



# 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

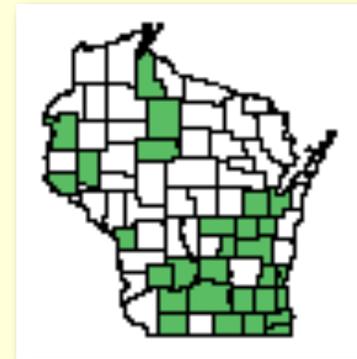
# Rhamnaceae - buckthorn family

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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Inner bark is bright green

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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!

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Fruits one-seeded drupes

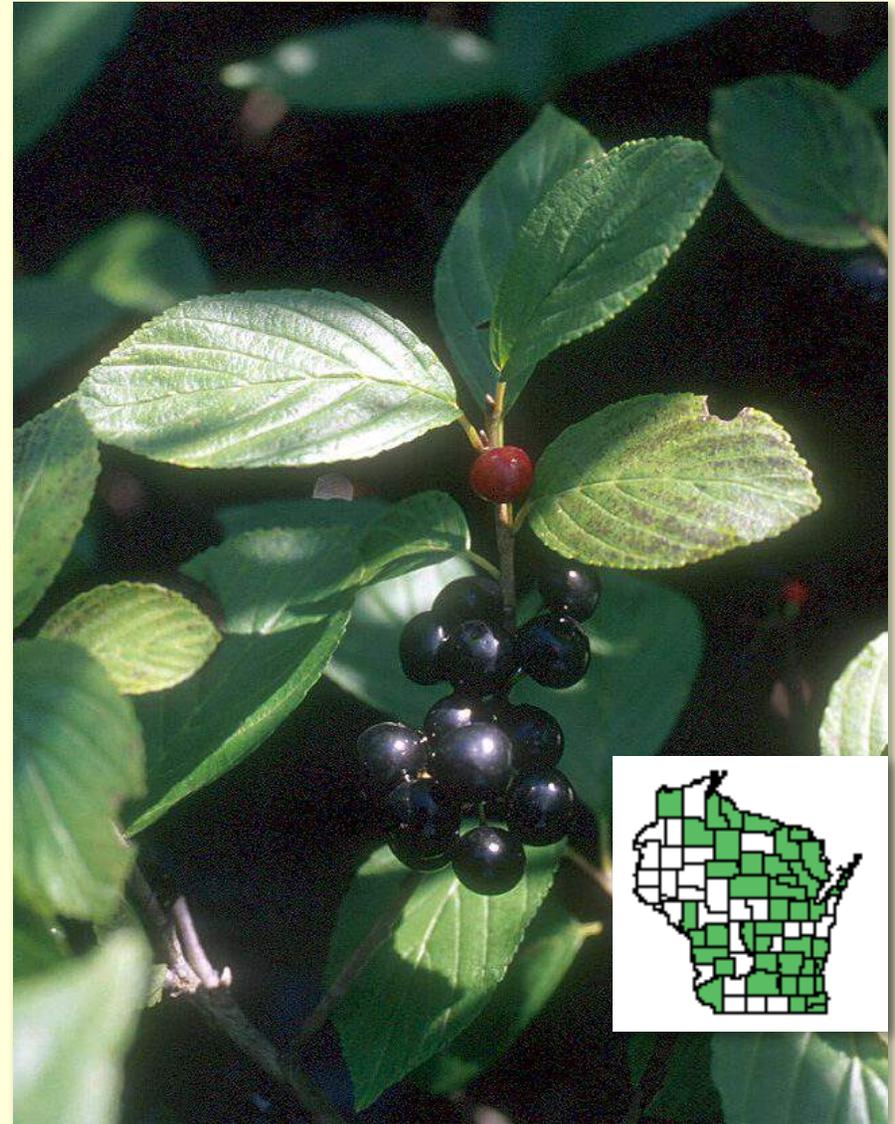
Shrubs often confused with cherries and hollies

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

# Rhamnaceae - buckthorn family

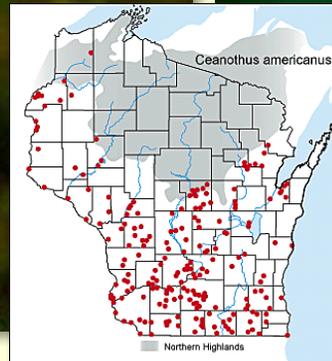
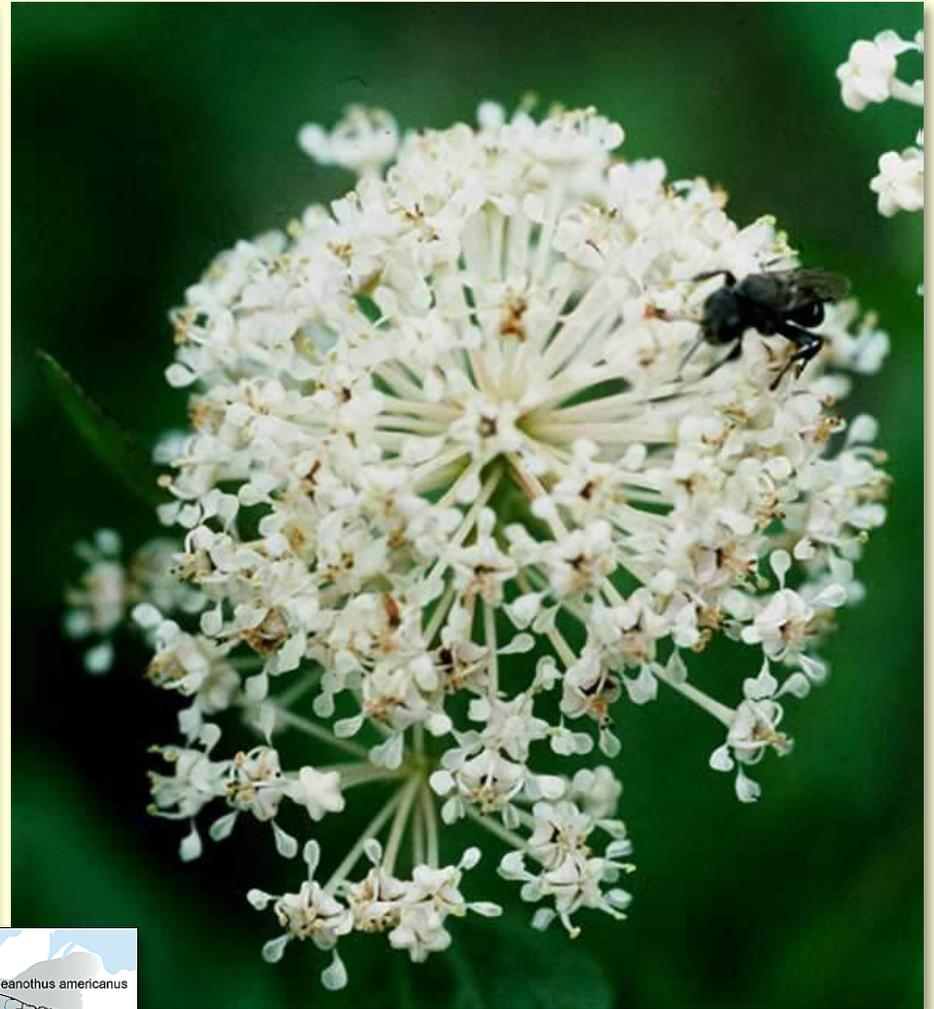


