

Deciduous Trees & Shrubs of Central Minnesota

Objectives: *Upon completion of this lab, a student should be able to:*

1. distinguish between a tree and shrub
2. distinguish between a compound and simple leaf
3. distinguish between a leaf and leaflet
4. describe the structure and purpose of a bud
5. distinguish between opposite, alternate and whorled leaf arrangement
6. use a dichotomous key to identify an unknown species
7. recognize and identify a spur shoot, leaf scar, vascular bundle scar
8. identify common trees and shrubs

Introduction

Woody plants can be roughly divided into two groups: (a) the evergreens or conifers, and (b) deciduous or broadleaf trees. The broadleaf trees, like oak and maple, have deciduous leaves which are shed at the end of the growing season. These trees also typically produce flowers, though they may go unnoticed because they are often green and not very showy. In fact, a large percent are wind-pollinated in the spring. There are about 80 species common trees and shrubs that grow on the campus of St. John's University. This exercise will provide an opportunity to identify some of these plants.

Broadleaf Identification

In general, to identify an unknown woody plant you will need to be able to answer the following questions (*in approximately the indicated order*):

1. Is it a tree or shrub?

Although this may seem obvious, it's not. Typically, trees have a single stem and are tall whereas shrubs have multiple stems and are short. To complicate matters, some trees are relatively short (*e.g.*, Ironwood, Slippery elm), while others may form multiple sucker shoots from near the base (*e.g.*, Basswood) or may form rather dense thickets by sprouting from underground roots (*e.g.*, Black locust). Tree seedlings may appear shrub-like.

2. Is the leaf blade comprised of one piece or is it divided into sections (leaflets)?

To provide a little background - leaves typically have a flat blade that is either attached directly to the stem or is attached via a stalk called a petiole. As an aside, some leaves may also have small, leafy appendages called stipules at the base of the leaf stalk. If the leaf has a single blade that is undivided it is termed "simple." In contrast, the blade of a compound leaf is divided into sections (called leaflets).

It's not always easy to determine whether or not a leaf is simple or compound. Fortunately, there is one foolproof trick - look for a bud, which is an embryonic or immature shoot. There is a bud at the junction of the leaf with the stem (axil). Thus, a leaf has a bud at its base but a leaflet does not. Plants such as Honey locust and Leatherwood may provide a little confusion since the base of their leaves are swollen and cover the bud so it is not visible unless you remove the leaf. Finally, another trick to distinguish between compound and simple leaves is to look for the textural and color difference between the stem and leaf.

3. How are the leaves attached to the stem?

Are the leaves attached singly to the stem (*alternate*), in pairs (*opposite*), or in groups of more than two (*whorled*)? Like distinguishing trees from shrubs, this simple feature can also be deceiving. For example, the leaves of some plants are borne on short spur (or dwarf) shoots. It will appear as though these plants have whorled attachment when in reality, the spur shoot is a compressed stem with alternate attachment. How can you tell? Look at the arrangement of the spur shoots themselves; they will alternate along the stem. Another method to determine leaf attachment is to look at the branching pattern of the tree. Since the branches come from the buds at the base of the leaves, the pattern of branching provides an indication of how the buds were positioned. A mnemonic to remember the common trees & shrubs with opposite leaves is "MADCap Horse," which stands for Maple, Ash, Dogwood, Cap = honeysuckle family which are mostly shrubs, and horsechestnut or buckeye.

Some Common Trees & Shrubs

Ash (*Fraxinus*) - The ashes can be recognized by their compound, opposite leaves and the characteristic winged fruits. Two species commonly occur in our area - green ash (*F. pensylvanica*) and black ash (*F. nigra*). Baseball bats are traditionally made from ash and the wood of black ash is used for making baskets.

Basswood (*Tilia americana*) - Basswood or linden or lime can be recognized by the relatively large, heart-shaped leaves that are usually lop-sided at the base. Basswood often grows intermixed with maples. Basswood often occurs in clumps of several stems. The wood is soft and good for carving and the flowers are fragrant and make a great honey.

Birches (*Betula*) - This group of trees is easily recognized by their beautiful bark. The leaves are simple, alternate and toothed. The flowers occur in clusters called catkins. Common species of birch include white or paper birch (*B. papyrifera*), river birch (*B. nigra*), and yellow birch (*B. alleghaniensis*).

