

Arizona Urban Tree Map Field Guide

NORTH CLIMATE REGION

Tree Identification Guide for the Urban
Forests of Arizona's North Region

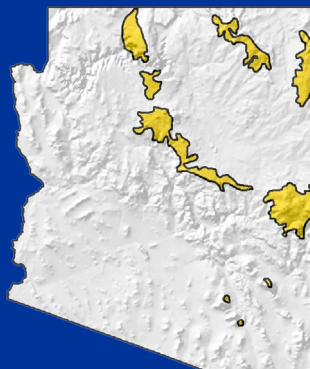


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INTRODUCTION

The Arizona Urban Tree Map (AZ UTM) is a joint project of the Arizona State Forestry Division and USDA Forest Service. The main goals of the project are to 1) support communities throughout Arizona in conducting urban forest inventories and 2) compile a database of inventory information, local forest resource information, strategies for public involvement and a sustainable plan to enable long-term urban forest management. This Tree Guide and corresponding instruction manual have been created using guidelines from the i-Tree Streets software program, which is an analysis tool for urban forest managers that uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, CO2 reduction, stormwater control, and property value increase (www.itreetools.org/streets/).

The i-Tree Streets program divides Arizona into three distinct climate zones (Figure 1): Southwest Desert,

Interior West and North. This Tree Guide describes trees in the North Climate Region as listed in the i-Tree Streets program. The climate of this region is generally cold and snowy in the winter with relatively warm, dry summers.

Users doing an inventory in a city that is near the border of several climate regions should consult the USDA Forest Service community tree guides at www.fs.fed.us/psw/programs/cufr/ for the reference cities near their study area to compare characteristics (e.g. typical tree species, climate) of the reference city to match with their study area.

This Tree Guide and associated inventory materials, including instructions on how to use the AZ State Forestry database, can be found online at www.azsf.az.gov/azutm.

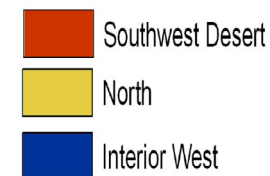
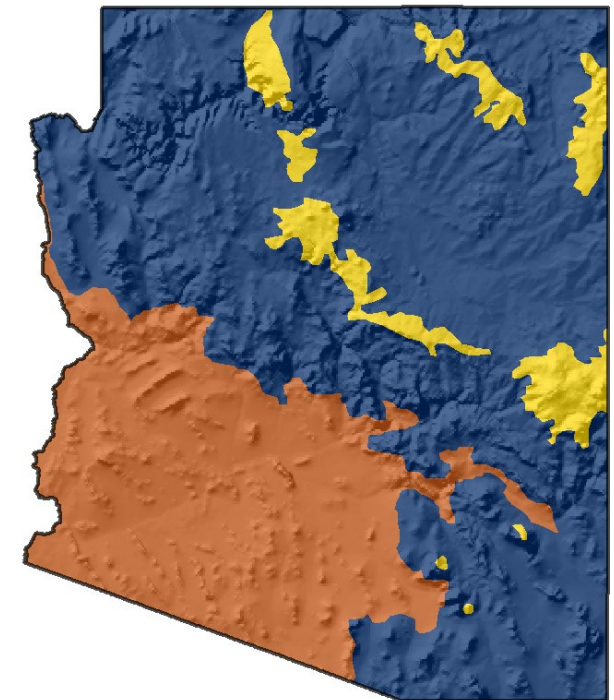


Figure 1. Arizona Climate Regions as defined by i-Tree Streets

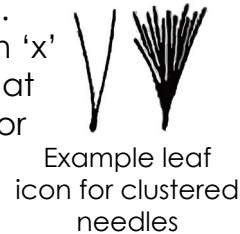
HOW TO USE THIS GUIDE

This tree field guide is designed to aid in the identification of trees commonly found in urban settings of the North climate region of Arizona. Unlike other field guides, this book does not contain information on natural setting (e.g. habitat, range, elevation) for each species because this guide is geared for tree identification in an urban setting where trees may have been planted, pruned or supplementally watered. Instead this guide focuses on tree characteristics such as form, leaf, fruit, flower and bark to aid in identification no matter the setting.