*Frangula alnus* (= *Rhamnus frangula*)  
Glossy buckthorn [invasive]



*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

Russian and autumn olive are invasive trees with alternate leaves



*Elaeagnus umbellata* - autumn olive



# Elaeagnaceae - Russian olive family

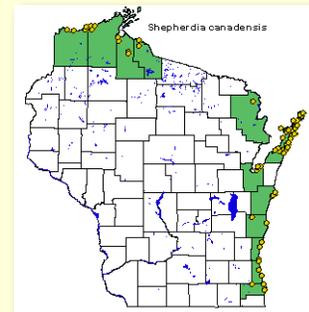


*Shepherdia argentea* - silver buffalo-berry (western N. Am. Species but planted)



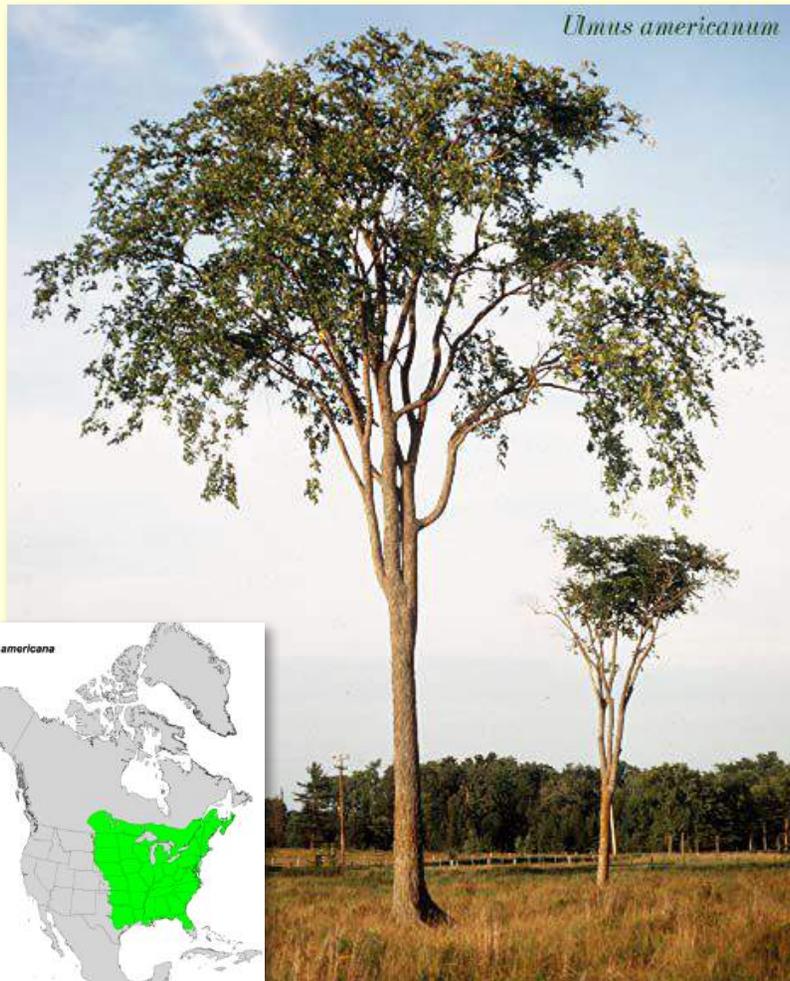
*Shepherdia canadensis* - buffalo-berry

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 *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



