

The Plant ID Process

WDCP Wetland Delineation Class



The Plant ID Process

Presentation Goals:

- Provide an understanding of the plant ID process
- Introduce tools, resources and basic concepts for plant identification

Common Steps

- 1) Observing Your Surroundings
- 2) Observing Plant Characteristics
- 3) Identifying Plant Family
- 4) Narrowing to Plant Family and Genus
- 5) Using Guides, Websites and Keys to Identify Species

1) Observing Your Surroundings



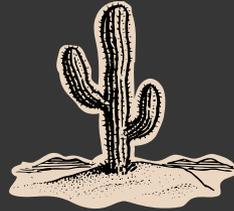
ID Hint: Visiting sites with ID enthusiasts can speed up the learning process

1) Observing Your Surroundings

Is it Wet?



Is it Dry?



Is the site ecologically intact?



Is the site degraded?

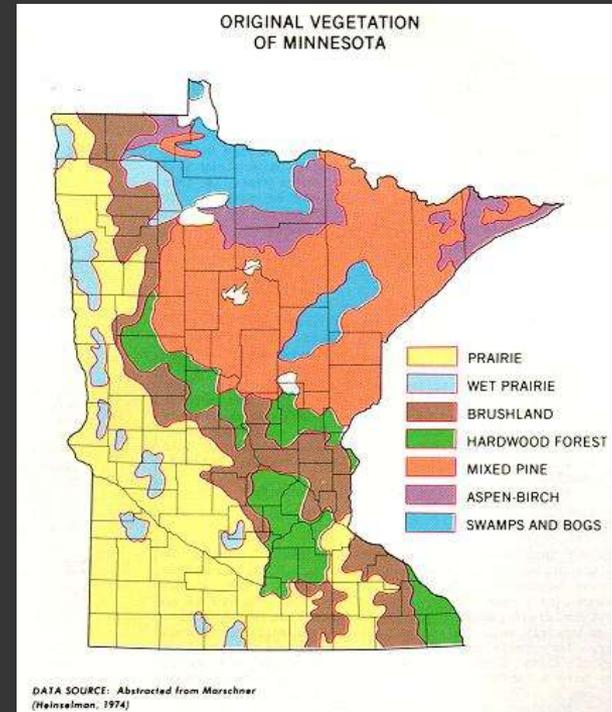
Other factors influencing what species may be present

- Region of the State

- Soils



- Plant Community Types Present





U.S. Army Corps
of Engineers

Regulatory Branch
St. Paul District

WETLAND PLANTS and PLANT COMMUNITIES of MINNESOTA and WISCONSIN

Third Edition · October 2011

By STEVE D. EGGERS AND DONALD M. REED



Common Plant Community Types



Common Plant Community Types

Floodplain Forest



Common Plant Community Types

Wet Meadow



Marsh Milkweed



Canada Blue-joint Grass

Common Plant Community Types

????



Prairie Cordgrass



Mountain Mint

Common Plant Community Types

????



Sweet Flag



Giant-bur Reed



There are Many Disturbed Community Types



Reed Canary Grass



Smooth Brome Grass



Common Buckthorn







2) Observing Plant Characteristics

2) Observing Plant Characteristics

All plants have unique characteristics



Broad-leaf cattail



ID Hint: Repetition, learning and re-learning is important to master plant ID

2) Observing Plant Characteristics

Many plant features help for ID:

- Flowers
- Underground root and stem structures
- Twigs
- Leaf arrangements
- Attachments of leaves to stems
- Leaf venation
- Shapes of leaf blades
- Leaf blade tips
- Leaf blade bases
- Leaf blade margins
- Surface of stems and leaves
- Modified plant parts
- Fruits and seeds



Butterfly Milkweed

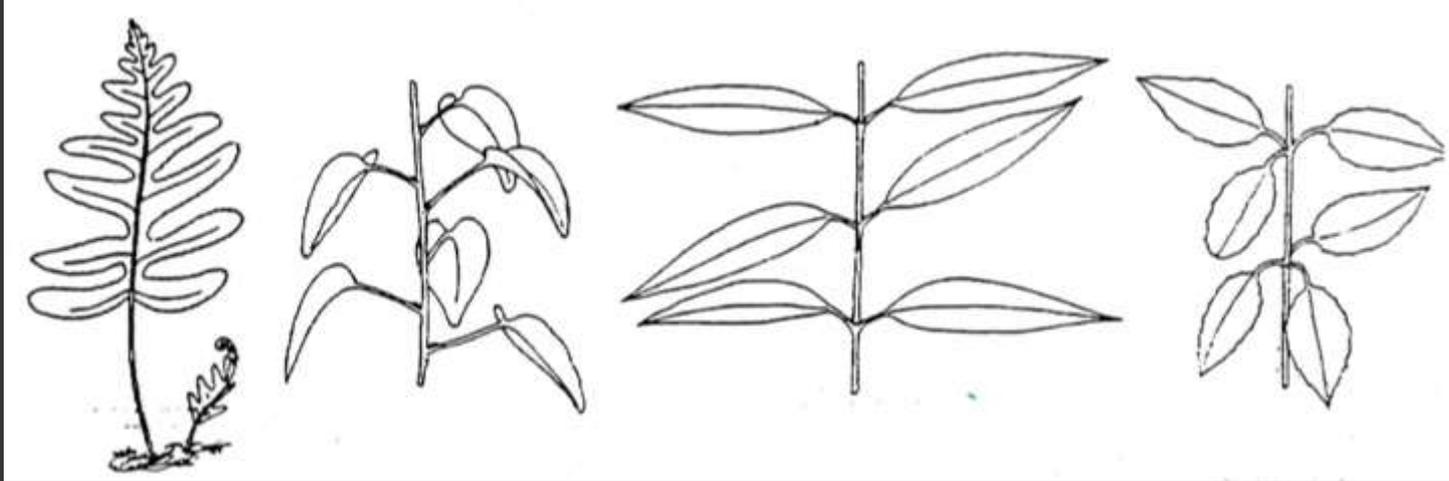
2) Observing Plant Characteristics

Other senses can be used, such as; feeling the texture of leaves and stems, smelling crushed leaves.



