Diversity and Evolution of Asterids
... carrots and bellflowers ...

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

Family also included with Caprifoliaceae (long-styled genera). Herbaceous plants with opposite leaves. Besides, the congested inflorescence, pappus (bristly or scaly structure), and achene, the family further shows involucral bracts around the “head” inflorescence - another feature seen later in the Asteraceae - sunflower family.
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

*CA 5  CO 5  A 5  G (2-5)*

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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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.

Hedera helix - cow parsnip

Sheath
• 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

CA 5 CO 5 A 5 G (2)

• 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

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 longistyila* - sweet cicely

Apiaceae (Umbelliferae) - carrot family

*Sanicula gregarri* - snakeroot
*Sanicula marilandica* - snakeroot

Apiaceae (Umbelliferae) - carrot family

*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

Apiaceae (Umbelliferae) - carrot family

*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

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**Apiaceae (Umbelliferae) - carrot family**

*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.

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**Apiaceae (Umbelliferae) - carrot family**

*Zizia aurea* - golden Alexanders

*Hydrocotyle americana* - marsh pennywort

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**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.
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

Campanulaceae - bellflower family

Campanula americana - tall bellflower

Campanula americana

Campanula rapunculoides - European bellflower

Campanula rotundifolia - Bluebell - circumboreal
Campanulaceae - bellflower family

Triodanis perfoliata - Venus looking glass

Secondary pollen presentation

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

Campanulaceae - bellflower family

Lobelia cardinalis - Cardinal flower

Campanulaceae - bellflower family

Lobelia siphilitica - Great blue lobelia
Campanulaceae - bellflower family

*Lobelia inflata*
Indian tobacco

*Lobelia spicata*
Spiked 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

*Lobelia kalmii*
Bog lobelia
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*