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 (arching along the edge)
- Inner bark is bright green

Rhamnus cathartica - European or common buckthorn (invasive) common 401 final exam shrub!

---

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.

- Flowers 4 or 5 merous (4 merous shown in common buckthorn)
- Stamens opposite the petals - unusual in flowering plants!

Rhamnus cathartica - European or common buckthorn (invasive) common 401 final exam shrub!
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 among our most invasive shrubs in the forest sites you will study.

**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)

*Rhamnus frangula* - Glossy buckthorn (invasive)

**Elaeagnaceae - Russian olive family**

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

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

Shepherdia argentea - silver buffalo-berry (western N. Am. Species but planted)

Shepherdia canadensis - buffalo-berry

Buffalo-berry is a 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 Ophiostoma 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

Ulmus rubra - red or slippery elm

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

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 in this case.

Note 2 styles on samara.

Ulmus americana - American elm

Ulmus rubra - red or slippery elm

common 401 final exam treelet!
**Ulmaceae - elm family**

*Ulmus rubra* - red or slippery elm

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

Common 401 final exam treelet!

---

**Ulmaceae - elm family**

*Ulmus thomasii* – rock or cork elm

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

*Humulus lupulus* - American hops

*Celtis occidentalis* - hackberry

*Cannabis sativa* - Hemp, marijuana

Note distinctive warty bark

---

**Cannabaceae - marijuana family**

*Humulus lupulus* - American hops

*Celtis occidentalis* - hackberry

*Celtis occidentalis* - hackberry

Fruit is a one-seeded drupe, not a berry!

---

*Humulus lupulus* - American hops

*Celtis occidentalis* - hackberry

*Cannabis sativa* - Hemp, marijuana

Note distinctive warty bark
**Cannabaceae - marijuana family**

- Female inflorescence
  - Seeds 1-seeded
  - *Cannabis sativa* Hemp, marijuana

- Male inflorescence

---

**Cannabaceae - marijuana family**

- *Cannabis sativa* L.
  - Fiber & oil cultivar
    - subsp. *sativa*
    - var. *spontanea*
    - var. *ruderalis*
  - “Domesticate”
    - Weakly intoxicant
    - Strongly intoxicant
  - “Wild”
    - Narcotic cultivar
      - var. *indica*
    - subsp. *indica*
      - var. *kafristanica*
      - var. *afghanica*

---

**Cannabaceae - marijuana family**

- Industrial hemp – part of Wisconsin agricultural past
  - Hemp farm outside Ripon

**Cannabaceae - marijuana family**

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

Humulus japonicus
Japanese hops

Cannabaceae - marijuana 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.

Urtica dioica - stinging nettle
Leaves have the palmate-pinnate venation; either alternate or opposite

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

Urtica dioica - stinging nettle

Flowers are reduced and unisexual, in congested inflorescences, and mostly wind-pollinated

Urtica dioica - stinging nettle

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
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.

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

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

Urtica dioica - stinging nettle

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

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
Moraceae - mulberry family

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

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

Morus rubra - red mulberry

Moraceae - mulberry family

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

Morus rubra - red mulberry

Moraceae - mulberry family

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

Maclura pomifera - osage orange

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

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

Allowed to call family **Leguminosae**

Legumes!

- Aster – 24K
- Orchid – 21K
- Legume – 19K
- Coffee – 13K
- Grass – 8K
- Mammal – 5K

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
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
“faboid” legumes

80 species in Wisconsin; many with root nodules for N\(_2\) fixation
Calyx often fused
Banner petal behind lateral petals
Bottom keel petals often fused
Stamens didelphous = 9 fused + 1 separate

Securigera (Coronilla) varia - crown vetch
Desmodium canadense - ticktrefoil

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

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

Robinia pseudo-acacia - black locust

invasive common 401 final exam tree!

Polygalaceae - milkwort family

A small family of herbs with flowers reminiscent of legumes; their closest relatives; milky latex in plant

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