ID Hint: Creating flashcards can be an effective way to memorize names

Leaf Structure



Basal

Alternate

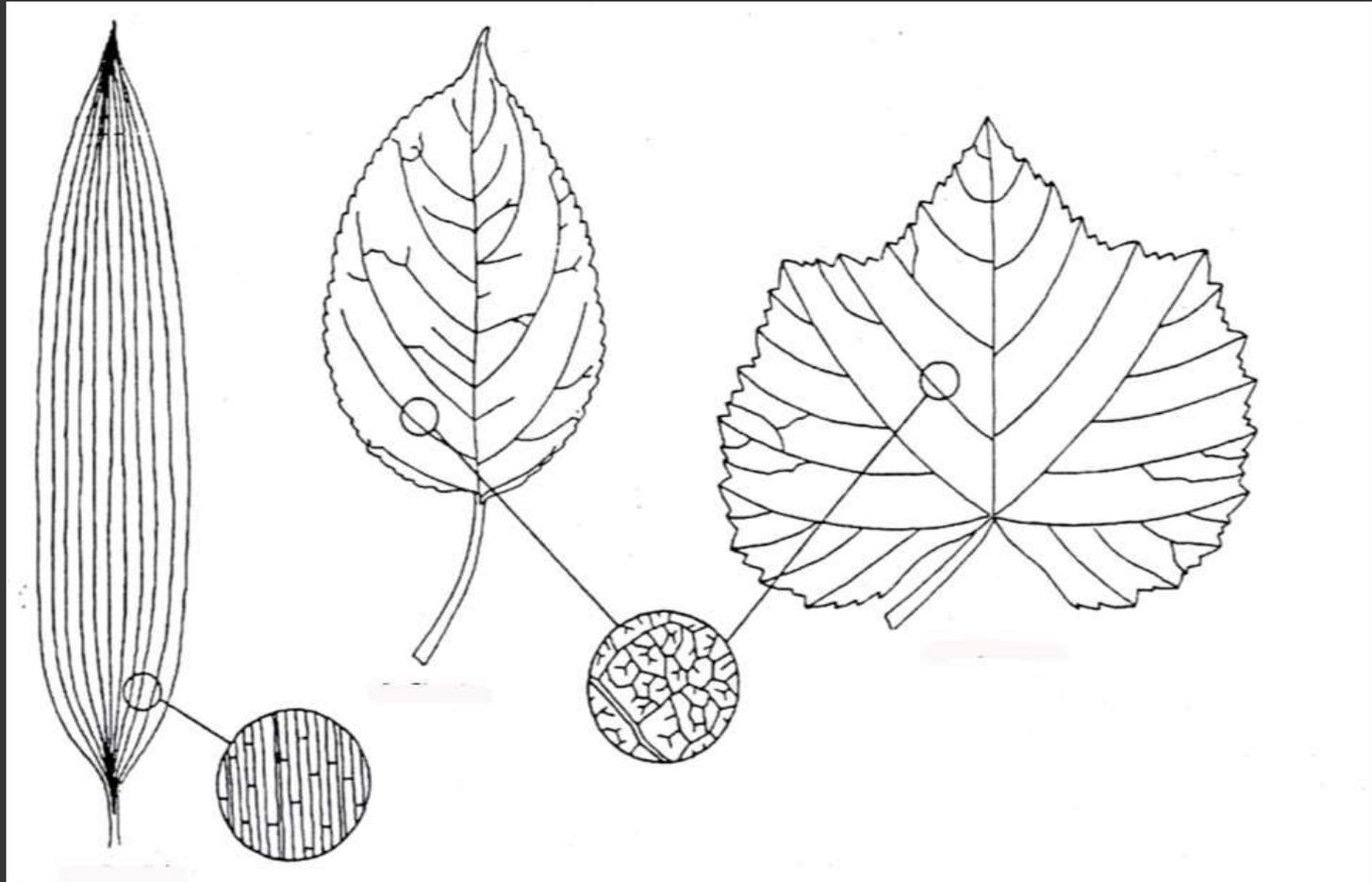
Opposite

Whorled



Bottle Gentian – alternate branching

Leaf Venation

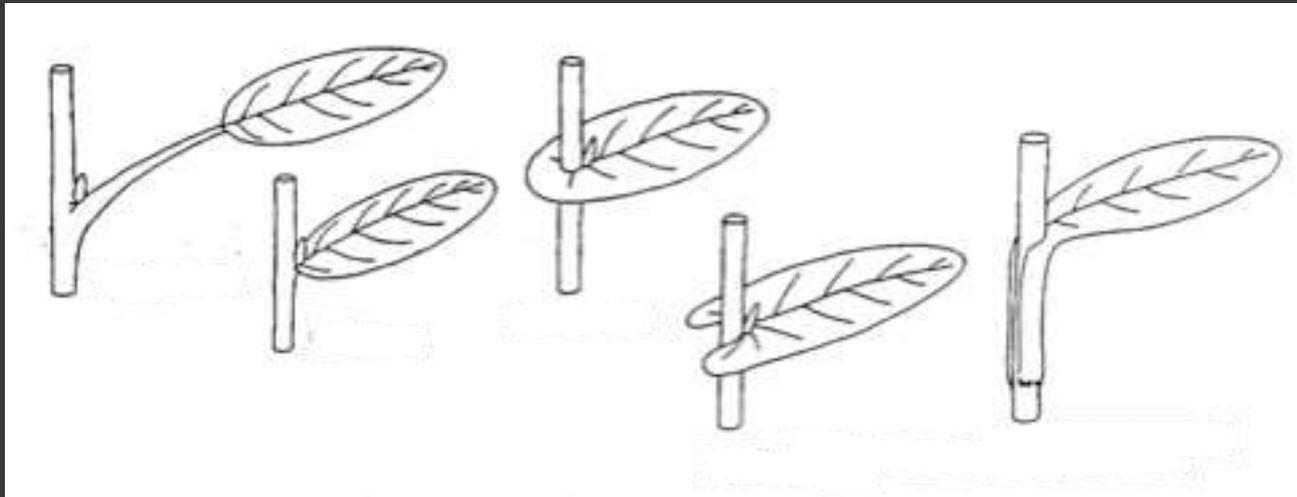


Parallel

Pinnate

Palmate

Attachment of Leaves to Stems



Petiolate

Sessile

Perfoliate

Clasping

Sheathing



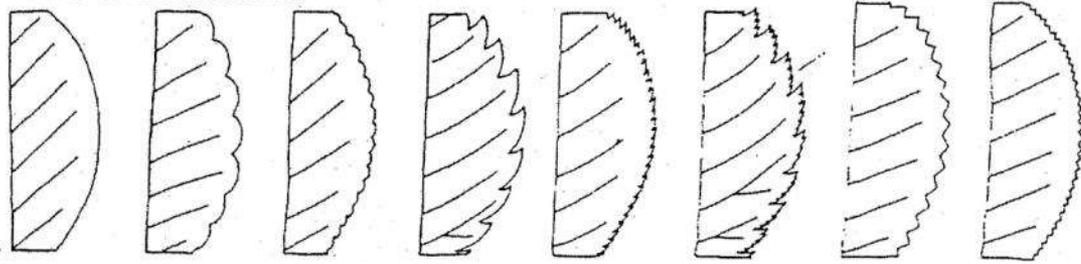
Cup Plant – Perfoliate leaves



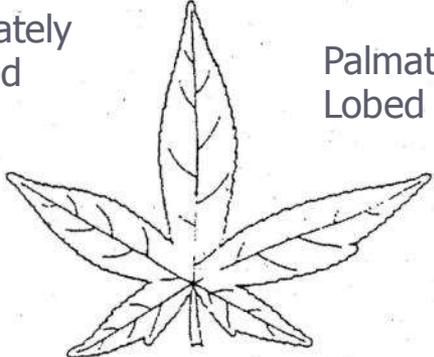
Boneset – Perfoliate leaves

Leaf Edges

LEAF MARGINS



Pinnately Lobed



Palmately Lobed



Leaf Margins:

Texture



Goldenrods



New England Aster



Black-eyed susan

Glossy buckthorn

Frangula alnus



<http://www.uvm.edu/~alarosa/nr260/images/alderbuckthorn1.jpg>

- Non-native shrub
- Wavy leaf margins lack teeth
- Glossy leaves
- No thorns at the end of branches



NCNE	MW	GP
FAC	FACW	FAC

Common Buckthorn

Rhamnus cathartica

NCNE	MW	GP
FAC	FAC	FACU



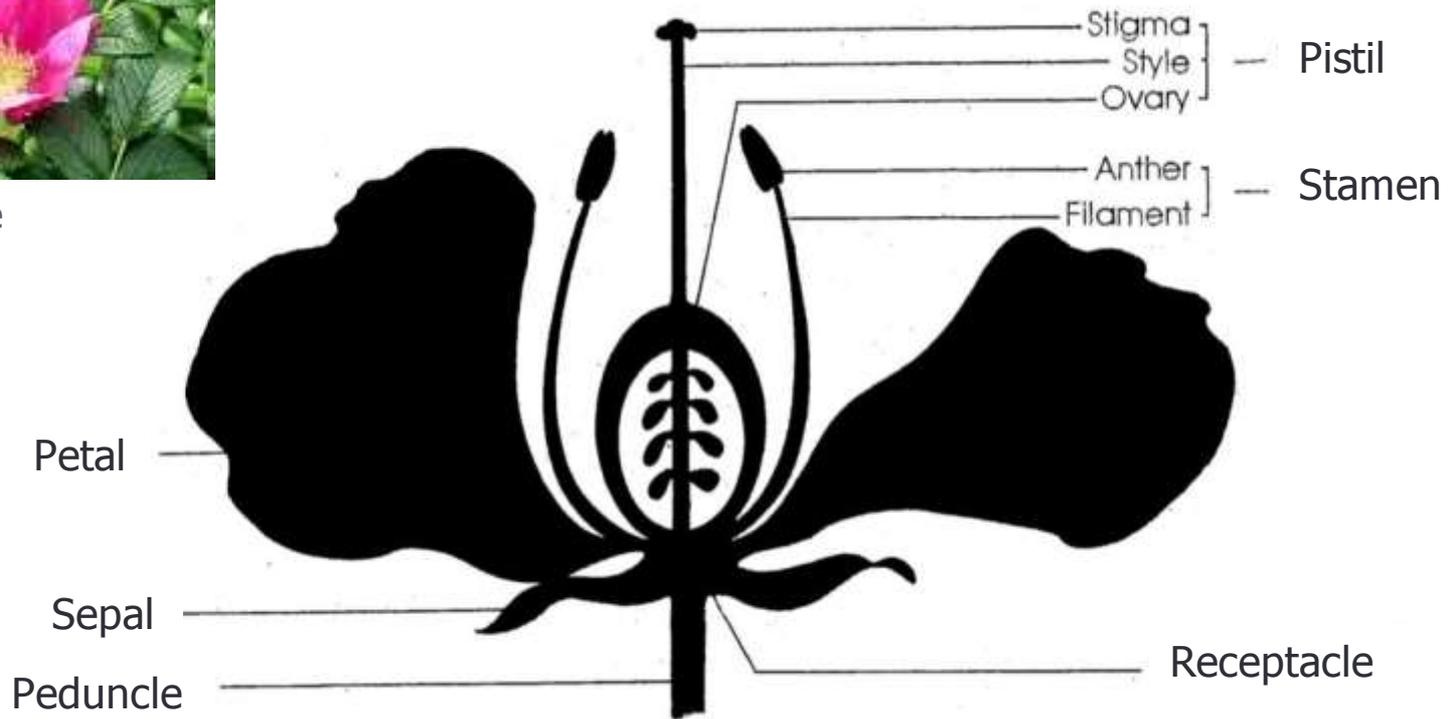
- Invasive shrub
- Toothed leaf margins
- Leaf veins curve up toward leaf tip
- Stem ends in a thorn