Pages 12 - 13 contain information on broad categories of trees that can be recorded during a tree inventory if no other identification can be made. These trees are separated into deciduous broadleaf, deciduous evergreen, conifers, and palms and then further divided by tree size (small, medium, large). Following the broad categories are pages that contain information on specific trees and corresponding identifying characteristics. These pages are grouped by leaf type and then ordered alphabetically by scientific name. Each of these tree pages has

a consistent structure to make it easier to locate pertinent information. A leaf icon showing basic leaf type appears on the top right corner of each description box. The scientific name(s) is listed first in italics followed by common name(s) in parentheses.

Scientific names with an 'x' in the name indicate that the species is a hybrid, or cross, between two other common tree species. Below species name is Family and Species Code, which is a two to six letter/number code in all caps. Each code is composed of the first two letters of the Genus and the first two letters of the species and a numerical identifier if needed (e.g. the code for *Pinus eldarica* is PIED2). The species code is an easy way to reference trees while in the field without having to record a lengthy scientific or common name. Below the tree name and species code is a list of information that can aid in tree identification, including family, typical height and width, form, leaf, bark, fruit, flower, and commonly associated insect and disease agents. A list of scientific names, common names and



species codes appears in the Index at the end of this guide. An expanded guide to the most likely insect and disease agents found in Arizona can be found in the Arizona Urban Tree Insect and Disease Field Guide at www.azsf.az.gov/azutm.

The information in this Guide is not an exhaustive description of all tree characteristics. Using the leaf type descriptions on page 4 and the dichotomous leaf key on page 5 are the easiest ways to identify a tree. The leaf key presents options related to leaf characteristics that lead to a list of trees and corresponding page numbers. To use the leaf key, determine if the leaf is scaly, needle-shaped or broad. For broad leaves, the next step is to determine if the leaves are simple or compound. Simple leaves are divided into categories based on leaf edges (smooth, serrated or lobed). Compound leaves are divided by leaflet type.

This guide does include some technical botanical terms, especially relating to leaf type. A list of technical terms and their definitions can be found in the Glossary (Pg. 85).

BASIC TREE MEASUREMENTS

Diameter at Breast Height

The most common tree measurement is Diameter at Breast Height, or DBH. DBH refers to the diameter of the trunk 4.5 feet from the ground on the uphill side of the tree and is used to estimate tree volume or weight.

There are several ways to measure DBH. A standard measuring tape does not measure DBH directly, but can be used to measure circumference. Dividing circumference by 3.14 gives the diameter. Calipers can be used, although the most popular tool is a diameter tape, or d-tape. The gradations on a d-tape are already converted from circumference to diameter, which is why it looks different than a standard measuring tape. A third option is a Biltmore stick, a graduated stick much like a yard stick. DBH is measured by holding the stick 25 inches from the eye and at breast height. The left side of the stick is flush with the left side of the tree. The number where the right side of the tree lines up with the stick is the approximate DBH of the tree.

Height

A Biltmore stick can also be used to estimate the height of a tree. Height is measured by standing about 65 feet from the tree and holding the stick upright with the back edge of the stick facing the user. The back edge of the stick will be marked with 1, 2, 3, 4, and 5 log markings, indicating the number of 16-foot logs in a tree (i.e. each log equals 16 feet). The bottom of the stick should line up with the bottom of the trunk. The height of the tree is how high the tree goes up on the stick. Another common tool is a clinometer, which uses triangulation to measure tree height.



Using a Biltmore stick to measure DBH.

TIPS FOR MEASURING DBH

The tree tapers in such a way that the diameter at a point below 4.5 feet is actually smaller than the diameter at 4.5 feet. Measure the diameter at the smallest point.

The tree has branches or bumps that interfere with DBH measurement. Measure DBH below the branch or bump, either a foot below or the point where bumps or branches cease to affect diameter of the stem. The underlying concept is to measure the diameter that would be closest to the expected DBH if branches or other irregularities were not present.

