and bur-reeds – one of 3 separate shifts to reduced flowers and wind pollination
- One (then Typhaceae) or two families

Typhaceae - cattails

- Typhaceae are robust, rhizomatous herbs (only 10 species of *Typha*) that like damp conditions and have erect, linear leaves
- Terminal cylindrical spike with distinct female flowers below and male flowers above

Typha - cattail

- Male flowers essentially 3 stamens
- Female flowers of one carpel with a single seed
- Wind pollinated

Achenes with copious amounts of white hairs near the base of each; wind dispersed
Typhaceae - cattails

- *Typha latifolia* × *T. angustifolia*
- *Typha X glauca* - hybrid cattail

- the hybrid is invasive and replaces other cattails and other emergent aquatic plants.

Sparganiaceae - bur reeds

- *Sparganium eurycarpum* - giant bur-reed

- Sparganium americanum - bur-reed

- fruits a head of 1-seeded achenes

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Poales II: wind pollinated families

- Look at 2 independent evolutions of "graminoid" habit, reduced flowers, and wind pollination.

- Reduced flowers, wind pollinated.
Juncaceae - rushes

- flowers mainly bisexual, reduced and wind pollinated
- 6 brownish tepals surround 6 stamens and superior 3-carpellate ovary

Fruit is a many-seeded capsule.

Juncaceae - rushes

- largely two genera - *Juncus* (rush) and *Luzula* (wood rush)
- often tussock forming, leaves usually 3-ranked on round, solid stems
- inflorescence congested, often terminal or appearing lateral

Juncus arcticus - Baltic rush
Note rhizome with vertical stems

Luzula acuminata - Wood rush

Juncus effusus - Common rush

Juncus tenuis - Path rush

Juncus greenei - Green's rush

Graminoids: grasses, sedges, rushes

<table>
<thead>
<tr>
<th>Juncaceae (Rushes)</th>
<th>Cyperaceae (Sedges)</th>
<th>Poaceae (Grasses)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leaves</strong></td>
<td>3-ranked (in 3 rows): Flat, W-shaped in cross-section, or apparently lacking (e.g. in <em>Eleocharis, Schoenoplectus</em>)</td>
<td>2-ranked (in 2 rows), sometimes appearing leafless</td>
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<tr>
<td>Sheaths</td>
<td>Margins overlapping</td>
<td>Margins fused</td>
</tr>
<tr>
<td><strong>Ligules</strong></td>
<td>None</td>
<td>A flap of tissue at the junction of the sheath and blade, partly fused to the blade</td>
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<tr>
<td>Floral scales</td>
<td>No scales beneath flowers, 6-merous (looks a little like a lily flower)</td>
<td>1 below each flower</td>
</tr>
<tr>
<td>Flowers</td>
<td>Usually bisexual</td>
<td>Bisexual or unisexual</td>
</tr>
<tr>
<td>Fruits</td>
<td>Capsule filled with 3 to many seeds</td>
<td>Achenes (a hard nutlet)</td>
</tr>
</tbody>
</table>

*Juncus arcticus* - Baltic rush
*Juncus greenei* - Green's rush
*Juncus effusus* - Common rush
*Juncus tenuis* - Path rush
*Juncus acuminata* - Wood rush
Luzula acuminata - Wood rush

Luzula multiflora - Common wood rush

Juncaceae - rushes

Cyperaceae - sedges

100 genera and 4,500 species primarily of moist habitats. Carex with 2,000 species is one of the largest of all angiosperm genera. Most species have triangular stems in cross section - “sedges have edges” - and thus leaves are 3-ranked.

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Cyperus has bisexual flowers: 3 stamens and 2 fused carpels. A single bract sits below each floret. The spikelets are generally symmetrically arranged.

Cyperus lupulinus - Sand cyperus or sedge

Scirpus validus (Schoenoplectus tabernaemontani) - Soft-stem bulrush

Scirpus and relatives (bulrushes) often have roundish stems. Florets are bisexual with 3 stamens, 3 fused carpels, 6 perianth bristles, and 1 subtending bract. Florets are generally whorled in the spikelet.
Scirpus atrovirens  
Dark green bulrush

Scirpus sp.

Scirpus cyperinus  
Wool-grass

Cyperaceae - sedges  
Sedges have unisexual flowers with the male and female florets usually arranged in discrete portions of the spikelets.

Carex (sedge) is a large, complex, and difficult to key out genus.

Carex pensylvanica  
Pennsylvania sedge

Male florets

Female florets

Carex intumescens  
Bladder sedge

Carex blanda  
Wood sedge

Carex is a genus of roughly 2000 species worldwide, over 150 in Wisconsin alone. It becomes easier to understand if you think of it in terms of two smaller subgenera:

Carex subgenus Carex
a. Stigmas usually 2, sometimes 1
b. Spikes almost always elongate or flattened
c. Perigynia round or triangular in cross-section, sometimes flattened (only if stigma 2)
d. Plants sometimes strongly reddish at base

Carex subgenus Urginea
a. Stigmas always 2
b. Perigynia usually flattened or plane-convex in cross section
c. Carex sect.

Carex subgenus Urginea
a. Spikes usually short; inflorescence may be elongated
A common woodland species
C. pensylvanica
Pennsylvania sedge

Carex stricta
Tussock sedge

Eriophorum angustifolium
cottongrass

Eleocharis ovata
-spikerush

Other genera . . .

Cyperaceae - sedges