Flower Anatomy



Wild rose



Inflorescence Structure

Terms Related to Inflorescence

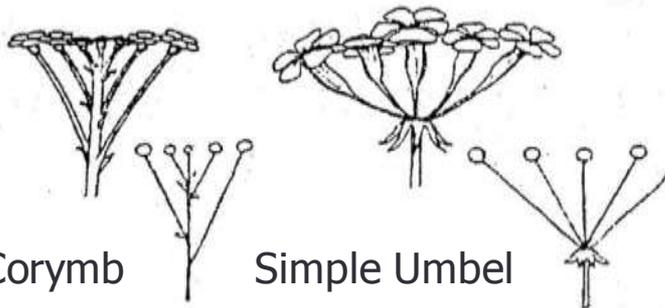
Inflorescence – The flowering part of a plant



Panicle

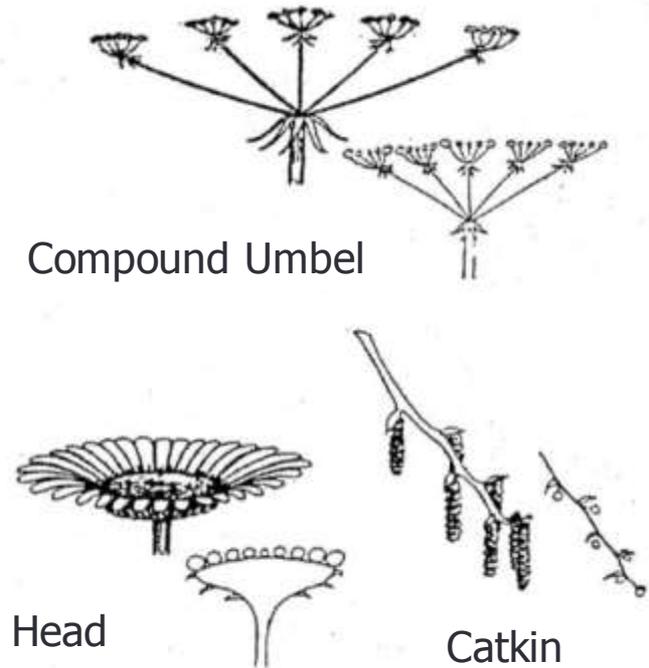
Spike

Raceme



Corymb

Simple Umbel



Compound Umbel

Head

Catkin



Stem Cross Sections



Cattail Leaf
(*Typha*)



Bur-reed Leaf
(*Sparganium*)



Iris Leaf
(*Iris*)



Sweet Flag Leaf
(*Acorus*)



Sedge Stem
(*Carex, Scirpus*)



Bulrush Stem
(*Scirpus*)

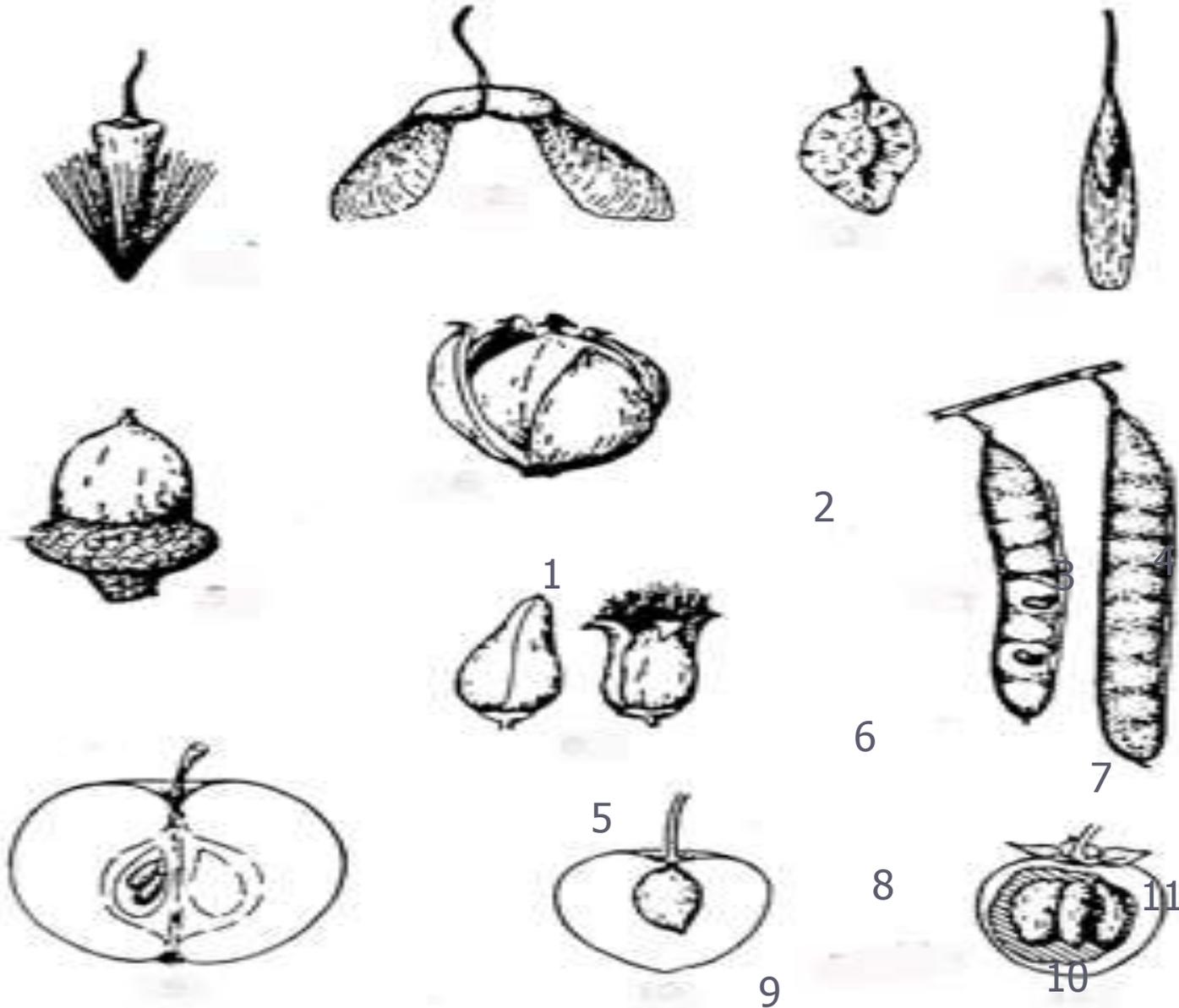


Grass Stem
(*Gramineae*)



Eggers and Reed 1997

Fruits and Seeds



Group Investigation of Plant Characteristics

Plant Types

Plant Types

Through observations plants can be grouped into grasses, sedges, rushes, forbs, ferns (and allies), trees, shrubs and vines



Marsh Milkweed

ID Hint: Specific guides are available for trees/shrubs, wildflowers, and ferns

Plant Type

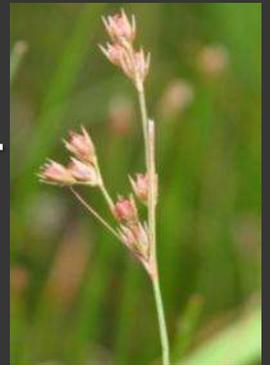
Grasses – Plants with round, hollow, jointed stems, modified flowers called florets and seed like grains



Sedges – grass-like plants having solid stems, leaves in three vertical rows, and spikelets of inconspicuous flowers, with each flower subtended by a scalelike bract.