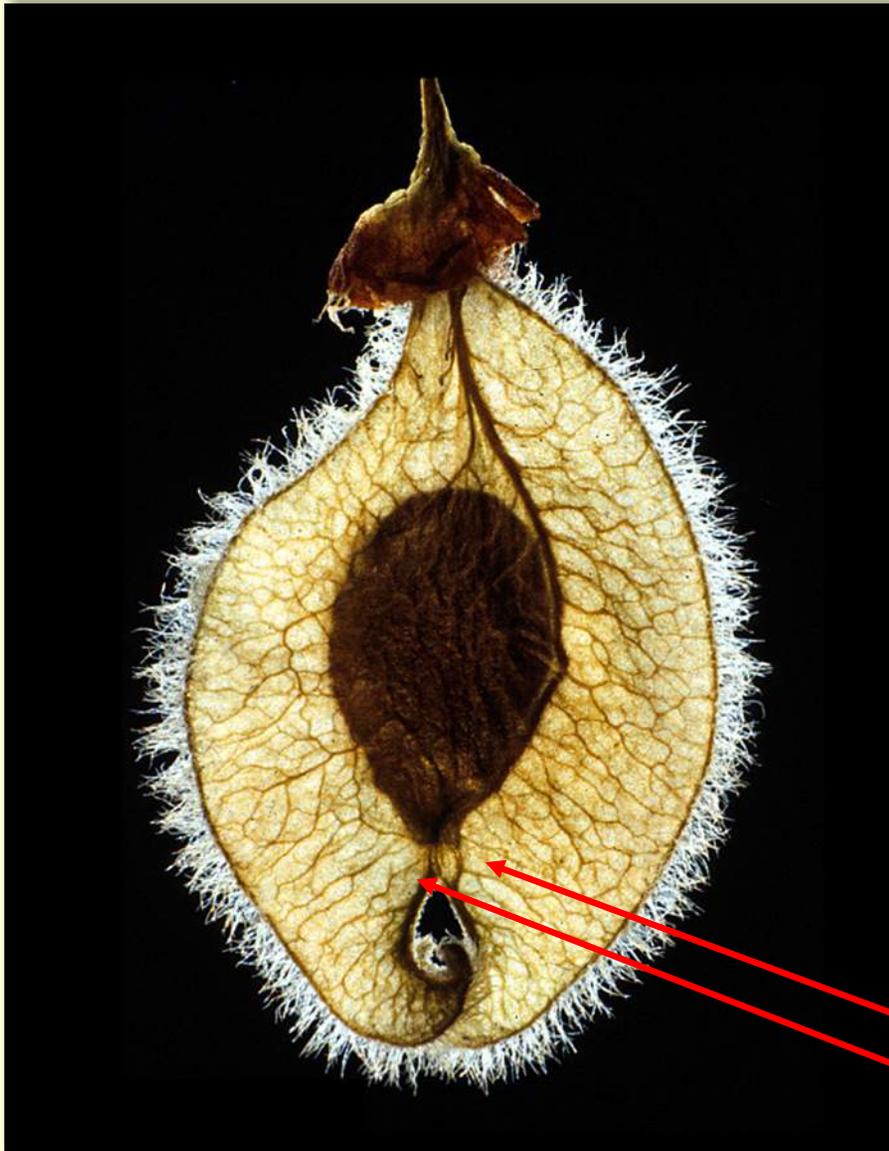
*Ulmus americana* - American elm



# Ulmaceae - elm family

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 americana* - American elm

# 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



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



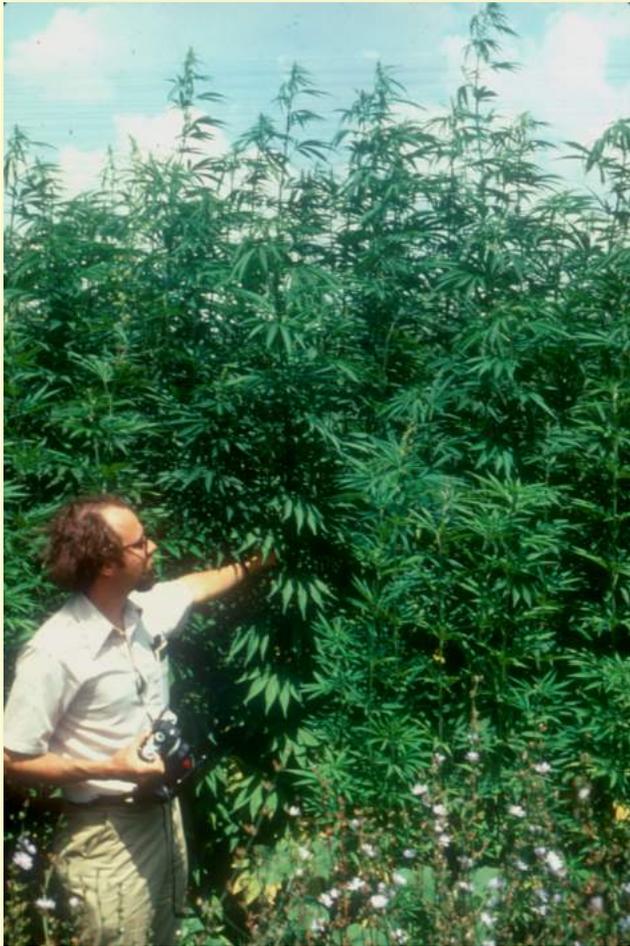
Rock elm has corky bark – otherwise leaves looks like a smoother American elm



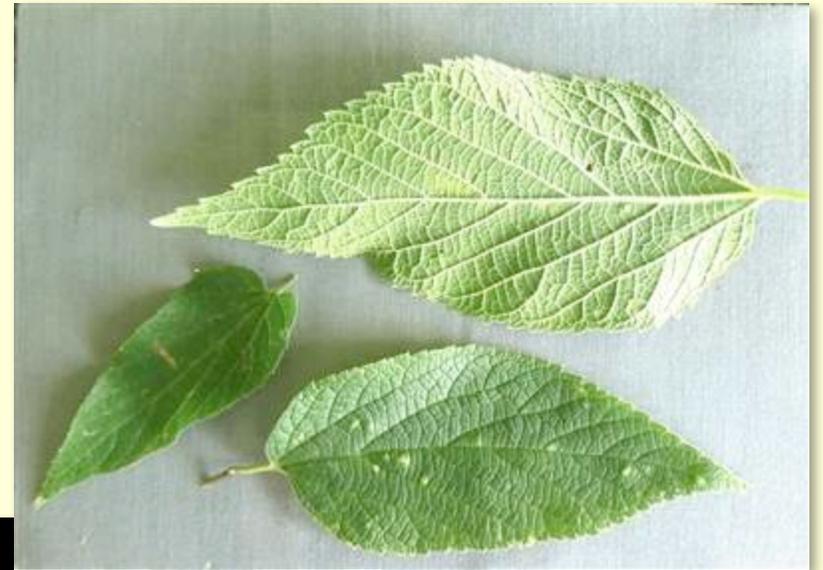
*Ulmus thomasii* – rock or cork elm

# 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



*Celtis occidentalis*  
Hackberry

*Humulus lupulus*  
American hops

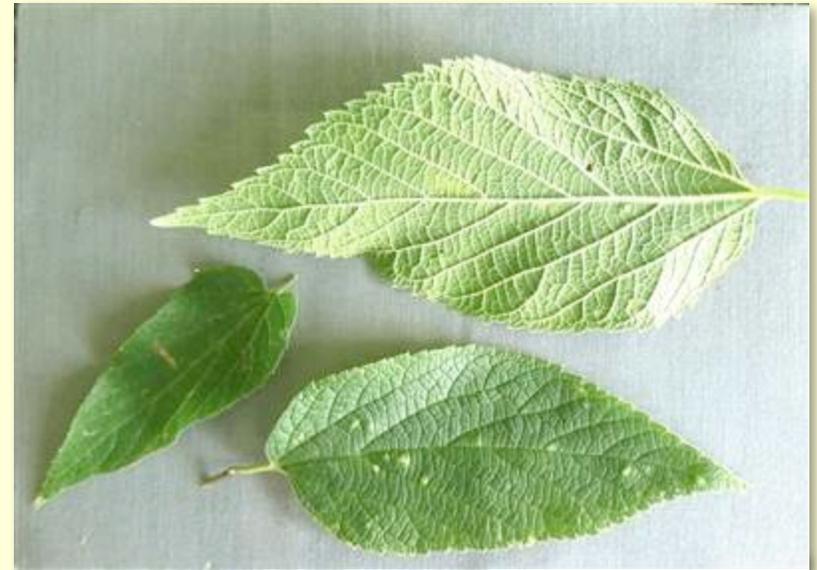
# Cannabaceae - marijuana family

*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.

