Diversity and Evolution of Asterids

Valerianaceae - valerian family

The congested inflorescence is part of the floral reduction seen in this group of Asterids. Reduction is also seen in calyx forming a pappus (bristly or scaly structure), and fruit is one-seeded achene. All three features are best seen in the Asteraceae - sunflower family.

Dipsacaceae - teasel family

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Valeriana uliginosa - marsh valerian

Valeriana edulis - edible valerian

Dipsacus fullonum - teasel

Introduced and adventive
Araliaceae - ginseng family

Largely a tropical family of trees, shrubs, or herbs (in Wisconsin). Often combined with the carrot family (Apiaceae). Leaves divided or up to 3 times or more compound; alternate in *Aralia*, whorled in *Panax*. Flowers in umbels. Distinctive aroma and chemicals.

*Aralia hispida* - bristly sarsaparilla  
*Aralia nudicaulis* - wild sarsaparilla

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Araliaceae - ginseng family

Flowers small, non-asterid like (no corolla tube), 5 merous, with 2-5 fused inferior carpels forming berries (2 carpels and dry fruits in Apiaceae).

*Aralia hispida* - bristly sarsaparilla: note 5 styles

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Araliaceae - ginseng family

*Aralia elata*  
Hercule’s club, Devil's walking stick  
SE USA native, escaped from cultivation

*Aralia racemosa*  
spikenard

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Araliaceae - ginseng family

*Panax quinquefolius* - American ginseng  
Rich woods; leaflets are stalked. Heavily collected woodland species for roots; now listed as “Special concern” by DNR. Most commercial grade ginseng is farm grown (as in Wisconsin).
Araliaceae - ginseng family

*Panax trifolius*
Dwarf ginseng
Rich woods; leaflets are sessile

Araliaceae - ginseng family

*Hedera helix*
English ivy
Eurasia - N. Africa; invasive in U.S.

Apiaceae (Umbelliferae) - carrot family

Large family of 300 genera and over 3000 species most common in north temperate regions. Economically important (carrot, parsnip, parsley, celery, dill, caraway).

Apiaceae (Umbelliferae) - carrot family

*Aethusa cynapium*
Dill
Aromatic herbs with hollow stems, dissected or compound leaves that are strongly sheathing, inflorescence umbellate.

Heracleum lanatum - cow parsnip
Apiaceae (Umbelliferae) - carrot family

- flowers small in umbels, often compound
- female flowers often along edge of each umbellate
- 5 merous with no corolla tube
- inferior gynoecium of 2 carpels separating at maturity

Apiaceae (Umbelliferae) - carrot family

- fruit dehiscent and splitting - schizocarp
- 2 dry, 1-seeded mericarps held together by carpophore
- fruits 5-ribbed separated by oil canals - taxonomic character for separating genera

Angelica atropurpurea - great angelica
Large coarse herb of wetter areas

Cicuta bulbifera
Bulblet water hemlock

Cicuta maculata
Spotted water hemlock

Although containing nasty compounds, Cicuta is not the hemlock that Socrates took. Common species of marshes and streams.
Apiaceae (Umbelliferae) - carrot family

Three common woodland genera

*Cryptotaenia canadensis* - honewort
*Osmorhiza longistylis* - sweet cicely

*Sanicula gregarii* - snakeroot
*Sanicula marilandica* - snakeroot

*Daucus carota* - wild carrot, Queen Anne’s lace
Note umbel with involucral bracts; larger female flowers along edge of umbel; the progenitor of cultivated carrot (same species); common weed

*Eryngium yuccifolium* - Rattlesnake master
Dry prairie species with sword-shaped leaves with spiny edge. Umbels has become literally a “head” as in Asteraceae.
Apiaceae (Umbelliferae) - carrot family

*Heracleum lanatum*
American cow-parsnip
Our most robust species in Wisconsin

*Pastinaca sativa* - wild parsnip
Introduced and spreading along roadsides. Dermatitic reaction from leaves is rapid but only in presence of UV light which causes precursor to change to phototoxin. Therefore, collect only by moonlight.

Campanulaceae - bellflower family

A family mostly of herbs, but some secondarily woody, widely distributed in the temperate regions and in the montane tropics. Contains 65 genera and over 2200 species, with half belonging to *Campanula* and *Lobelia*.

- Family has alternate leaves and milky latex.
- Flowers are 5 merous and inferior ovaried.

*Zizia aurea* - golden Alexanders

*Hydrocotyle americana* - marsh pennywort
Campanulaceae - bellflower family

The family is divided into two distinct subfamilies - Campanuloideae and Lobelioideae - distinguished by floral symmetry, staminal fusion, and carpel number. They are often considered as separate families (as in the UW Herbarium website).

Campanula - bellflower
Subfamily Campanuloideae

Lobelia - lobelia
Subfamily Lobelioideae

Campanula americana - tall bellflower

Campanula rapunculoides - European bellflower

Campanula rotundifolia - Bluebell - circumboreal

Campanula and relatives have actinomorphic flowers, stamens not fused, and 3-5 fused carpels. Note the 3 styles of Campanula to the left.
Campanulaceae - bellflower family

*Triodanis perfoliata* - Venus looking glass

Secondary pollen presentation

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Campanulaceae - bellflower family

**Subfamily Lobelioideae**

*Lobelia* and relatives have zygomorphic flowers, stamens fused into a tube in which the pollen is shed, and 2 fused carpels. Style pushes pollen out through the tube.

Staminal tube

Style

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Campanulaceae - bellflower family

*Lobelia cardinalis* - Cardinal flower

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Campanulaceae - bellflower family

*Lobelia siphilitica* - Great blue lobelia
Campanulaceae - bellflower family

- **Lobelia inflata**
  - Indian tobacco

- **Lobelia spicata**
  - Spiked lobelia

Campanulaceae - bellflower family

- **Lobelia kalmii**
  - Bog lobelia

Menyanthaceae - bog buckbean family

Aquatic, or semi-aquatic family. Flowers 5 merous with fringed petals. Gynoeicum of 2 fused superior carpels. Our one species is restricted to bogs and has trifoliate leaves.

- **Menyanthes trifoliata**
  - Bog buckbean
Menyanthaceae - bog buckbean family

Aquatic, or semi-aquatic family. Flowers 5 merous with fringed petals. Gynoecium of 2 fused superior carpels. Our one species is restricted to bogs and has trifoliate leaves.

*Nymphoides* (E. North America et al.) - convergence! mimic of *Nymphaea*