Rushes – Stems rounded and solid with few leaves or reduced leaves. Flower has tepals around a capsule



Plant Type

Forbs – A broad-leaved, non-woody flowering plant with around 148 families in Minnesota



Canada Anemone

Plant Type

Ferns – Flowerless, seedless vascular plants having roots, stems, and fronds and reproducing by spores



Trees – A large woody plant, usually with one to a few main stems or trunks



Shrubs – A woody plant with many stems, Typically shorter than 5 meters.



Vines – A plant with the stem not self-supporting but trailing or climbing on some type of support



4) Narrowing to Family and Genus

4) Narrowing to Family and Genus

- ▶ **FAMILY:** Poaceae (Grass Family)
- ▶ **GENUS:** *Calamagrostis*
- ▶ **SPECIES:** *canadensis*



Calamagrostis canadensis



ID hint:
If plants can be grouped to a genus, guides such as Newcomb's can be effective to determine the species

4) Narrowing to Family and Genus

Plant Families are grouped based on similar characteristics (often starting with flower structure):

Examples:

- Mints have tubular flowers and square stems
- Smartweeds have swollen joints and five petal-like sepals
- Water plantains have three white petals and large oval or arrowhead shaped leaves



4) Narrowing to Family and Genus

Aster family members



Nodding Bur Marigold



Black-eyed Susan



Giant Goldenrod



New England Aster



Stiff Goldenrod



Red-stemmed Aster

4) Narrowing to Family and Genus

There are around **160 families** of flowering plants , this includes grasses, sedges and rushes (graminoids) and around 16 families of woody plants

Non-flowering plants include around **12 families** of ferns, fern allies, and conifers

4) Narrowing to Family and Genus

Plant Genera are grouped based on similar characteristics within a family:

Genus within the Water Plantain Family:



Alisma – Flowers on a widely branching cluster; leaves elliptical or egg-shaped

Echinodorus - Flowers in open umbels; leafless stems, leaves oval to lance-shaped, fruit a spiny burr



Sagittaria – Flowers in whorl of usually 3 from unbranched stalk, leaves linear or arrow shaped



Mint Family - Lamiaceae

- 4-angled square stem typically
- Often aromatic
- Flowers in leaf axils, or heads or spikes at end of stem
- Leaves simple, opposite, sharply toothed or lobed



Vervain Family - Verbenaceae



- 4-angled square stem
- Opposite, toothed leaves
- Flowers in spikes or groups at end of stem

Milkweed Family (Apocynaceae)



- Leaves opposite
- Milky juice in stem
- Flowers numerous in umbels at end of stem

Maples (Aceraceae)



Acer rubrum var. *rubrum*



Acer saccharinum

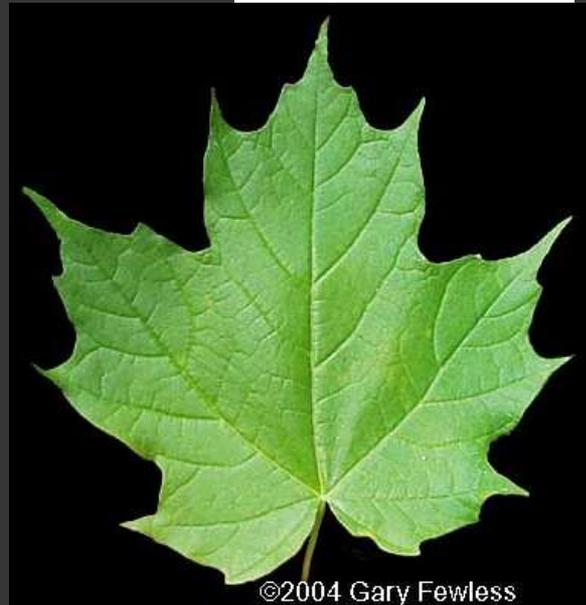


Acer saccharum var. *saccharum*



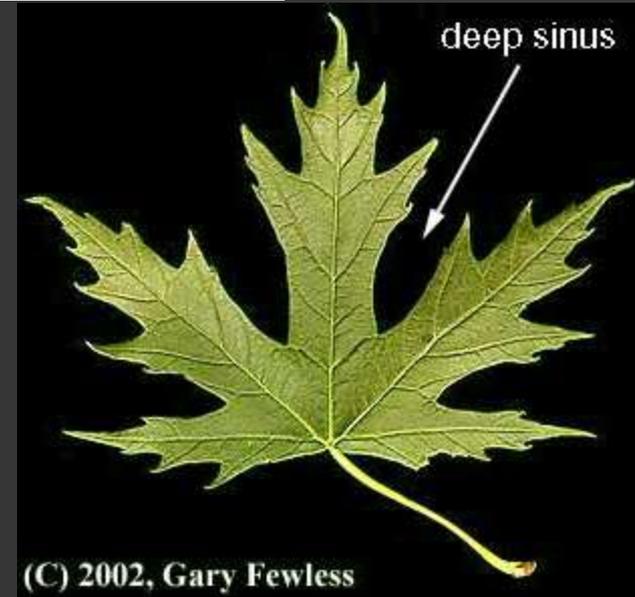
©2004 Gary Fewless

Red maple
(Acer rubrum)



©2004 Gary Fewless

Sugar maple
(Acer saccharum)



(C) 2002, Gary Fewless

Silver maple
(Acer saccharinum)

NCNE	MW	GP
FAC	FAC	FAC

NCNE	MW	GP
FACU	FACU	UPL

NCNE	MW	GP
FACW	FACW	FAC

Oaks (Fagaceae)



Quercus rubra



Quercus macrocarpa
var. *macrocarpa*



(C) 2002, Gary Fewless

N. Red Oak
(*Quercus rubra*)



©2004 Gary Fewless

N. Pin Oak
(*Q. ellipsoidalis*)



(C) 2002

Bur Oak
(*Q. macrocarpa*)

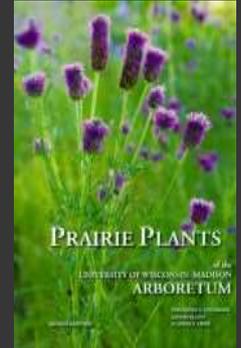
NCNE	MW	GP
FACU	FACU	FACU

NCNE	MW	GP
FACU	FAC	FACU

5) Using Guides, Websites and Keys to Identify Species

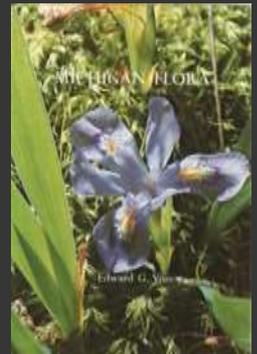
5) Using Guides, Websites and Keys to Identify Species

Field Guides – Images are used to aid Identification, generally provide a lower degree of certainty but can help group species to plant family



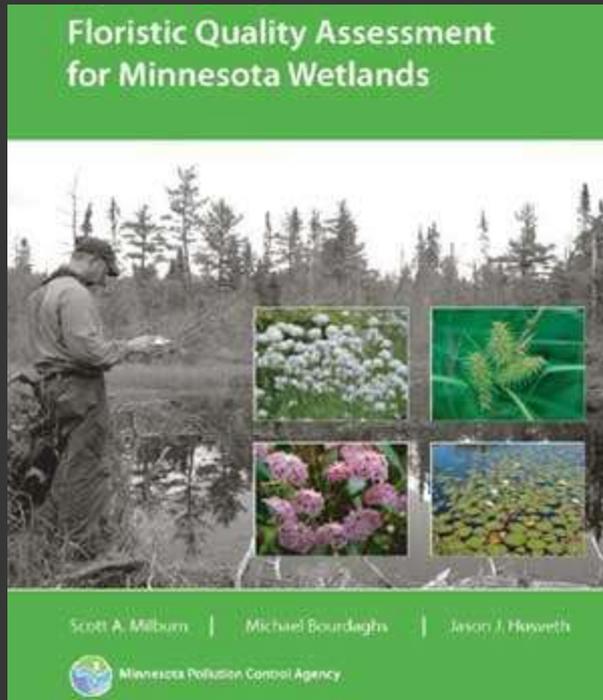
Websites – Wide variety of plant websites, most are used similar to field guides