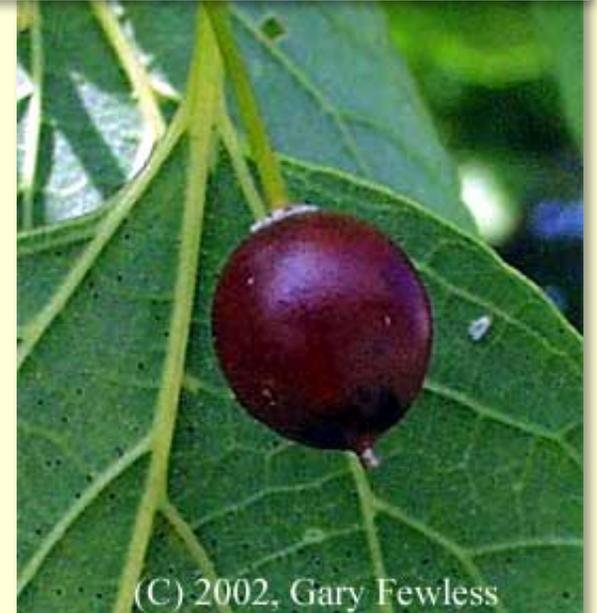


Note distinctive warty bark

*Celtis occidentalis*  
- hackberry

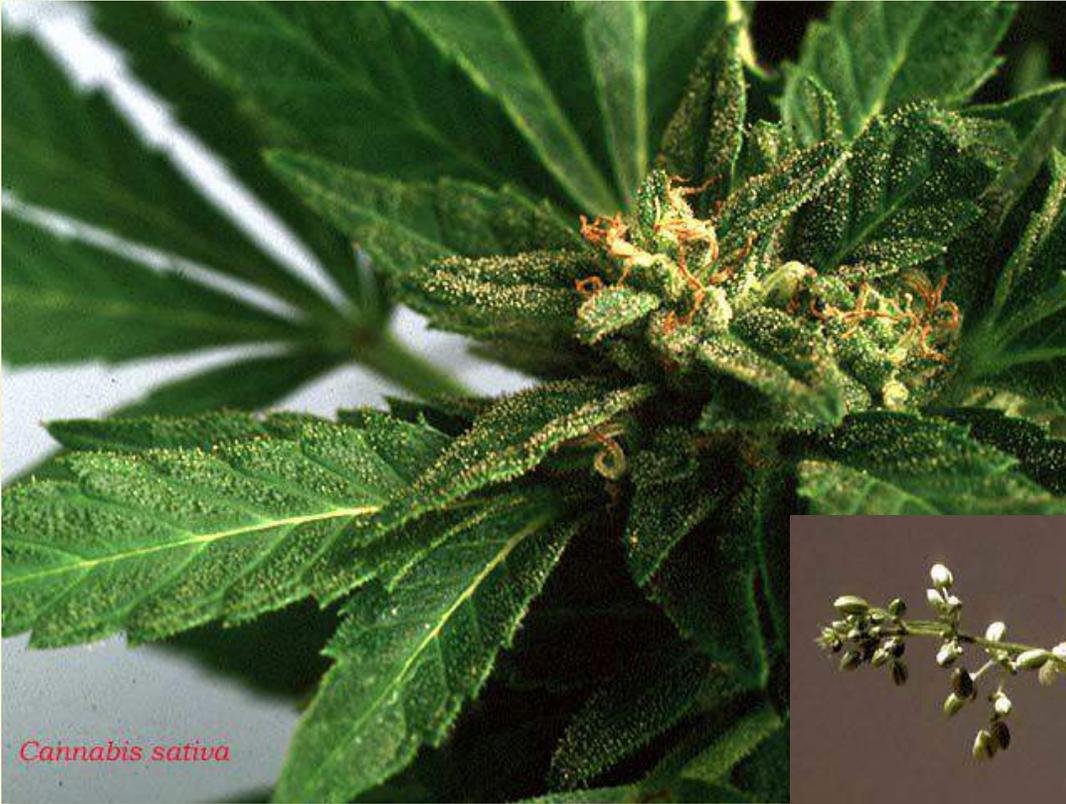


Fruit is a one-seeded drupe,  
not a berry!

