Diversity of Wisconsin Rosids

... elms, mulberries, legumes ...

we will be seeing, in the next few lectures, many of the woody plants (trees/shrubs) present at your sites

Rhamnaceae - buckthorn family

A large family of trees and shrubs in the tropics and temperate areas. In Wisconsin we have 2 genera (Rhamnus and Ceanothus) and 6 species. Several are some of our most invasive shrubs in the forest sites you will study.

Many of our species are armed with thorns
Leaves are simple and alternate or opposite often with arcuate venation (arcing along the edge)

Rhamnus cathartica - European or common buckthorn [invasive] common 401 final exam shrub!

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

- Flowers 4 or 5 merous (4 merous shown in common buckthorn)
- Stamens opposite the petals - unusual in flowering plants!
- Fruits one-seeded drupes
- Shrubs often confused with cherries and hollies

Rhamnus cathartica - European or common buckthorn [invasive] common 401 final exam shrub!

Rhamnus alnifolia - alder leaf buckthorn [native]

Frangula alnus (=Rhamnus frangula) - Glossy buckthorn [invasive]

Rhamnus cathartica - European or common buckthorn [invasive]

Rhamnus alnifolia - alder leaf buckthorn [native]

Rhamnaceae - buckthorn family

Ceanothus americanus - New Jersey tea

Elaeagnaceae - Russian olive family

Elaeagnus angustifolia - Russian olive

Russian olive family are small trees and shrubs easily recognized by silvery or reddish glandular hairs covering bottom leaves and/or stems

Elaeagnus umbellata - autumn olive

Russian and autumn olive are invasive trees with alternate leaves
Elaeagnaceae - Russian olive family

Shepherdia argentea - silver buffalo-berry
Shepherdia canadensis - buffalo-berry

Buffalo-berries are North American species with opposite leaves.

Ulmaceae - elm family

A north temperate family of trees best known for the American elm with its distinctive vase shaped growth form. Dutch Elm disease, caused by the fungus Ceratostomella ulmi, is gradually destroying these magnificent trees. Dutch Elm disease was first discovered in this country in 1930.

Leaves are *distichously* arranged - 2 ranks in one plane - and pinnately veined.

Leaf bases are strongly asymmetric.

Ulmus americana - American elm

Flowers are bisexual but reduced and wind pollinated, they appear before the leaves.

Pistil is made of two fused carpels but only one seed matures; fruit is a *samara* - a winged achene is this case.

Note 2 styles on samara

Ulmus rubra - red or slippery elm

Red elm leaves are more sand papery in texture, less asymmetric at base; inner bark is reddish.

*Ulmus americana* - American elm

common 401 final exam treetlet!
Ulmaceae - elm family

Red elm leaves are more sand papery in texture, less asymmetric at base; inner bark is reddish
Samaras are larger than the American elm and without fringe of hairs along edge

Ulmus rubra - red or slippery elm

common 401 final exam treelet!

Ulmaceae - elm family

Rock elm has corky bark—otherwise leaves looks like a smoother American elm

Ulmus thomasii – rock or cork elm

Cannabaceae - marijuana family

A small family in the Great Lakes of 3 genera and 4 species of trees, herbs and vines. Plants palmi-pinnate (Celtis), palmately lobed (Humulus) or compound (Cannabis). Often distinctively aromatic plants. Flowers unisexual.

Cannabis sativa
Hemp, marijuana

Humulus lupulus
American hops

Celtis occidentalis
Hackberry

Celtis is a group of small trees previously placed in Ulmaceae or Celtidaceae. Hackberries have unisexual flowers. Leaves are strongly palmi-pinnate - with 3 main veins at base.

Note distinctive warty bark

Celtis occidentalis - hackberry

Fruit is a one-seeded drupe, not a berry!
Hemp is a resilient plant that can be used for fiber, oil, and in food. Wisconsin was once the number one hemp growing state, this bill “sets in motion” a path back to that level of productivity. There’s no worry about getting “high” by smoking the crop, as Marijuana contains around 15 percent THC, industrial hemp has only a fraction of one percent.
**Cannabaceae - marijuana family**

*Humulus lupulus*
American hops
Under cultivation, notice the hop female inflorescences which is source of beer flavoring - lupulin

*Humulus japonicus*
Japanese hops

**Urticaceae - nettle family**

Largely a tropical family of herbs and shrubs. In Wisconsin we have 5 genera and 6 species - all of them herbs and generally restricted to woodlands.

