Diversity of Wisconsin
Rosids

... oaks, birches, evening primroses ...

a major group of the woody plants (trees/shrubs) present at your sites
The Wind Pollinated Trees

- Alternate leaved tree families
- Wind pollinated with ament/catkin inflorescences
- **Nut** fruits = 1 seeded, unilocular, indehiscent
  (example - acorn)
*Juglandaceae - walnut family*

Well known family containing walnuts, hickories, and pecans

Only 7 genera and ca. 50 species worldwide, with only 2 genera and 4 species in Wisconsin

*Juglans cinera*
Butternut, white walnut

*Carya ovata*
Shagbark hickory
*Juglandaceae - walnut family*

Leaves pinnately compound, alternate (walnuts have smallest leaflets at tip)

Leaves often aromatic from resinous peltate glands; **allellopathic** to other plants

*Juglans cinera*
Butternut, white walnut

*Carya ovata*
shagbark hickory
The chambered pith in center of young stems in *Juglans* (walnuts) separates it from un-chambered pith in *Carya* (hickories).
Trees are **monoecious**

Wind pollinated

**Juglandaceae - walnut family**

*Juglans nigra*

Black walnut

Female flower

Male inflorescence
Male flowers apetalous and arranged in pendulous (drooping) catkins or aments on last year’s woody growth

Calyx small; each flower with a bract

**Juglandaceae - walnut family**

*Juglans cinera*
Butternut, white walnut
*Juglandaceae - walnut family*

Female flowers apetalous and terminal

Calyx cup-shaped and persistent; 2 stigma feathery; bracted

Juglans cinera  
Butternut, white walnut

Juglans nigra  
Black walnut

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*Juglandaceae - walnut family*

Fruit a **nut**
Single ovule fused to ovary wall
Surrounded often by persistent 4-parted calyx which can become fleshy; thus sometimes mistakenly called a “drupe”

*Carya cordiformis*
Bitternut hickory

*Juglans cinera*
Butternut, white walnut
*Juglandaceae - walnut family

Fruit a **nut**
Single ovule fused to ovary wall
Surrounded often by persistent 4-parted calyx which can become fleshy; thus sometimes mistakenly called a “drupe”
*Juglandaceae - walnut family*

One of the most prized of all lumber trees for fine furniture is black walnut - primarily southern Wisconsin tree.

*Juglans nigra* - black walnut
Previously wide-spread, the butternut is now “special concern” species with up to 60% of the trees in Wisconsin now infected with the butternut canker fungus (**Sirococcus clavigignenti-juglandacearum**).
One of the more common trees of more mesic to xeric forests over much of Wisconsin - oak/hickory forests - is the shagbark hickory with its characteristic peeling bark and usually 5 leaflets.
Carya cordiformis
Bitternut hickory

*Juglandaceae - walnut family

Usually 7 leaflets
**Fagaceae - beech family**

Similar to Juglandaceae, except simple leaves and nut enclosed by subtending bracts; comprise 8 genera and about 1000 species

In Wisconsin we have beech, oaks, and chestnut

_Fagus_ - beech

_Castanea_ - chestnut

_Quercus_ - oak
American beech is characteristic of mesic forests in eastern Wisconsin - beech/maple forest

Beech apparently colonized Wisconsin from both the southeast and northeast via Upper Peninsula

*Fagus grandifolia* - American beech
**Fagaceae - beech family**

Branches are flattened, leaves with toothed edges

2 pistillate flowers (2 nuts) surrounded by one set of bracts

*Fagus grandifolia - American beech*
*Fagaceae - beech family*

*Quercus*, the oaks, have bracts below female flower that coalesce into a woody cup of the **acorn** fruit (nut)

*Quercus* usually separated into two groups:

**White oaks** - rounded leaf lobes, thinner walled xylem of summer wood, fruit matures in 1 yr

**Red oaks** - bristle tipped leaf lobes, thicker xylem, fruit matures in 2 yrs
**Fagaceae - beech family**

*White oaks* - rounded leaf lobes, thinner walled xylem of summer wood, fruit matures in 1 yr

*Red oaks* - bristle tipped leaf lobes, thicker xylem, fruit matures in 2 yrs

Extensive (!) hybridization within each of the two groups — species boundaries not at all clear
**Fagaceae - beech family**

White oak - Alleghenian species typical of more mesic woodlands in Wisconsin.

*Quercus alba* - white oak
**Fagaceae - beech family**

Bur oak: Ozarkian element species of xeric oak woodlands and oak savannas

*Quercus macrocarpa*  
bur oak
**Fagaceae - beech family**

Other white oaks:

- *Quercus muhlenbergii*  
  Chinquapin oak

- *Quercus bicolor* - swamp white oak
**Fagaceae - beech family**

Red oaks:

*Quercus rubra*
Red oak
**Fagaceae - beech family**

Red oaks:

*Quercus velutina*
Black oak

*Quercus coccinea*
Scarlet oak
special concern
**Fagaceae - beech family**

*Castanea dentata* American chestnut

Introduced

2 female flowers per spiny involucre
**Fagaceae - beech family**

*Castanea dentata*
American chestnut
Massachusetts in late 1800s

Japanese chestnut in Connecticut - resistant

*Castanea dentata*
American chestnut
**Betulaceae - birch family**

Strictly monoecious family of shrubs and small trees

Both female (erect) and male (drooping) inflorescences are in aments/catkins

Fruit a small nut or 1 seeded samara, subtended by 3-lobed bract
**Betulaceae - birch family**