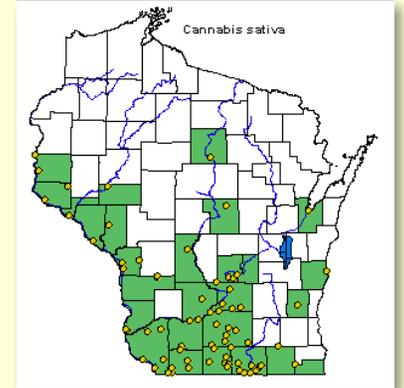


(C) 2002, Gary Fewless

# Cannabaceae - marijuana family



Female inflorescence  
Seeds 1-seeded



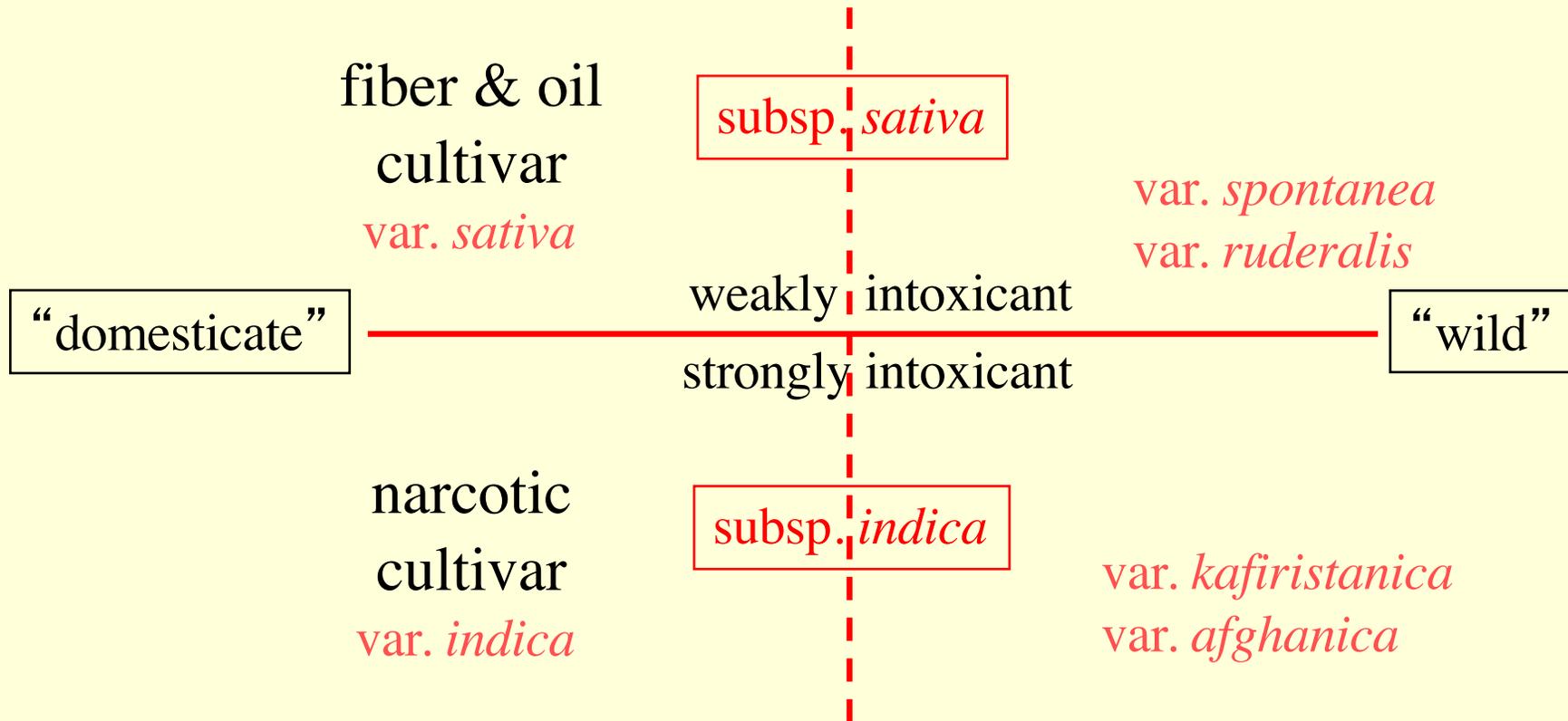
*Cannabis sativa*  
Hemp, marijuana

Male inflorescence



# Cannabaceae - marijuana family

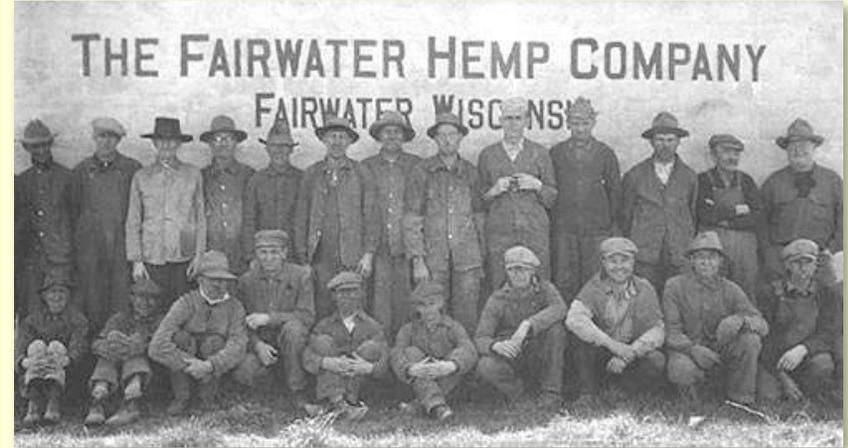
- *Cannabis sativa* L.



# Cannabaceae - marijuana family



*Hemp farm outside Ripon*



Industrial hemp – part of Wisconsin agricultural past



# Cannabaceae - marijuana family



*Humulus lupulus*  
American hops

Under cultivation; notice the hop female inflorescences which is source of beer flavoring - lupulin



## WISCONSIN HOP EXCHANGE GROWERS

Below is a map of our members and where they're currently growing!



# Cannabaceae - marijuana family

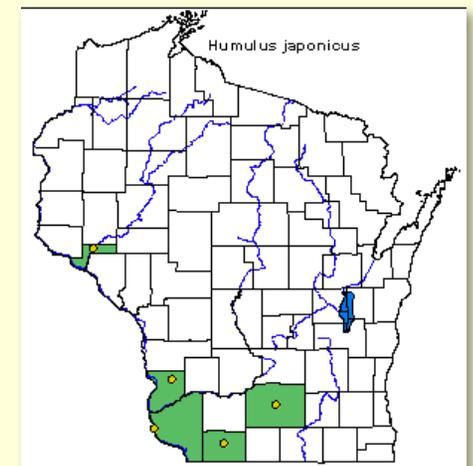


*Humulus lupulus*  
American hops

Under cultivation; notice the hop female inflorescences which is source of beer flavoring - lupulin



*Humulus japonicus*  
Japanese hops [escaped]



# 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.



Leaves have the palmipinnate venation; either alternate or opposite

*Urtica dioica* - stinging nettle

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

# Urticaceae - nettle family

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  
[opposite leaves, stinging]



*Laportea canadensis* - wood nettle  
[alternate leaves, stinging]



# Urticaceae - nettle family



*Boehmeria cylindrica*  
false nettle

*Boehmeria cylindrica*  
False nettle



*Parietaria pensylvanica*  
pellitory



*Pilea pumila*  
clearweed

# Moraceae - mulberry family



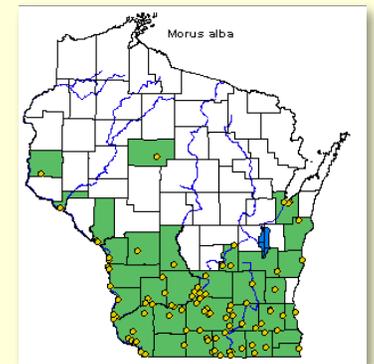
A large and important family of tropical trees (figs, breadfruit). Two genera (*Morus* and *Maclura*) with 3 species occur in Wisconsin, although only 1 is native.