Some species, like stinging nettle, are a source of irritants found in specialized hair-like cells on stems and leaves.

Leaves have the palmipinnate venation, either alternate or opposite.

Flowers are reduced and unisexual, in congested inflorescences, and mostly wind-pollinated.
Urticaceae - nettle family

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Stamens have a peculiar elastic spring-like mechanism that flings pollen further out from the plant.

Leaves are palmi-pinnate as in other related families of the Rosales. Genera in Wisconsin can be separated by leaf arrangement, presence of stinging hairs, and inflorescence features.

Urtica dioica - stinging nettle

Laportea canadensis - wood nettle

Boehmeria cylindrica - false nettle

Parietaria pensylvanica - pellitory

Bischiera clydonacea - clearweed

Urticaceae - nettle family

Moraceae - mulberry family

A large and important family of tropical trees (figs, breadfruit). Two genera (Morus and Maclura) with 3 species occur in Wisconsin, although only 1 is native.

Well developed latex system occurs in the family and thus is easy to recognize by usually milky sap when leaves or stems are cut.

Leaves are alternate, strongly palmi-pinnately veined.

*Morus alba* - white mulberry (introduced, source of food for silk worms in the Orient) - has characteristic variable lobing of leaves.

*Morus alba* - white mulberry

*Morus alba* - white mulberry
**Moraceae - mulberry family**

*Morus alba* - white mulberry

Flowers reduced, unisexual, no petals

Single seeded fruits (fleshy achenes or drupelets) from many flowers coalesce to form one fleshy, **multiple fruit** (e.g., mulberry, fig, breadfruit)

*Morus alba - white mulberry (left: female, right: male)*

**Moraceae - mulberry family**

*Morus rubra* - red mulberry

Red mulberry is our one native species, and is quite rare and is a riparian edge specialist

*Morus rubra - red mulberry*

**Moraceae - mulberry family**

*Maclura pomifera* - osage orange

Osage orange is not native but often seen escaped; note the large grapefruit sized multiple fruit

*Maclura pomifera - osage orange*

**Moraceae - mulberry family**

Note the multiple fruit - derived from an entire inflorescence, not from just one flower

*Morus rubra - red mulberry*

Cross section of multiple fruit showing individual one-seeded fruitlets
Fabaceae

Produce specialized follicles - **legumes** - that open along two lines of dehiscence.

Fabaceae

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- These are all now treated as one family called the Fabaceae or Leguminosae.
- Older manuals and WisFlora separate into distinct groups:
  - "caesalpinoids"
  - "faboids"
  - "mimosoids"

Fabaceae

Most of the legumes are compound leaved - pinnately, palmately, trifoliolate - a few are simple leaved.

Stipules are generally well-developed.

Fabaceae

Most of the legumes are compound leaved - pinnately, palmately, trifoliolate - a few are simple leaved.
“caesalpinoid” legumes

Chamaecrista fasciculata (golden cassia, locust-weed)

Flowers 5 merous with 10 stamens; topmost petal = banner sits in front of the 2 lateral or wing petals

Gynoecium monocarpic and forms the legume

Cercis canadensis - eastern redbud

NOT native

Gleditsia triacanthos - honey locust

"caesalpinoid" legumes

Senna marilandica - southern wild senna

Senna hebecarpa - wild senna
“faboid” legumes

CA (5)  CO 3+(2)  A (9)+1  § 1

80 species in Wisconsin; many with root nodules for N₂ fixation
Calyx often fused
Banner petal behind lateral petals
Bottom keel petals often fused
Stamens diadelphous = 9 fused + 1 separate

Coronilla varia - crown vetch
Desmodium canadense - ticktrefoil

Baptisia leucophaea (=B. bracteata) - creamy wild indigo

Apios americana - groundnut

Lathyrus japonicus - beach pea
Lupinus perennis - lupine
“faboid” legumes

Robinia pseudo-acacia - black locust

invasive
common 401 final exam tree!

Melilotus alba
White sweet clover

Medicago sativa
alfalfa

Trifolium pratense
Red clover

Polygalaceae - milkwort family

Polygala paucifolia
gaywings, flowering wintergreen

Early flowering plant of northern hardwood pine forests

Polygala sanguinea
purple milkwort

Polygala polygama - bitter milkwort

Species characteristic of sandy soils; note the cleistogamous flowers = closed and selfing vs. chasmogamous = open and outcrossed