Buckeye (*Aesculus*) - Buckeyes are named for the appearance of their distinctive seeds which are produced in a spike-covered pod that splits open. The leaves are opposite and palmately compound. Horsechestnut is a related species that is planted as an ornamental. The seeds of buckeye and horsechestnut should not be roasted over an open fire - they are not the edible chestnuts.

Buckthorn (*Rhamnus cathartica*) - Buckthorn, or European buckthorn, is a shrub with simple leaves that are opposite or nearly so. The twigs end in a sharp spine giving this plant its common name. Buckthorn was once a common landscape plant until we realized it was too successful and was spreading to our woodlands and choking out our native species. Buckthorn has separate male and female plants. The leaves, which have veins similar to dogwood, stay greener longer in the autumn than any other native woody plant. Buckthorn should be eradicated when it is encountered.

Catalpa (*Catalpa*) - Cigartree is another name for this tree with long, thin brown pods. These trees have large heart-shaped leaves and beautiful white and purple flowers when it blooms in midsummer.

Cherry (*Prunus*) - Cherry is a common name for woody plants in the genus, *Prunus*, that produce a stone fruit. These plants typically have simple, alternate leaves. At the junction of the leaf blade with the stalk there is usually a pair of glands. The flesh of the fruits can be used to make

jelly but the seed and vegetative parts shouldn't be eaten because they contain cyanide-producing chemicals.

Dogwoods (*Cornus*) - Dogwoods are shrubs with simple opposite leaves that have very distinctive veins that run along the margin of the leaf to the tip. When you rip open a leaf the veins you will see cobwebby filaments. Dogwoods produce a berry for a fruit.

Elms (*Ulmus*) - The elms are trees with alternate, simple and toothed leaves. The base of the leaves is lopsided. The fruits are flat, round and winged. Until it was decimated by a fungal disease, the American elm (*U. americana*) was the predominant street tree because it has a "Y-shape" that when planted on both sides of a road forms a lovely green cathedral. Another common elm is slippery elm (*U. rubra*) which is named for its mucilaginous inner bark, not its rough sandpapery leaves.

Hackberry (*Celtis occidentalis*) - Perhaps the most distinctive feature of this tree is its warty bark. The leaves are simple, alternate, toothed and have a lopsided base. The fruits are hard but the outer coating can be scraped off and eaten. Witches broom's, which are areas of excessive branching caused by a mite that infects the terminal bud of a branch, often occur on these trees.

Honey Locust (*Gleditsia triacanthos*) - These trees have alternate compound leaves. Some of the leaves may be singly compound while others may be doubly-compound. Our native variety has numerous thorns on the stem. However, the cultivated varieties have been selected for being unarmed. They produce male and female flowers on separate plants. The females produce long brown pods.

Honeysuckle (*Lonicera*) - Honeysuckles are shrubs with simple, opposite leaves. They produce a berry that is readily eaten and dispersed by birds.

Ironwood (*Ostrya virginiana*) - Ironwood is a small tree that grows in the understory of maples, basswood and oaks. They get their name from their dense wood that makes good fence posts. Another name for this tree is hop hornbeam which refers to the clusters of fruits that are reminiscent of hops used in brewing. The bark of these trees is finely lined and seems to twist like a barber-pole.

Kentucky Coffee tree (*Gynocladus dioica*) - Presumably the early settlers made a coffee substitute from the hard seeds of this tree. Stout twigs with a salmon colored pith, large compound leaves and stubby brown pods make this tree easy to recognize.

Leatherwood (*Dirca palustris*) - This shrub is an indicator of moist rich soil and often occurs with maples and basswood. The leaves are egg-shaped and the base of the leaf forms a protective cap that covers the bud. The bark is very tough and fibrous and was used for lacing by native Americans. The sap of the tree may cause a dermatitis in sensitive individuals.

Maples (*Acer*) - The maples are characterized by having opposite leaves and a pair of winged seeds. There are several common maples on campus included sugar maple (*A. saccharum*), Norway maple (*A. platanoides*), Amur maple (*A. ginnala*), box elder (*A. negundo*), and silver maple (*A. saccharinum*). All the maples can be tapped to make maple syrup, but sugar maple is preferred because it has a higher sugar concentration.