*Betula papyrifera* - paper birch
**Betulaceae - birch family**

*Betula pumila*
Bog birch

*Betula allegheniensis*
Yellow birch
Characteristic of northern hardwood forest; requires rich humus of tree falls to germinate; once prized veneer tree
**Betulaceae - birch family**

*Betula nigra - river birch*

River birch is a classic floodplain tree species south of the tension zone growing with silver maple.
**Betulaceae - birch family**

*Alnus*, the alders form extensive thickets in wet areas or along rivers and lakes; seeds form in woody “cone” inflorescences.
**Betulaceae - birch family**

*Ostrya virginiana* - eastern hop hornbeam, ironwood
Note the hops-like inflorescence

2 trees of mesic woods:

*Humulus* – hops
*Cannabinaceae*
**Betulaceae - birch family**

2 trees of mesic woods: and

*Carpinus caroliniana*
Hornbeam, blue beech, muscle tree
Note the sinewy trunk
**Betulaceae - birch family**

**Corylus americana**
Hazelnut, filbert

**Corylus cornuta**
Beaked hazelnut, filbert

Hazelnuts or filberts are small shrubs with highly prized fruits low in saturated fats.
Myricaceae - bayberry family

Dioecious shrubs or subshrubs with sweet aromatic smell

Fix atmospheric nitrogen via actinomycetes (Frankia) in roots (found in bogs, sandy soil)

*Myrica gale* - sweet gale

*Comptonia peregrina* - sweet fern
*Lythraceae - loosestrife family*

Close relative of the evening primrose family; mainly tropical in distribution

4 genera and 5 species occur in Wisconsin, most of these are wetland plants

Flowers 4, 5, or 6 merous with stamens double the number of sepals and in two distinct sets

**Hypanthium** well developed but with superior pistil = **perigynous**

*Lythrum alatum* - winged loosestrife
*Lythraceae - loosestrife family

- **tristyly** common — 3 levels at which 2 sets of anthers and 1 set of styles are positioned
*Lythraceae - loosestrife family

*Lythrum salicaria*

purple loosestrife

Ecologically invasive in wetlands; from Europe
*Lythraceae - loosestrife family

2 unrelated “loosestrifes”
Lythrum & Lysimachia

Lythrum alatum - winged loosestrife
Native species hybridizing with L. salicaria?
*Lythraceae - loosestrife family

Decodon verticillatus - swamp loosestrife

This species has whorled leaves = “verticillilate”
*Onagraceae - evening primrose family*

A moderate sized family of 17 genera and about 650 species - most diverse in western N. America

6 genera and about 30 species in Wisconsin

*Oenothera biennis* - evening primrose

4 merous flowers, epigynous, and often well developed **hypanthium**

Evening primrose is hawkmoth pollinated
*Onagraceae - evening primrose family

**Chamerion angustifolium** - fireweed  **Epilobium stricta** - willowherb

*Chamerion & Epilobium* have capsules opening to release seeds with comas
*Onagraceae - evening primrose family

*Circaea canadensis* - enchanter’s nightshade

*Circaea alpina*
Northern enchanter’s nightshade

2 merous flowers; fruit is one-seeded and bristly
*Onagraceae - evening primrose family

* Oenothera (Gaura) biennis - gaura
* Ludwigia palustris - water primrose
*Geraniaceae - geranium family

Family often scented; 2 genera in Wisconsin

Common lavender flowered plant with lobed basal leaves seen in many forest sites at final exam time

Geranium maculatum- wild geranium
*Geraniaceae - geranium family

Geranium maculatum - wild geranium

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5 merous flowers with a superior pistil made up of 5 carpels each with a single ovule
Fruit is a **schizocarp** = dehiscing fruit where each carpel breaks apart separately; here each carpel in breaking off a one-seeded **mericarp**
*Geraniaceae - geranium family

Geranium robertianum
Herb robert

Geranium sibiricum
Siberian crane’s - bill
*Geraniaceae - geranium family

The stork’s-bills of genus *Erodium* drill their mericarps into the ground

*Erodium cicutarium* - stork’s-bill
*Oxalidaceae - wood-sorrel family*

Family is both tropical and temperate with over 600 of the 900 species belonging to the genus *Oxalis*

Typically 3-foliate leaves (the real shamrock), plants often creeping

Leaves are acidic to taste due to oxalic acid in the form of calcium oxalate

*Oxalis corniculata* - creeping yellow wood sorrel
*Oxalidaceae - wood-sorrel family

Flowers similar to wild geranium family, but each of the 5 carpels have \( \infty \) seeds and produce capsules.

_**Oxalis stricta** - tall wood-sorrel_
**Oxalidaceae - wood-sorrel family**

The violet wood-sorrel is an early spring flowering plant of prairies and dry woodlands south of the tension zone.

Like the loosestrife and geranium families who all have 2 sets of stamens, trimorphic heterostyly (tristyly) is common.

*Oxalis violacea*
Violet wood sorrel
*Staphyleaceae - bladdernut family*

Single species in Wisconsin; easily recognized small tree by its striped bark, opposite odd-pinnately compound leaves, and 3 carpellate inflated or “bladder” fruit

*Staphylea trifolia* - bladdernut