The vertically growing tree is on a slope. Measure the diameter 4.5 feet from the ground on the upper side of the slope.

The tree leans. Measure 4.5 feet up the stem in the direction of the lean.

The tree forks below DBH or near DBH. Measure the diameter at the narrowest part of the main stem below the fork.

The tree splits into several trunks close to ground level. Measure the diameter of each trunk separately, using the principals described above. The DBH for the tree is found by adding each diameter and taking the square root of the sum.

LEAF TYPES

Needles and scaly needles

Needle-like leaves are comparatively long, thin, usually evergreen and most often found on conifers. Needles may be rounded as in pines, flattened as in hemlocks, or scale-like (often triangular-shaped and appressed to the stem) as in junipers and cedars. Needles can be arranged singly or can occur in groups of 2-5 within a fascicle (bundle).



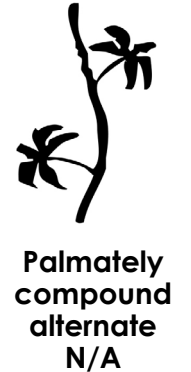
Simple undissected and simple lobed leaves

Simple leaves have a single leaf blade from their point of attachment to the stem. Some simple leaves have leaf edges that are round, elliptical or oval without indentations. These are referred to as simple undissected leaves. Others have a single blade at the point of attachment but have edges that indent - divided into incompletely separated sections (resembling clubs in a deck of cards). These are referred to as simple lobed leaves. Simple undissected and simple lobed leaves may be arranged oppositely or alternately along a stem. Opposite leaves occur directly across from each other while alternate leaves are off-set.



Compound leaves (pinnate or palmate)

A compound leaf is a single leaf that is composed of many small blades (leaflets) that resemble leaves themselves. Each compound leaf has a single point of attachment to the stem. Pinnately compound leaves are the shape of a feather, palmately compound leaves are the shape of a fan or hand.