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]

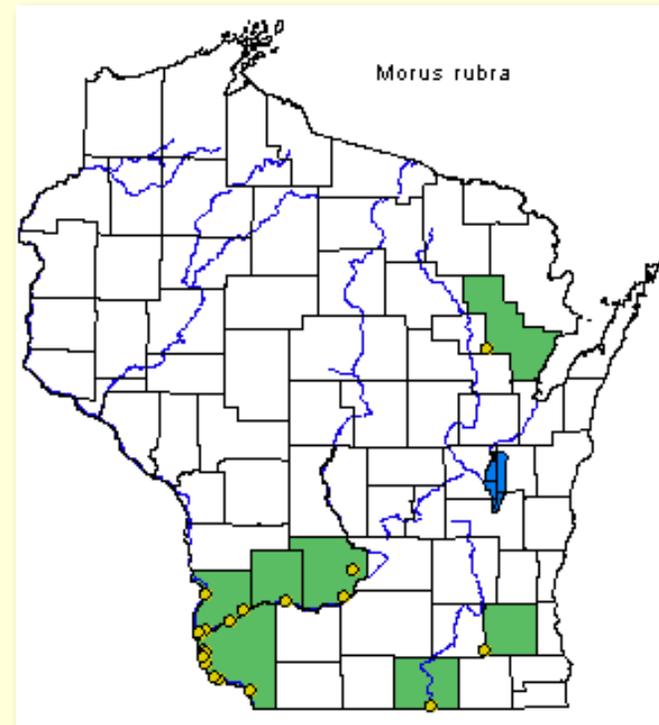


*Morus alba* - white mulberry [left - female ; right - male]

# 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

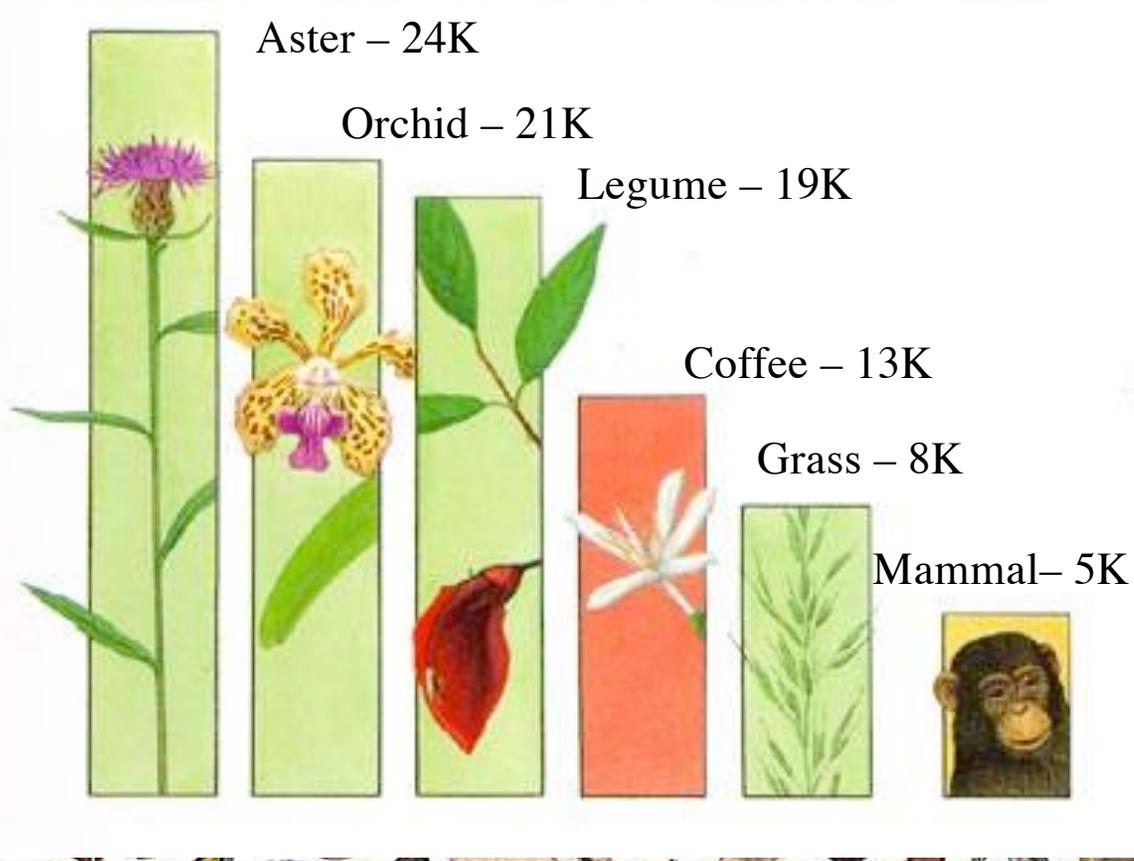


Produce specialized follicles - **legumes** - that open along two lines of dehiscence