Keys – Used for advanced identification
And for a high degree of certainty



5) Using Guides, Websites and Keys to Identify Species

Range Information/Maps/Atlases



Pteridophytes

Family classification is still undergoing much revision.
Thus species (fide FNA 1993, vol. 2) are listed as follows:

Adiantum pedatum L. / northern maidier
Asplenium platyneuron (L.) Britton, Steud. /
state Special Concern list
Asplenium rhizophyllum L. / walking fern
Asplenium trichomanes L. var. *trichomanes*
state Threatened list

[*Athyrium angustum* (Willd.) C. Presl see
Athyrium filix-femina (L.) Roth ex Mert.
northern lady fern

[*Athyrium pycnocarpon* (Spreng.) Tidestr. see *Diplazium pycnocarpon*]

[*Athyrium thelypteroides* (Michx.) Desv. see *Deparia acrostichoides*]

Azolla caroliniana Willd. / Carolina mosquito fern

reported for Minnesota by FNA but no specimens at MIN; widespread in eastern U.S. and more cold tolerant than *A. mexicana*, from which it differs in megaspore traits; unfortunately sporocarps are rarely collected but necessary for identification

Azolla mexicana C. Presl / Mexican mosquito fern

some of our specimens probably *A. caroliniana* (see comments under *Azolla caroliniana*)

Botrychium acuminatum W.H. Wagner / tailed grape fern; pointed moonwort

restricted to Lake Superior region; known only from Cook Co. (last collected 1999)

Botrychium ascendens W.H. Wagner / triangle-lobe moonwort; upswept moonwort

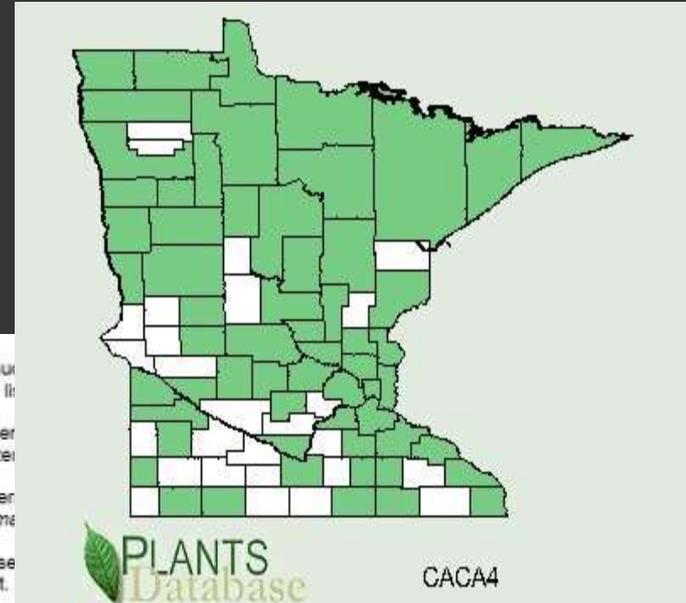
known only from mine dumps in Crow Wing Co. (and one location in St. Louis Co.);

disjunct from the western montane region and Hudson Bay

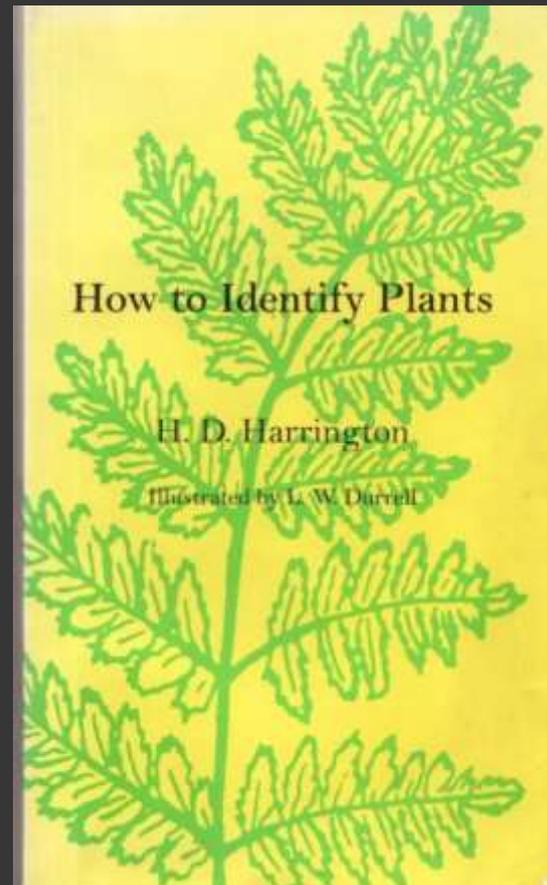
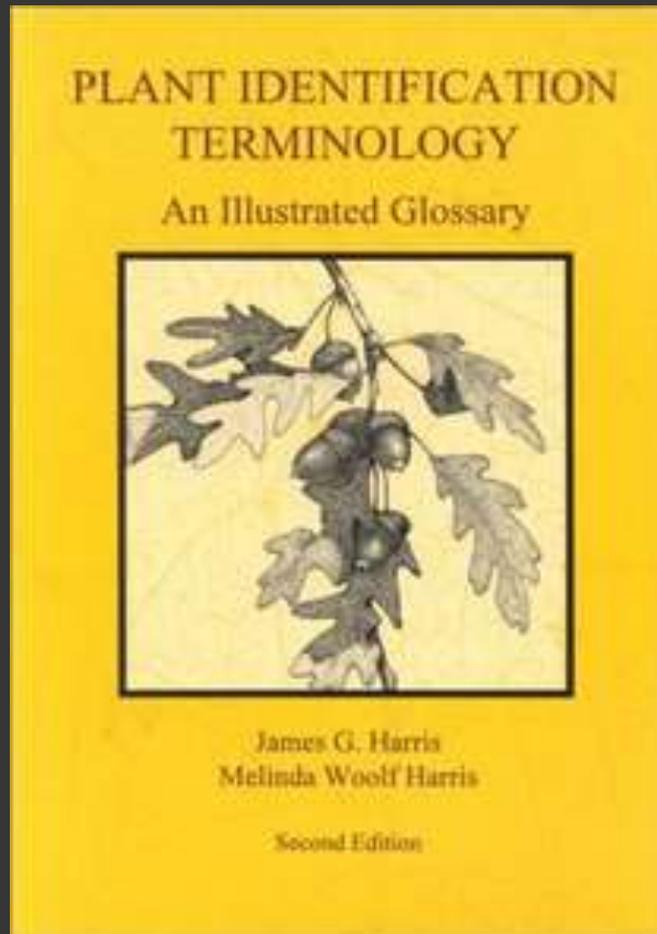
Botrychium campestre W.H. Wagner & Farrar / Iowa moonwort; prairie moonwort

