Diversity and Evolution of Asterids

... mints and snapdragons ...
*Boraginaceae - borage family

Widely distributed, large family of alternate leaved plants. Typically hairy. Typically possess helicoid or scorpioid cymes = **compound monochasium**. Many are poisonous or used medicinally.

*Mertensia virginica* - Eastern bluebells
*Boraginaceae - borage family

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

Gynobasic style; not terminal style which is usual in plants; this feature is shared with the mint family (Lamiaceae) which is not related.

*Myosotis - forget me not*

2 carpels each with 2 ovules are separated at maturity and each further separated into 1 ovuled compartments

Fruit typically 4 nutlets
*Boraginaceae - borage family

Echium vulgare
Blueweed, viper’s bugloss
adventive
*Boraginaceae - borage family

Hackelia virginiana
Beggar’s-lice

Myosotis scorpioides
Common forget-me-not
*Boraginaceae - borage family

*Lithospermum canescens
Hoary puccoon

*Lithospermum incisium
Fringed puccoon
*Boraginaceae - borage family

Lithospermum canescens
Hoary puccoon

• Lithospermum (pucoon) - classic dimorphic heterostyly
*Boraginaceae - borage family

*Mertensia virginica*
Eastern bluebells

Botany 401 final field exam plant!
Hydrophyllum virginianum - Common waterleaf

*Botany 401 final field exam plant!

Leaves compound or lobed and “water-marked”
**Oleaceae - olive family**

- Woody plants, opposite leaves
- 4 merous actinomorphic or regular flowers

*Syringa vulgaris* - Lilac
cultivated
**Oleaceae - olive family**

- Woody plants, opposite leaves
- 4 merous actinomorphic or regular flowers

*Forsythia intermedia / suspensa*
Goldenbell, forsythia
introduced

*Ligustrum vulgare*
European privet
planted, invasive

CA (4)  CO (4) or 0  A 2  G (2)
**Oleaceae - olive family**

- Ashes have compound leaves, other genera are simple
- Ashes have diamond-shaped furrows on the bark
- Ashes are unisexual, other genera are bisexual

*Fraxinus pennsylvanica* - Red, green ash

- Male flowers
- Female flowers

CA (4)  CO (4) or 0  A 2  G (2)
**Oleaceae - ash family**

- Ashes have 1-seeded samaras
- Note opposite, compound leaves and furrowed bark

*Fraxinus americana*
White ash
Lamiaceae - mint family

CA (5)  CO (2+3)  A 4,2  G (2)

- Strong odors (mint, peppermint, sage, rosemary)
- Squarish stems with opposite leaves
- Flowers in **verticels = clustered flowers at a node**
**Lamiaceae - mint family**

- Strongly 2-lipped corolla with 4 or 2 stamens inserted
- Bilabiate — family is called Labiatae
**Lamiaceae - mint family**

CA (5)  CO (2+3)  A 4,2  G (2)

- Strongly 2-lipped corolla with 4 or 2 stamens inserted
- Bilabiate — family is called Labiatae
- Important for bee pollination - key innovation for *Salvia*?
**Lamiaceae - mint family**

- CA (5)  CO (2+3)  A 4,2  G (2)

- 2 carpels but *gynobasic* as in Boraginaceae
- 4 nutlets
Lamiaceae - mint family

Glechoma hederacea - creeping charlie
Naturalized and invasive
**Lamiaceae - mint family**

*Leonurus cardiaca* - motherwort, naturalized

Cardiac glycosides such as leonuridin
**Lamiaceae - mint family**

*Lycopus americanus*
Water horehound

*Lycopus uniflorus*
Water horehound
**Lamiaceae - mint family**

*Monarda punctata* - horsemint, spotted bee-balm

*Monarda fistulosa* - bee-balm, wild bergamot
Lamiaceae - mint family

Nepeta cataria - catnip

Prunella vulgaris - selfheal
**Lamiaceae - mint family**

*Scutellaria parvula*
skullcap

*Salvia -sage*
(ornamental)
*Verbenaceae - vervain family*

- Like Lamiaceae
- Squarish stems with opposite, serrate leaves
- Inflorescence often spike-like
- Flowers with terminal style, not lipped
- Fruits usually nutlets (but not gynobasic) or drupes

