Diversity of Wisconsin Asterids

... bellflowers and asters ...
**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**

Subfamily Campanuloideae

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**

*Campanula americana* - tall bellflower
**Campanulaceae - bellflower family**

*Campanula rotundifolia*
Bluebell - circumboreal

*Campanula rapunculoides*
European bellflower
**Campanulaceae - bellflower family**

*Triodanis perfoliata* - Venus looking glass

Secondary pollen presentation
**Campanulaceae - bellflower family**

**Subfamily Lobelioidae**

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.
**Campanulaceae - bellflower family

*Lobelia cardinalis*
Cardinal flower
**Campanulaceae - bellflower family**

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

\[\text{Lobelia inflata} \quad \text{Indian tobacco} \]
\[\text{Lobelia spicata} \quad \text{Spiked lobelia}\]
**Campanulaceae - bellflower family**

*Lobelia kalmii*
Bog lobelia
**Campanulaceae - bellflower family**

*Lobelia dortmanna*

Water 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.

Menyanthes trifoliata
Bog buckbean
Menyanthaceae - bog buckbean family

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

... asters and chickory ...
**Asteraceae - aster family**

One of the most successful of all flowering plant families with over 1500 genera and 23,000 species.

Family has 3 specialized features important in this radiation:

1. Special inflorescence “head”
2. Pollen presentation
3. Diverse secondary chemistry
**Asteraceae - aster family**

The **head** or **capitulum** is a cluster of 1 or 2 distinct flower types. The family is also called “Compositae” referring to this clustering.

The head is surrounded by special bracts called the **involucre** or **phyllaries**.

The involucre is important in the classification and identification within the family.
**Asteraceae - aster family**

Calyx is reduced to a pappus of scales, awns, bristles, or absent

Corolla has 5 petals but variously fused or zygomorphic

Pollen presentation – anthers fused

[Diagram of flower parts: style branches, stamens, corolla, pappus, ovary.]

Inferior ovary - achene
**Asteraceae - aster family**

Main floret types:

1. **Disk** or **tubular** florets are actinomorphic
**Asteraceae - aster family**

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2. **Ray** florets are usually 3 long fused petals + 2 short petals

3. **Ligulate** florets are 5 fused petals but split open
**Asteraceae - aster family**

The fruit is a one-seeded **achene** with the pappus serving as the fruit disperser (e.g., barbs for animal dispersal, hairs for wind dispersal)
**Asteraceae - aster family**

These various types of florets come together to form a number of different looking heads. The 3 most important ones are:

**Radiate head**: disk or tubular florets in the center, ray florets along the edge (these usually pistillate only)

**Discoid head**: only disk or tubular florets comprise the entire head

**Ligulate head**: only ligulate florets comprise the entire head (note 5 lobed florets)
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*Liatris* - blazing star
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*Taraxacum* - dandelion
**Asteraceae - aster family**

Tribe Lactuceae (Cichorieae)

Only have ligulate heads, milky latex in vegetative parts

Dandelion, goat’s-beard, chickory, hawkweed

*Taraxacum* - dandelion
**Asteraceae - aster family**

*Cichorium intybus* - chickory

Eurasian weed - totally naturalized
**Asteraceae - aster family**

*Hieracium caespitosum* - yellow hawkweed

*Krigia biflora* - false dandelion
**Asteraceae - aster family

*Prenanthes alba* - lion’s foot

Leaves come up early in spring; note the various spring ephemerals below (common names?)
**Asteraceae - aster family**

Tribe Cardueae (Cynareae)

*Cirsium vulgare*
Bull thistle

Plants with spiny phyllaries and often leaves and stems

Flowers never radiate

Petals white or cynanic colors (blues, purples)

Thistle, knapweed, burdock

*Cirsium pitcheri*
Dune thistle
**Asteraceae - aster family**

*Centaurea stoebe* - Spotted knapweed

*Arctium* - burdock
**Asteraceae - aster family**

Tribe Vernoniaeae

*Vernonia fasciculata*

Ironweed

Alternate leaves

Purple flowers

Resembles joe-pye weeds
**Asteraceae - aster family**

Tribe Heliantheae

Large tribe with radiate (sometimes discoid heads), multi-layered phyllaries, rays mostly yellow, tendency for opposite leaves

Coneflower, sunflower, rosinweed, ox-eye, black-eyed Susan, prairie dock, coreopsis, Peruvian daisy

*Ratibida pinnata* - coneflower

*Helianthus annuus* - sunflower
**Asteraceae - aster family**

*Bidens cernuus* - bur marigold

*Echinacea pallida* - purple coneflower
**Asteraceae - aster family**

*Ambrosia artemisiifolia*

ragweed

Tribe Heliantheae
Subtribe Ambrosieae

Unisexual and wind pollinated, rays absent, stamens not fused

Ragweed, cocklebur

Male florets

Female florets
**Asteraceae - aster family**

- Tribe Heliantheae
- Subtribe Eupatorieae

- Opposite or whorled leaves
- Discoid heads
- Corolla never yellow

**Eupatorium maculatum**
Joe-pye weed

**Eutrochium perfoliatum**
Boneset

Joe-pye weed, boneset, snakeroot, blazing star
**Asteraceae - aster family**

Tribe Astereae

Conspicuous rays in radiate head, pappus of plumose bristles; asters, goldenrods, fleabanes

*Solidago rigida* - stiff goldenrod

*Symphyotrichum novae-angliae* – New England aster
**Asteraceae - aster family**

Tribe Anthemideae

Aromatic plants, with dissected, alternate leaves; pappus of awns or scales or missing

Ox-eye daisy, yarrow, wormwood, tansy, dog fennel

*Leucanthemum vulgare*
Ox-eye daisy, chrysanthemum

*Tanacetum bipinnatum - Lake Huron tansy*
**Asteraceae - aster family**

*Achillea millefolium* - yarrow

*Matricaria discoidea* - pineapple weed
**Asteraceae - aster family**

*Tribe Gnaphalieae (Inuleae)*

Plants usually covered with white hairs, pappus of bristles or hairs

Pussy toes, cudweed, pearly everlasting

*Antennaria plantaginifolia* - pussy toes
**Asteraceae - aster family

Anaphalis margaritacea - pearly everlasting
**Asteraceae - aster family**

Tribe Senecioneae

Alternate or basal leaved, phyllaries in 1 row, capillary pappus; ragwort, Indian plantain

Packera aurea - golden ragwort