state Special Concern list

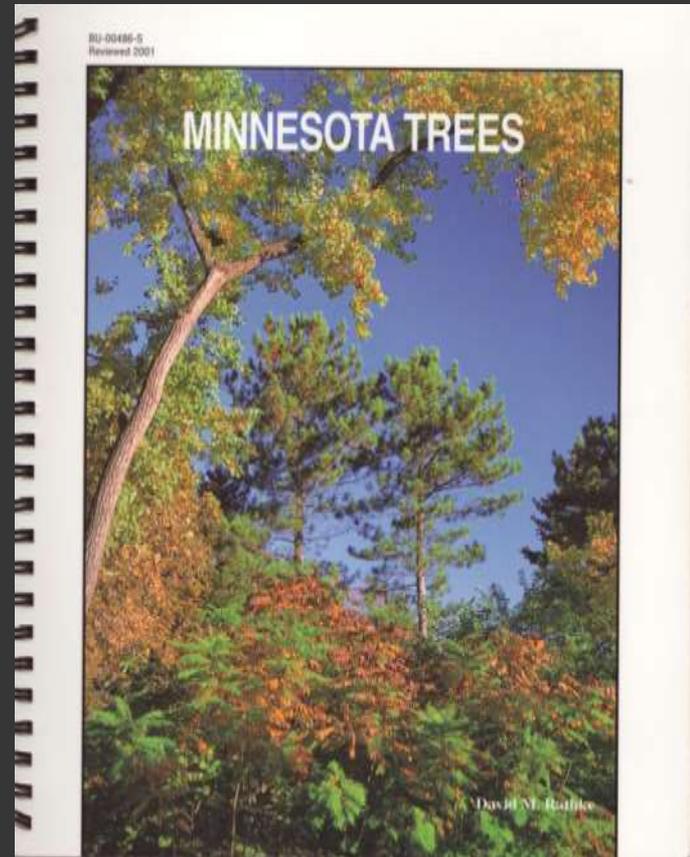
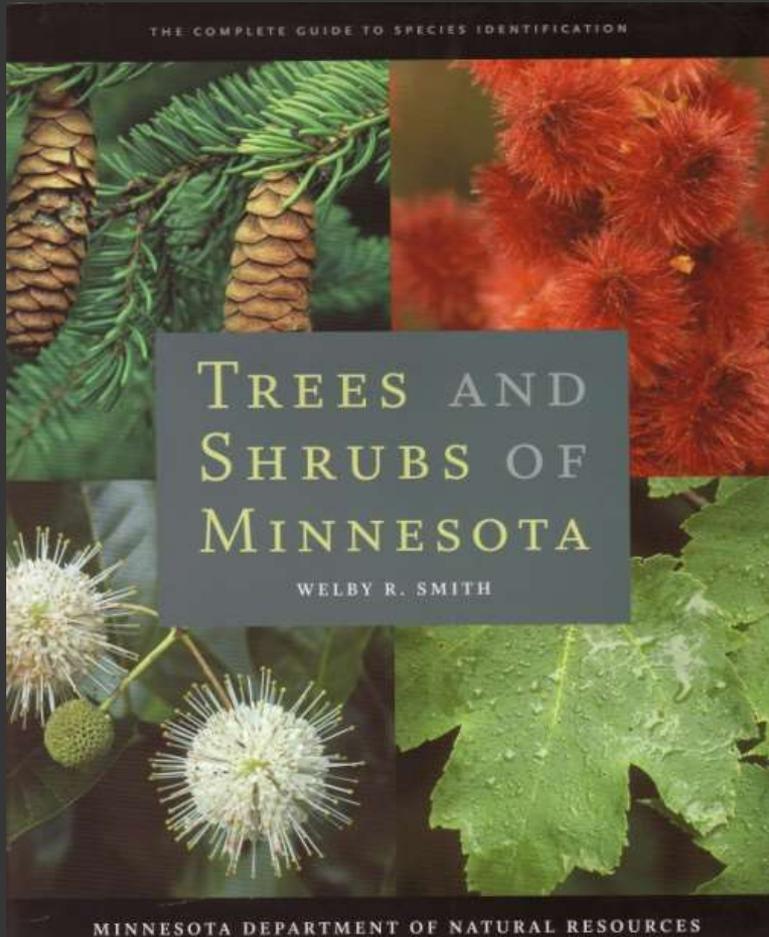
Botrychium dissectum Spreng. / cut-leaf grape fern; dissected grape fern



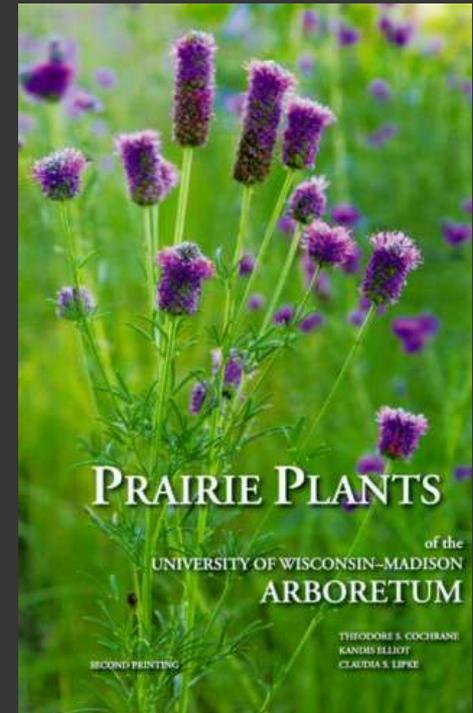
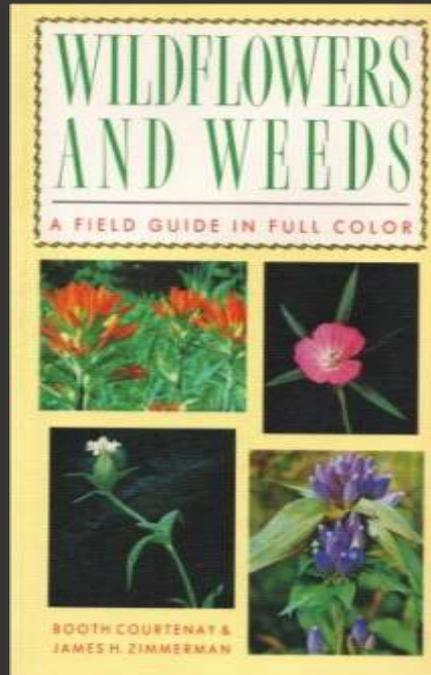
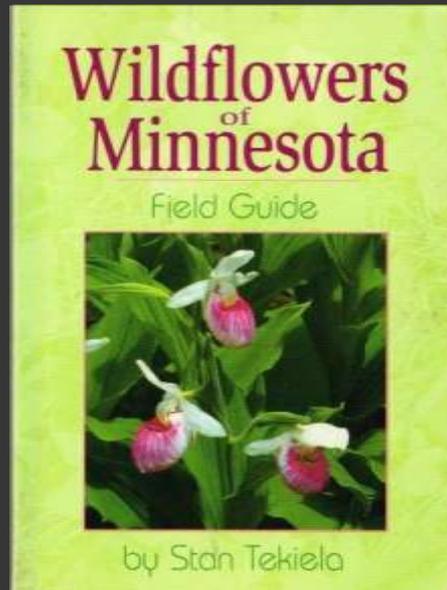
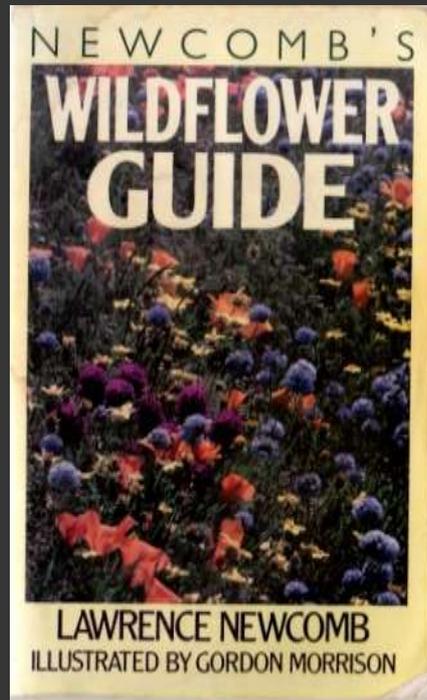
Plant Terms