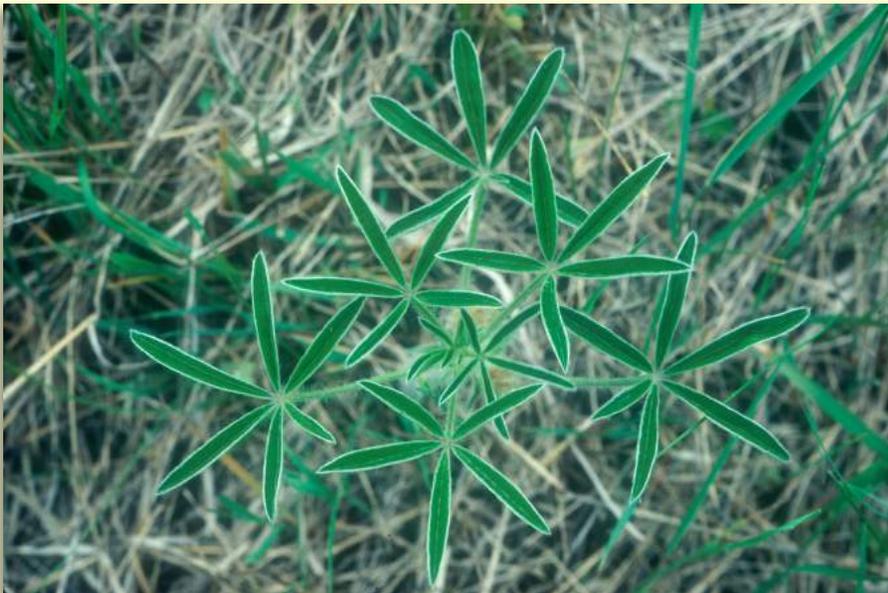
Allowed to call family **Leguminosae**

# Legumes!



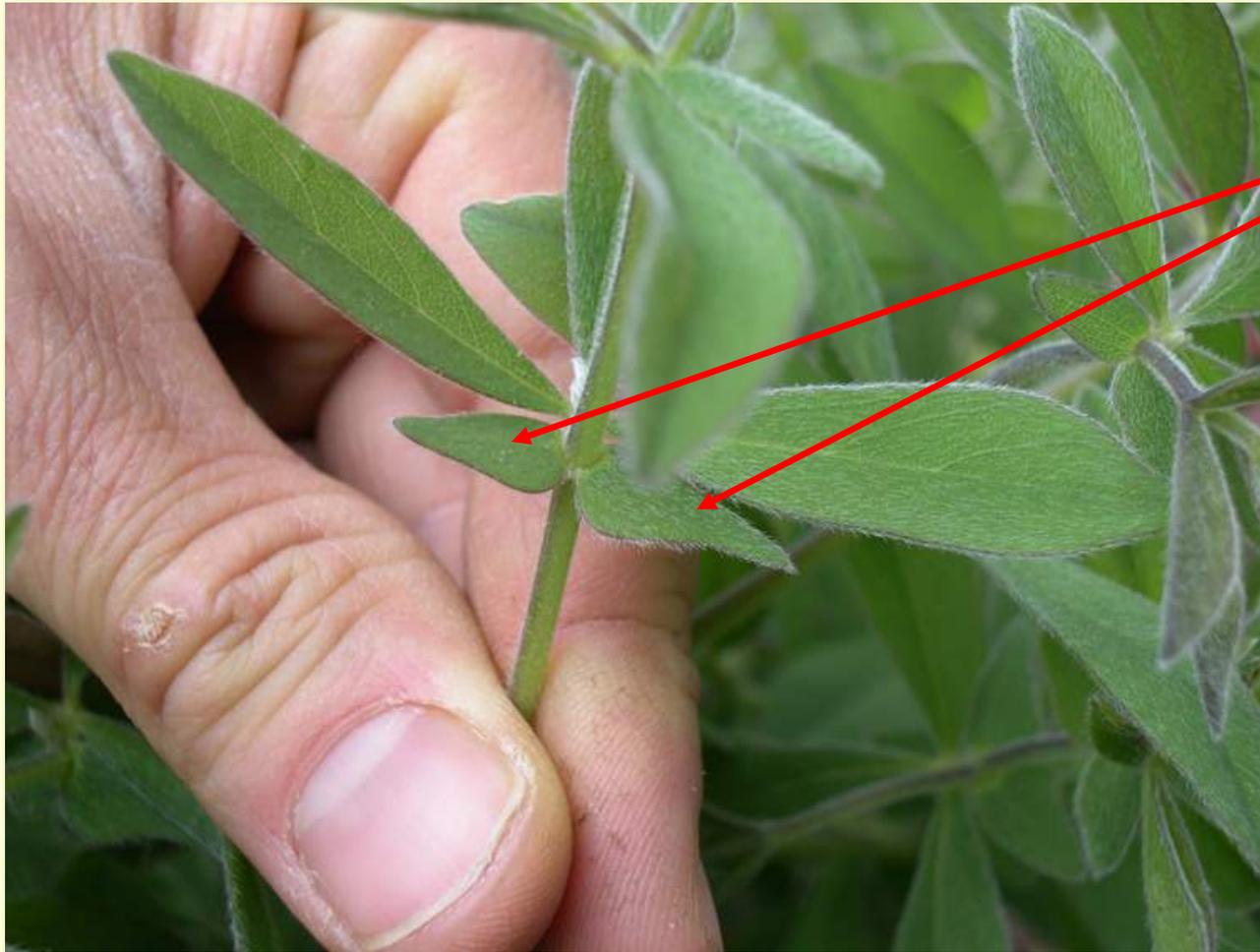
# Fabaceae

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



# Fabaceae

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



**Stipules** are generally well- developed

# “caesalpinoid” legumes

CA 5 CO 5 A 10 G 1



1 carpel

legume

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



*Chamaecrista fasciculata*  
golden cassia, locust-weed)

# “caesalpinoid” legumes



*Senna marilandica* - southern  
wild senna



*Senna hebecarpa*- wild  
senna

# “caesalpinoid” legumes



*Cercis canadensis* - eastern redbud  
NOT native

# “caesalpinoid” legumes

*Gleditsia triacanthos* - honey locust



# “faboid” legumes

CA (5) CO 3+(2) A (9)+1 G 1

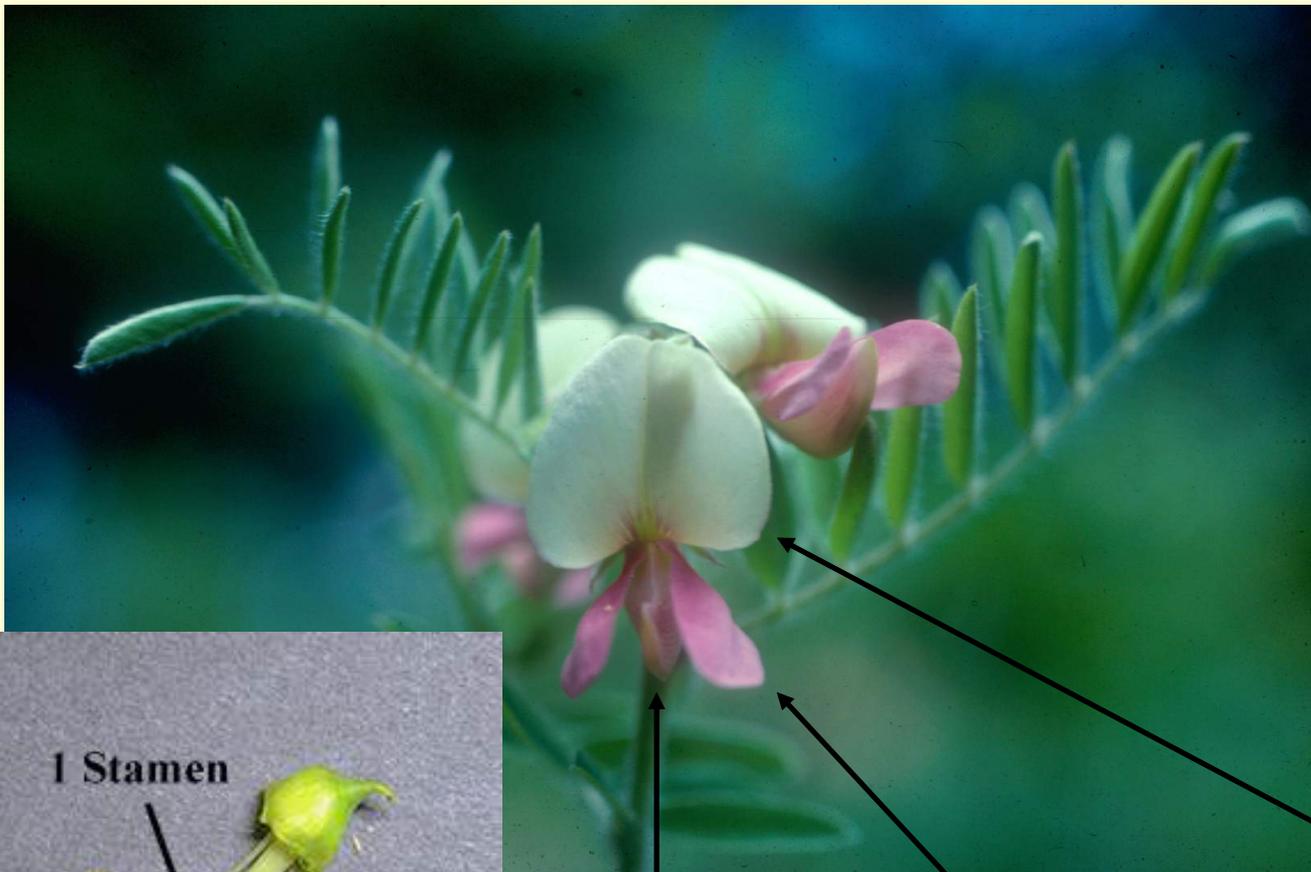
80 species in Wisconsin;  
many with root nodules for  
N<sub>2</sub> fixation