Oaks (*Quercus*) - The oaks are trees with simple, alternate and lobed leaves. There are two groups of oaks - the red oaks and the white oaks. The red oaks, which includes northern red oak (*Q. rubra*) and northern pin oak (*Q. ellipsoidalis*), have sharp pointed lobes and take two years to mature acorns. The white oaks such as white oak (*Q. alba*), swamp white oak (*Q. bicolor*), and bur oak (*Q. macrocarpa*), have rounded lobes and mature acorns in a single season. The wood is valuable for lumber. White oak is used extensively in barrel making.

Poplars (*Populus*) - This group of trees has simple, alternate leaves with a flattened leaf stalk (petiole). The flowers are produced in catkins. The buds are often resinous. There are several species of poplar in our area including quaking or trembling aspen or popple (*P. tremuloides*), bigtooth aspen (*P. grandidentata*), cottonwood (*P. deltoides*) and balsam poplar (*P. balsamifera*).

Prickly ash (*Zanthoxylum americana*) - These shrubs have paired thorns at the base of each leaf and can form dense thickets that can be nearly impenetrable. The leaves are alternate and compound. The fruit has a slight citrus odor reflecting its close evolutionary relationship. The wood of the plant was chewed for toothaches because it contains salicylic acid, a precursor to aspirin.

Sumac (*Rhus*) - These shrubs usually grow along roadsides and in other disturbed areas. They have alternate, pinnately compound leaves. They are one of our most beautiful fall plants; the leaves turn a beautiful scarlet color. The red clusters of fruits can be used to make a lemonade substitute. Two common species on campus are smooth sumac (*R. glabra*) and staghorn sumac (*R. typhina*). They look similar with the exception that the twigs of the latter are covered with hairs.

Walnuts (*Juglans*) - These trees have alternate compound leaves. The pith or core of the twigs is brown with partitions. The wood is valuable for woodworking and used for gunstocks and furniture. There are two species - Black walnut (*J. nigra*) and butternut (*J. cinerea*). They look similar except that black walnut twigs and leaves are less hairy and they have round fruits while butternut twigs are hairy and the fruits are oblong. The fruits are covered by a greenish husk that eventually dries up and turns brown. Once this is removed it exposes the hard nut inside. The nuts are loved by squirrels and are very tasty if you have the patience to crack them open.

Willows (*Salix*) - These woody plants are often shrubs or small trees. They have simple, alternate leaves and usually distinctive stipules (leafy appendages at the base). The flowers are in catkins and make the distinctive "pussy willows." The bud are covered by only a single scale. They frequently grow in a wet area.

In Class Exercise:

In lab today we will take a walk around campus to locate and identify various species of trees and shrubs. I will also show you how to use a dichotomous key to identify woody plants. Please dress appropriately. We will go out rain or shine! We will likely see the following species:

Ash, green
Aspen, quaking
Basswood
Birch – paper
Birch – river
Box elder

Buckeye, Ohio
Buckthorn
Catalpa
Cherry, black
Cottonwood
Dogwood

Elm, American
Hackberry
Honey locust
Honeysuckle, Tartarian
Kentucky coffee tree
Leatherwood

Maple, sugar
Maple, red
Oak – white

Oak – bur
Oak - northern red
Prickly ash

Sumac, smooth
Walnut, black
Willow

References:

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- Farrar, John Laird. 1995. *Trees of the Northern United States and Canada*. Iowa State University Press, Ames. **(my personal favorite)**
- Rosendahl, Carl O. 1955. *Trees and Shrubs of the Upper Midwest*. University of Minnesota Press, Minneapolis.
- Stephens, H. A. 1973. *Woody Plants of the North Central Plains*. The University Press of Kansas, Lawrence.
- Symonds, George W. D. 1963. *The Shrub Identification Book*. William Morrow & Company, New York.
- Symonds, George W. D. 1958. *The Tree Identification Book*. Quill, New York.

Web Resources:

- [Simplified Checklist to Woody Plants of St. John's - SG Saupe](#)
- [Checklist of the Trees & Shrubs of St. John's University and the College of St. Benedict](#)