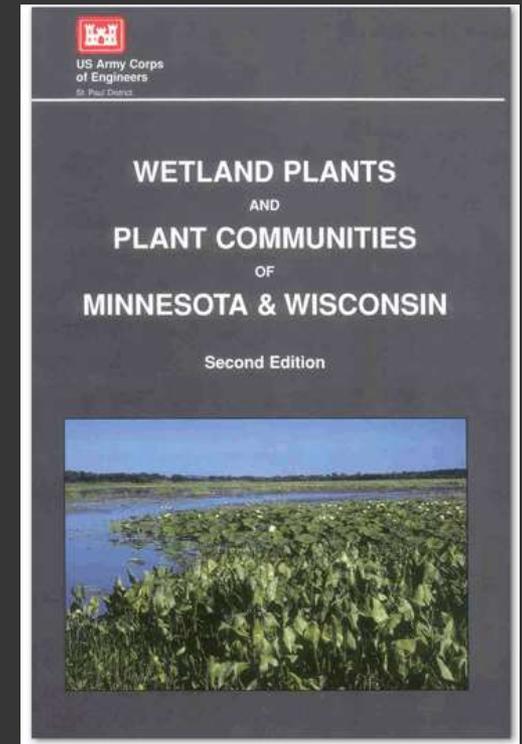
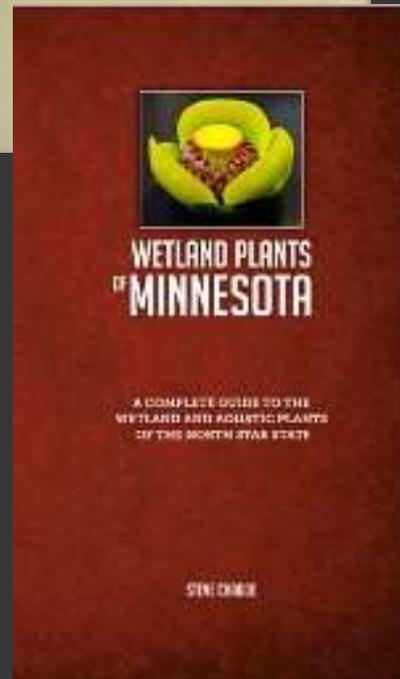
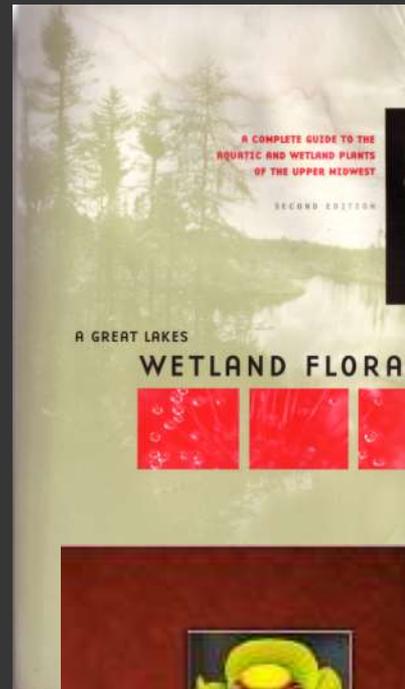
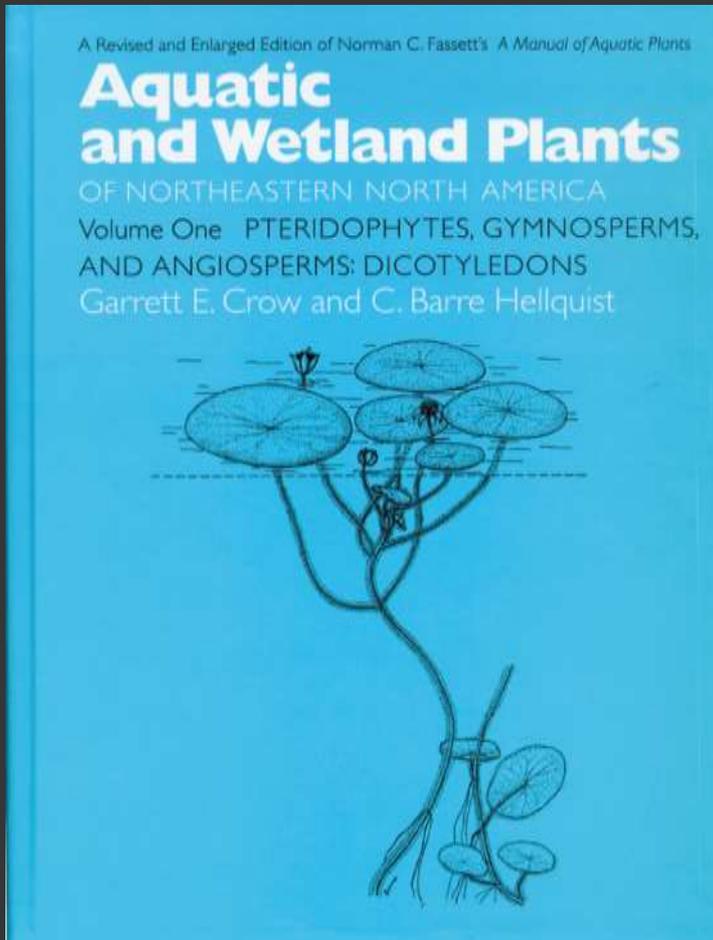
Trees and Shrubs



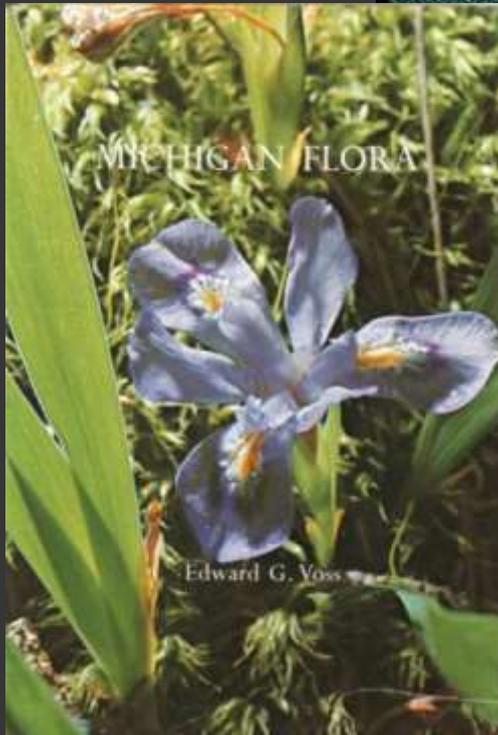
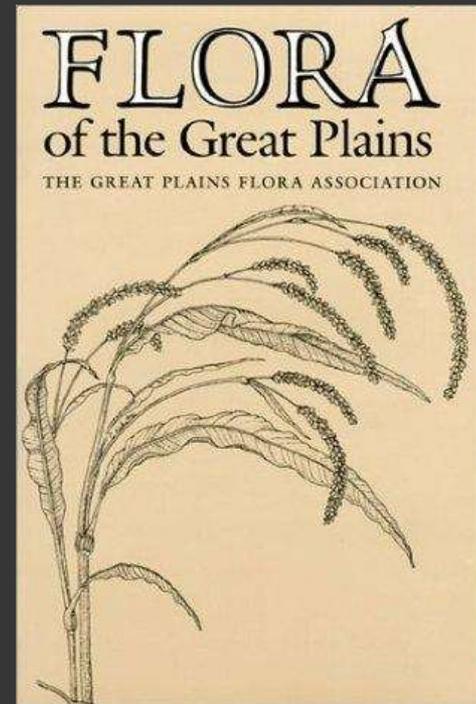
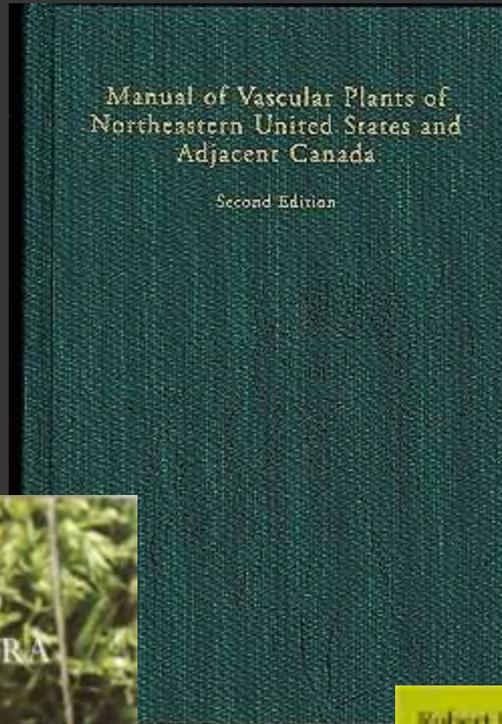
Wildflowers