Calyx often fused

**Banner** petal behind **lateral**  
petals

Bottom **keel** petals often  
fused

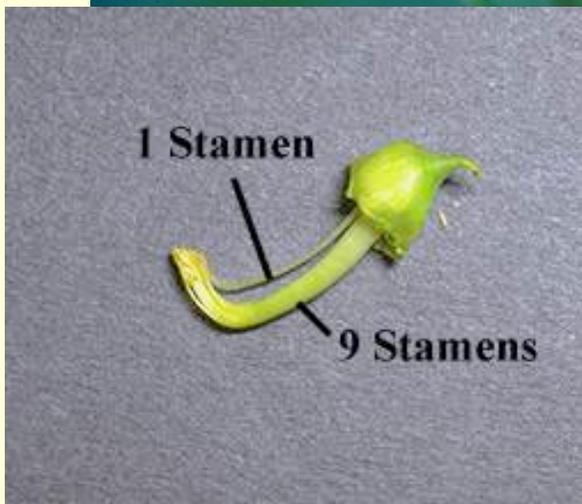
Stamens **diadelphous** =  
9 fused + 1 separate



banner petal

2 keel petals

2 lateral petals



1 Stamen

9 Stamens

# “faboid” legumes



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

*Apios americana* - groundnut



## “faboid” legumes



*Securigera (Coronilla) varia* - crown vetch



*Desmodium canadense* - ticktrefoil

# “faboid” legumes



*Lathyrus japonicus* - beach pea



*Lupinus perennis* - lupine

# “faboid” legumes



*Robinia pseudo-acacia* -  
black locust

invasive  
common 401 final exam tree!

# “faboid” legumes



*Melilotus alba*  
White sweet clover



*Vicia villosa*  
Hairy vetch



*Medicago sativa*  
alfalfa

*Trifolium pratense*  
Red clover

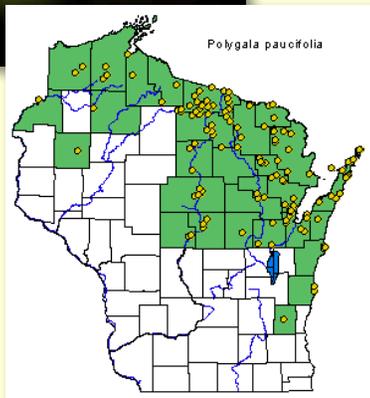


# Polygalaceae - milkwort family



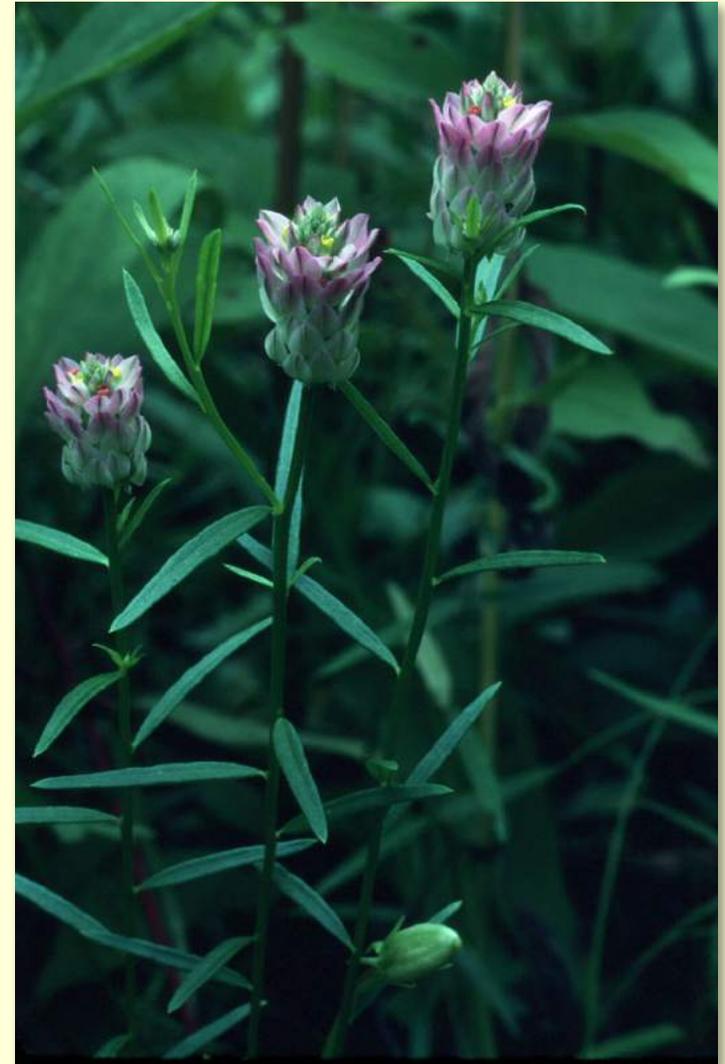
*Polygala paucifolia*  
gaywings, flowering wintergreen

Early flowering plant of northern  
hardwood pine forests



*Polygala sanguinea*  
purple milkwort

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



# Polygalaceae - milkwort family



*Polygala polygama* - bitter milkwort

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

