Diversity of Wisconsin Rosids

... violets, willows, spurges ...
Violaceae - violet family

A tropical to temperate family of 800 species in about 20 genera. They comprise herbs (ours) to vines and trees. Over 200 are violets (Viola). Wisconsin has around 28 species of Viola and 1 member of Hybanthus.

Viola tricolor - pansy, jonny-jump-up

Viola affinis - sand violet
Violaceae - violet family

Hybanthus concolor - green violet
Special concern, almost extirpated
Violaceae - violet family

Violets herbaceous – basal or stemmed leaved
Leaves often heart shaped and palmately veined or lobed, and sometimes palmately compound.

Stipules are well developed.
Violaceae - violet family

- Flowers insect pollinated, with nectar guides, and strongly zygomorphic
- Perianth 5 merous
- Lower petal spurred, 2 lower stamens have spurs going back into the petal spur
- 5 stamens form extensions of connective around style
- Pistil 3 carpellate with parietal placentation
Violaceae - violet family

Pistil forms 3 parting capsule in chasmogamous flowers (open flowers) from out-crossing

Cleistogamous, or closed flowers, form small capsules via self-pollination (note the parietal placentation in upper capsule)
Violaceae - violet family

V. pedata
Bird’s-foot violet

V. pedatifida
Prairie violet

early spring, open area violets
Violaceae - violet family

*V. pubescens* - downy yellow violet
A stemmed yellow violet

*V. canadensis* - Canada white violet
A stemmed white violet

early spring, woodland violets
Violaceae - violet family

V. *sororia* - dooryard violet
*Wisconsin state flower!*

One of many stemless purple violets — these often hybridize making them particularly difficult to key out

V. *macloskeyi*
*Wild white violet*
*A small white flowered violet*
Hypericaceae - St. John’s-wort family

A small family of temperate herbs or small shrubs of 9 genera and 560 species (= Clusiaceae or Guttiferae). In Wisconsin we have 2 genera (*Hypericum* and *Triadenum*) and 14 species. Some are invasive.

All of our species are opposite leaved.

Many of the species have leaves that are **punctate** - with quite visible clear to black dots, these sometimes seen on petals as well.

*Hypericum punctatum* - St. John’s-wort
Hypericaceae - St. John’s-wort family

Flowers yellow (*Hypericum*) or pink (*Triadenum*)

Stamens many, often grouped at base

Hypericum perforatum - Klamath weed [ecologically invasive]
Note the perforations along edge of yellow petals
Hypericaceae - St. John’s-wort family

Pistil made up of 3 to 5 fused carpels with axile or parietal placentation

Fruit a capsule

Hypericum pyrimidatum
great St. John’s wort
Hypericaceae - St. John’s-wort family

*Triadenum virginicum*
marsh St. John’s wort

Wetland species with pinkish petals and fewer stamens
Salicaceae - willow family

A woody family of about 55 genera and over 1000 species – most willows. In Wisconsin we have 2 genera (*Populus, Salix*) and 6 species. All have simple, alternate leaves.

*Populus deltoides* - American cottonwood
Salicaceae - willow family

A woody family of about 55 genera and over 1000 species – most willows. In Wisconsin we have 2 genera (*Populus, Salix*) and 6 species. All have simple, alternate leaves.
Salicaceae - willow family

*Populus* - poplars, cottonwood, aspens

Trees **dioecious** = male and female trees, sometimes clonal

Male and female flowers reduced and in **catkins** or **aments** - wind pollinated!

Male flowers are reduced to essentially stamens

Female flowers reduced to only a 2-3 carpellate pistil, with large feathery styles

*Populus deltoides*
American cottonwood
Salicaceae - willow family

The flowers possess a **disk**, which is probably reduced sepals

Each flower is subtended by a **bract** = modified leaf

Fruit is a capsule which release the seeds with a **coma** attached (cottony hairs; how cottonwood gets its name)

Wind dispersed seeds as well!
These aspens are clonal from root sprouts, fast growing, light wooded, and important for pulp in the paper industry.

Bark is light grey; leaves have flattened petioles.
Salicaceae - willow family

*Populus balsamifera*
Balsam poplar, balm-of-gilead

*Populus alba*
White poplar
Introduced from Europe
Salicaceae - willow family

*Salix* - willows

Dioecious as in *Populus*

But, both wind and insect pollinated!
Salicaceae - willow family

Unlike *Populus*, the willow flowers have no disk, but instead a **gland** for nectar production and insect pollination in addition to wind pollination.

Like *Populus*, the willow flowers have bracts; and the fruit is a capsule with cottony seeds.