*Verbena hastata*

Blue vervain
*Verbenaceae - vervain family

Verbena stricta - Hoary vervain

Phyla lanceolata - fogfruit
Phrymaceae – lopseed family

Phyrma leptostachya
lopseed
Scrophulariaceae - figwort family

*Scrophularia marilandica* - eastern figwort, carpenter’s square

*Verbascum blattaria* - moth mullein
Scrophulariaceae - figwort family

*Verbascum thapsus* - common mullein  weedy biennial (1st year as a rosette)
*Plantaginaceae - plantain family*

- Large family
- Zygomorphic flowers
- Capsules

*Chelone glabra - turtlehead*
*Veronicastrum virginicum - Culver’s-root*
Linaria vulgaris - butter and eggs

*Plantaginaceae - plantain family
*Plantaginaceae - plantain family

Veronica catenata - water speedwell
Veronica persica
Bird’s-eye speedwell

*Plantaginaceae - plantain family
Plantaginaceae - plantain family

*Plantago* (plantains) are wind pollinated derivatives within this animal pollinated family. Leaves are basal and with strongly arcuate venation. Note the circumscissile capsule below.
*Plantaginaceae - plantain family

*Plantago major - common plantain
*Plantaginaceae - plantain family

Plantago patagonica - wooly plantain
CA (4-5) CO (2+3) A 5, 2+2, 2 G (2)

Stamens 5, or 2 sets of 2, or reduced to 2. Gynoecium bi-carpellate, axile placentation, and usually producing many seeded capsules.

**Orobanchaceae – broomrape family**
**Orobanchaceae – broomrape family**

*Castilleja coccinea* - Indian paintbrush

Group C of hemi-parasites related to Orobanchaceae
**Orobanchaceae – broomrape family**

Castilleja sessiflora - downy paintbrush
**Orobanchaceae – broomrape family**

*Pedicularis canadensis* - wood betony

*Pedicularis lanceolata* - swamp lousewort
**Orobanchaceae – broomrape family**

Holo-parasitic family (totally non-green) with snapdragon like flowers

Now shown to be closely related to the hemi-parasitic genera of Scrophulariaceae only

*Conopholis americana* (squaw-root)
**Orobanchaceae – broomrape family**

*Orobanche fasciculata* -  fascicled broomrape

Threatened: grows only on *Artemisia campestris* - wormwood

*Orobanche uniflora*  
One-flowered broomrape
**Orobanchaceae – broomrape family**

*Epifagus virginiana - beech drops*
Grows only on roots of beech (*Fagus*)

haustoria
*Lentibulariaceae - bladderwort family

Insectivorous herbs, aquatic or of wetlands. Wisconsin has 2 of the 3 genera — *Utricularia* (bladderworts) with mouse-trap like modified leaves and *Pinguicula* (butterwort) with sticky fly-paper modified leaves. Plants are rootless.
**Lentibulariaceae - bladderwort family**

Flowers strongly zygomorphic and often spurred. Many of the species are threatened or endangered.

*Utricularia cornuta*

horned bladderwort

*Utricularia intermedia*

flat leaved bladderwort
*Lentibulariaceae - bladderwort family

Bladderworts separated based on habitat, floral color, and position of bladders.

Utricularia vulgaris - common bladderwort
*Lentibulariaceae - bladderwort family

*Utricularia purpurea* - purple bladderwort

*Utricularia resupinata* - resupinate bladderwort
*Lentibulariaceae - bladderwort family

Endangered in WI and found only in Apostle Islands on exposed, bare rock (right). Far more common in MI and found in various habitats (above).

*Pinguicula vulgaris*
Butterwort
*Lentibulariaceae - bladderwort family

*Pinguicula vulgaris* Butterwort

Sticky “fly-paper” leaves – vs. “vacuum-trap” of *Utricularia*
*Bignoniaceae - trumpet creeper family

Tropical family of trees, shrubs, and woody vines consisting of 113 genera and 800 species.

Leaves mostly compound (exception is catalpa from North America).

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\text{CA (5) \ CO (5) \ A 2+2 \ G (2)}
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Flowers 5 merous, +/- 2 lipped, 4 stamens with a 5th staminode

Fruit either capsule or berry

*Campsis radicans* - trumpet creeper
Cultivated; from eastern North America
*Bignoniaceae - trumpet creeper family

**Catalpa speciosa**

Elongated capsules appearing like legumes

*Introduced from eastern North American and often escaped*