Diversity and Evolution of Asterids

...gentians, milkweeds, and potatoes...

Gentianaceae - gentian family

Cosmopolitan family of 80 genera and nearly 900 species. Herbs to small trees (in the tropics) with opposite leaves.

Flowers 4 or 5 merous; pistil superior of 2 carpels; parietal placentation; fruit capsular

Gentiana andrewsii - Bottle gentian

Gentiana puberulenta - Prairie gentian

Gentianopsis procera - fringed gentian

Genus is 4 merous with fringed petals
Gentianaceae - gentian family

Gentianopsis crinita - fringed gentian

Gentianella quinquefolia - stiff gentian

Gentianella is 4-5 merous, without fringe, and without plaits between petal lobes.

Apocynaceae - dogbane family

Mainly tropical family of trees and vines with opposite leaves. Milky latex commonly poisonous and source of medicinal drugs.

Vinca minor - periwinkle

Introduced ground cover, often spreading

Apocynum androsaemifolium

Spreading dogbane

CA (5) CO (5) A5 G 2

Flowers 5 merous, small, and with 2 separate carpels.

Apocynum androsaemifolium

Apocynum sibiricum

Spreading dogbane

Hemp dogbane

Fruits are follicles with cottony seeds for wind dispersal.

Apocynum androsaemifolium

Apocynum sibiricum

Spreading dogbane

Hemp dogbane
Asclepiadaceae - milkweed family

Now placed in Apocynaceae. Opposite leaves generally (rarely whorled or alternate). Heavy latex system of nasty compounds. Flowers often in umbels; fruits of each flower 2 follicles.

Asclepiadaceae - milkweed family

Note 2 free carpels slightly fused at top

Corona = hood + crest
Gynoecium = A + G
Pollinia = pollen mass

Asclepiadaceae - milkweed family

Unusual corona structure for nectar reward

Corona = hood + crest
Gynoecium = A + G
Pollinia = pollen mass

Asclepiadaceae - milkweed family

Fusion of 5 stamens and top of gynoecium

Corona = hood + crest
Gynoecium = A + G
Pollinia = pollen mass
Asclepiadaceae - milkweed family

Corona = hood + crest
Gynostegium = A + G
Pollinia = pollen mass

Asclepias amplexicaulis - Clasping milkweed

“Las Vegas” strategy of pollination; but when occurs, all % ovules are fertilized. Typically few follicles are produced per plant. Note seeds with coma attached for wind dispersal.
Asclepiadaceae - milkweed family

- Asclepias syriaca - Common milkweed
- Asclepias incarnata - Swamp milkweed

Rubiaceae - coffee family

- Coffea arabica - coffee
- Galium - Bedstraw

Opposite or whorled leaves
Inter-petiolar stipules

The family has inferior ovary.

All species in Wisconsin are 4-merous; species in the tropics are largely 5-merous.

Galium aparine - cleavers

Cleavers and bedstraws are numerous; separated by number of whorled leaves and fruit type.
Rubiaceae - coffee family

*Galium obtusum* - wild madder

*Galium lanceolatum* - wild licorice

Cephalanthus occidentalis - buttonbush

Only shrub in Wisconsin; restricted to riparian forest or lake edges. Note “heads” of tiny flowers.

Houstonia caerulea - azure bluet

Special concern

Mitchella repens

Partridge berry, twin-berry

Note: paired flowers above with connate pistils; “twin” berry to right
Solanaceae - nightshade family

- Large cosmopolitan family of alternate-leaved herbs, vines, or shrubs with cyme inflorescences
- Important family for nasty compounds (and drugs)
- Important for source of foods (potato, tomato, pepper)

Solanum dulcamara
Bittersweet

Solanum - tomato & eggplant

Capsicum - pepper

Solanaceae - nightshade family

edible fruits include . . .

Atropa belladona
Brugmansia
Datura innoxia

Nicotiana tabacum

Solanaceae - nightshade family

drug plants include . . .

CA (5) CO (5) AS S G (2)

• 5 - merous flowers
• axile placentation
• berry fruited

Capsicum - pepper

Solanum dulcamara
Bittersweet

Solanum tuberosum
Horse nettle

Solanum lycopersicum
Tomato
Solanaceae - nightshade family

- stamens often terminal, pored for buzz pollination by bees

Solanum carolinense - Horse nettle

Solanum dulcamara - Bitterweet

Physalis alkekengi - Japanese lantern

Solanum carolinense - Horse nettle
Solanaceae - nightshade family

*Physalis virginiana*
Ground cherry
Note: calyx surrounding berry

*Solanaceae - nightshade family*

*Datura stramonium*
Jimson-weed
Introduced, hallucinogenic roadside weed
also called thorn-apple