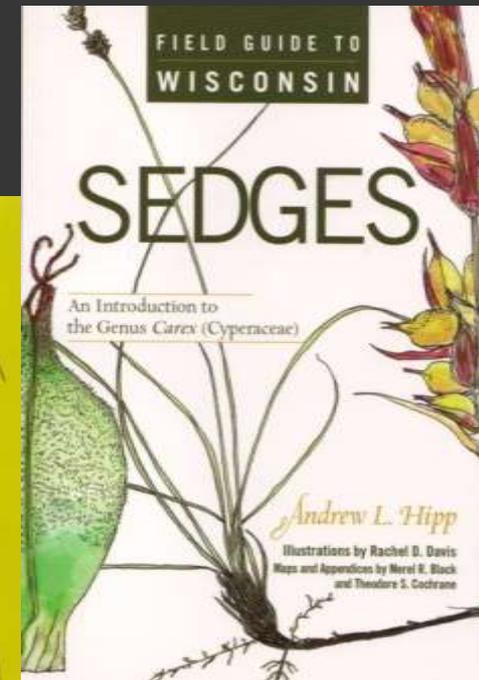
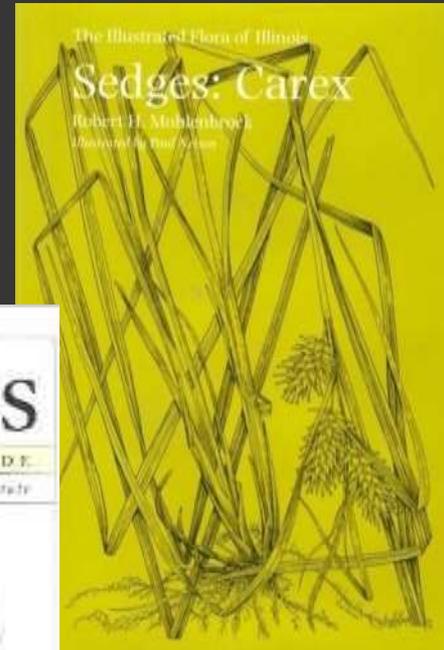
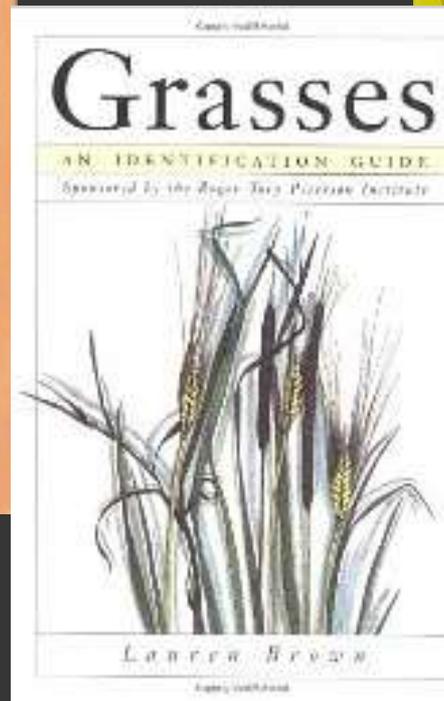
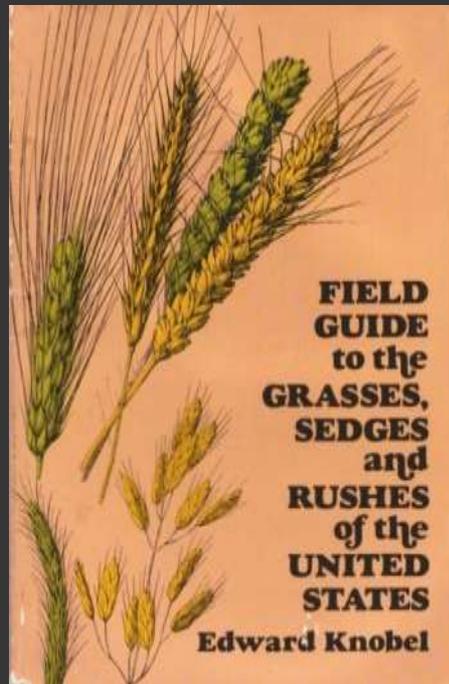
Wetland Plants



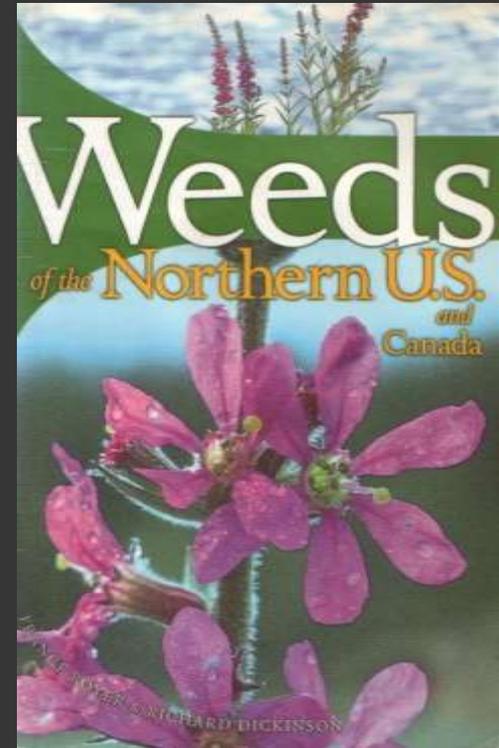
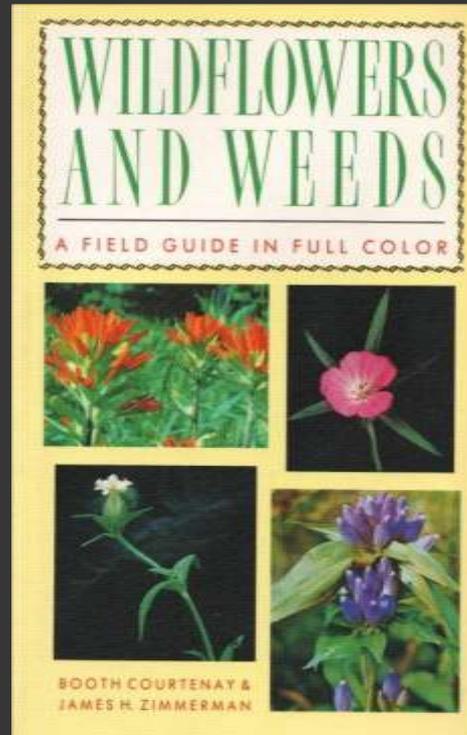
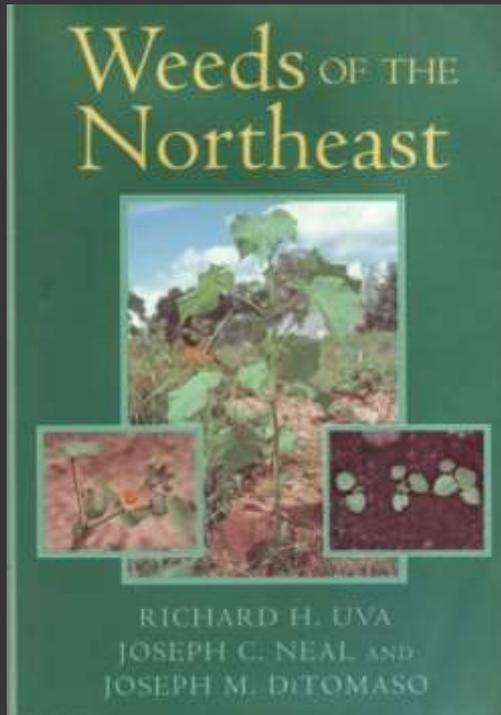
Plant Keys



Grasses, Sedges, Rushes



Weeds



Websites

<http://www.mn.nrcs.usda.gov/programs/wrp/plantid/about.html>

Minnesota Wetland Restoration Plant ID Guide

<http://www.botany.wisc.edu/wisflora/>

Wisflora: Wisconsin vascular plant families

<http://wisplants.uwsp.edu/search.html>

Robert Freckman Herbarium -UWSP

<http://plants.usda.gov/>

USDA Plants Database

<http://www.bellmuseum.umn.edu/ResearchandTeaching/Collections/ScientificCollection/PlantCollection/InfoonMinnesotasFlora/index.htm>

Bell Museum Herbarium

<http://www.dnr.state.mn.us/npc/index.html>

MDNR – Native Plant Communities

<http://www.minnesotawildflowers.info/>

MN Wildflowers

<http://www.dnr.state.mn.us/invasives/terrestrialplants/index.html>

MDNR - Invasive Plants



Plant name: Search

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Your purchase of Minnesota Wildflowers merchandise help raise much needed funds to keep this project going and growing. Thank you for your support!

Mobile App for Android and iPhone

App Screenshots



Now you can take Minnesota Wildflowers with you out in the field and not have to worry about pesky Internet connections! At present, the mobile app features 500 Upper Midwest forbs and can be expected to expand each year as we expand the web site. Minnesota Wildflowers receives a small percent from each sale so your purchase helps to support ongoing expansion of this project.

Leaf of the New Jersey Tea

Leafsnap: An Electronic Field Guide

Leafsnap is the first in a series of electronic field guides being developed by researchers from [Columbia University](#), the [University of Maryland](#), and the [Smithsonian Institution](#). This free mobile app uses visual recognition software to help identify tree species from photographs of their leaves.

Leafsnap contains beautiful high-resolution images of leaves, flowers, fruit, petiole, seeds, and bark. Leafsnap currently includes the trees of the Northeast and will soon grow to include the trees of the entire continental United States.

This website shows the tree species included in Leafsnap, the collections of its users, and the team of research volunteers working to produce it.

Free for iPhone:



and iPad:



lifehacker