*Salix*, (a) twig with catkin, (b) floral diagrams of male and female flowers, (c) male flower, (d) female flower, (e) capsule.
Salicaceae - willow family

*Salix* - willows

Many species are “precocious” - flower before leaves flush in spring

*Salix discolor* - pussy willow
Salix pedicellaris - bog willow

Salix humilis - prairie willow
Note capsule and cottony seeds
Euphorbiaceae - spurge family

A large cosmopolitan family of trees, shrubs, and herbs

Latex bearing and filled with nasty chemicals (source of rubber, castor oil, tapioca, poinsettia).

Leaves alternate, simple (often palmately lobed) or palmately compound.

Family has unisexual flowers, 5 sepals, no petals, numerous stamens, 3 fused carpels, and capsules

\[
\begin{array}{cccc}
\text{CA} & \text{CO} & \text{A} & \text{G} \\
5 & 0 & \infty & 0 \\
5 & 0 & 0 & 3
\end{array}
\]

*Ricinus* - castor oil bean
Euphorbiaceae - spurge family

*Acalypha rhomboidea* – copper leaf, mercury (native)

A Wisconsin example of this typical type of male and female unisexual flower arrangement
Euphorbiaceae - spurge family

*Croton glandulosus* – sand croton (naturalized)

A Wisconsin example of this typical type of male and female unisexual flower arrangement
A quite different arrangement of unisexual flowers is seen in many of our spurges of the genera *Euphorbia* and *Chamaesyce*.
Euphorbiaceae - spurge family

The “flower” of our flowering spurge is actually a highly modified inflorescence = cyathium

*Euphorbia corollata* - flowering spurge (native)

Shown here are 3 cyathia; the whole unit here is one cyathium
Euphorbiaceae - spurge family

Cyathium is composed of:
- glands
- appendages of glands
- many 1-stamened male flowers (no perianth)
- one 3-carpellate female flower (no perianth)
Euphorbiaceae - spurge family

_Euphorbia virgata_ (E. esula) - leafy spurge

One of several species labelled “obnoxious weed” by state law

Clonal growth, out-competes range plants as it spreads westward, and avoided by cattle and other animals.
Euphorbiaceae - spurge family

*Euphorbia polygonifolia* (Chamaesyce p.) - seaside spurge

One of several species that are restricted to the Great Lakes coasts with wider disjunct distributions along the Atlantic marine coasts (also includes beach pea, sea rocket)
Celastraceae – bittersweet family
An important tropical family of vines. We have vines, shrubs, and herbs.

*Celastrus scandens* – American bittersweet
Celastraceae – bittersweet family

An important tropical family of vines. We have vines, shrubs, and herbs.

*Euonymus atropurpurea* – Eastern wahoo, burning-bush
Celastraceae – bittersweet family

*Parnassia* - grass of parnassus - has now been moved from unrelated to Saxifragaceae. Note the *staminodia*.

*Calciphiles* (adapted to high calcium areas like fens, limestone pavement- e.g. Door Co.)
Cucurbitaceae - melon family

A tropical, subtropical, and temperate family of vines. Most noted for important fruits such as gourds, melons, cucumbers.

_Echinocystis lobata_- wild cucumber

Alternate, simple leaves which are typically palmately lobed and veined.

Tendrils are modified inflorescences.
Cucurbitaceae - melon family

Flowers unisexual and plants monoecious

Sepals and petals are both fused; stamens are weird, female flower is epigynous

Male flower left

Female flower right
Cucurbitaceae - melon family

Fruit is a berry with leathery rind = **pepo** (pumpkin)

Flowers unisexual and plants monoecious

Sepals and petals are both fused; stamens are weird, female flower is epigynous
Cucurbitaceae - melon family

*Echinocystis lobata*
wild cucumber

Note the many small male flowers and few female flowers going into fruit and spiny pepo.

Early spring seedlings are common with 2 large cotyledons.
Cucurbitaceae - melon family

*Sicyos angulata* - bur cucumber

Small “burred” cucumber or pickle-like fruits can be seen on bottom right
Vitaceae - grape family

Vines in the tropics and temperate areas. In Wisconsin we have 2 genera and 6 species. Includes one of the most celebrated of all plants *Vitis vinifera* - wine grape.

Flowers are small and usually clustered in more showy inflorescences. Fruits berries with several seeds.

*Parthenocissus tricuspidata* - Boston ivy

*Vitis* - grape
Vitaceae - grape family

Leaves simple in *Vitis* (grapes) and usually compound in *Parthenocissus* (woodbines, Boston ivy); venation and lobing usually strongly palmate.

Plants climb by *tendrils* = modified branches or inflorescences; others climb by *holdfasts*; these often negatively phototropic.
Vitaceae - grape family

*Parthenocissus quinquefolia* - Virginia creeper, woodbine
Vitaceae - grape family

Parthenocissus quinquefolia
Virginia creeper, woodbine

Parthenocissus inserta
grape woodbine
Vitaceae - grape family

Vitis riparia (+ V. vulpina)
River, frost grape

Vitis aestivalis
Summer grape