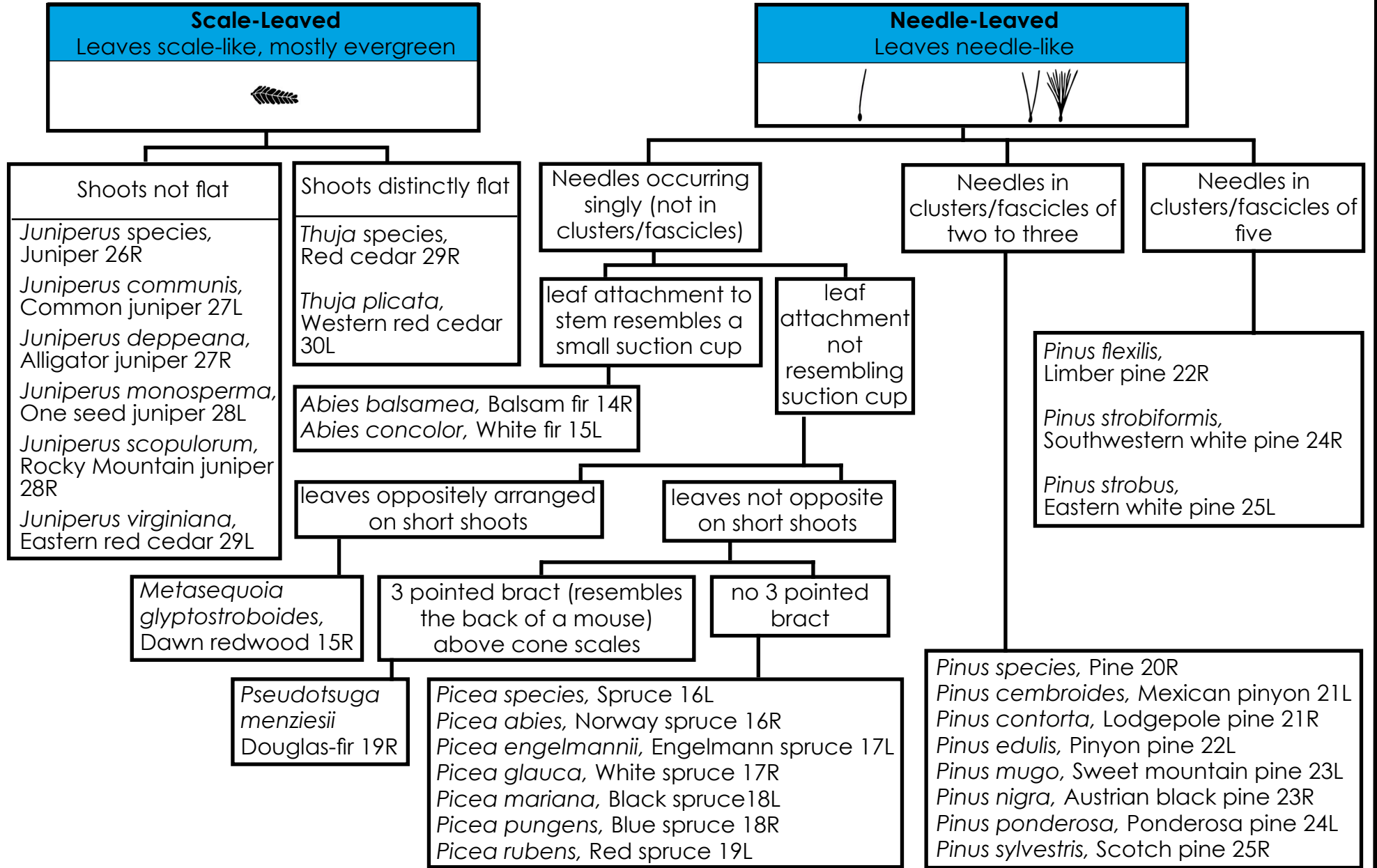
Bipinnately compound leaves

A twice compound leaf occurs when each of the leaflets (divided leaf blades) of a compound leaf is composed of an even smaller set of leaflets. Compound leaves, like simple leaves, may be arranged oppositely or alternately along a stem. Opposite leaves occur directly across from each other while alternate leaves are off-set.

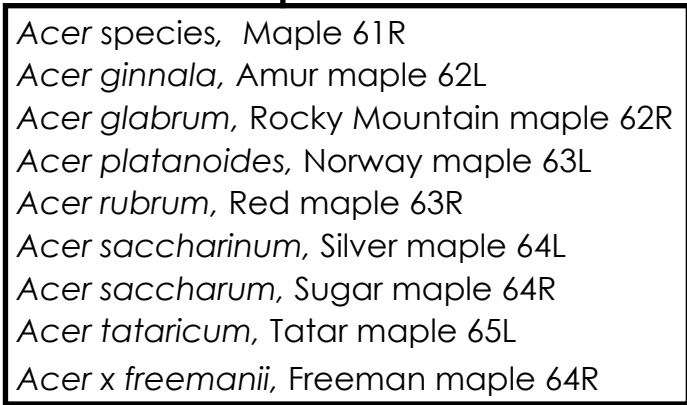
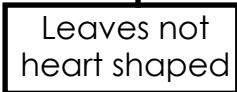
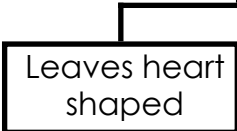
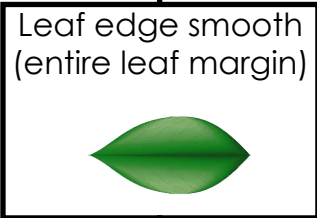
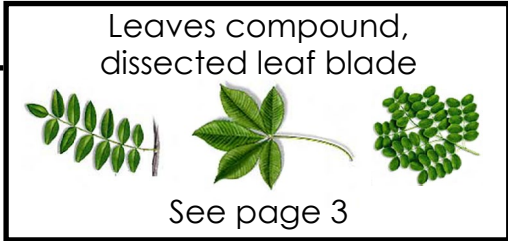
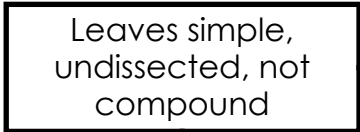
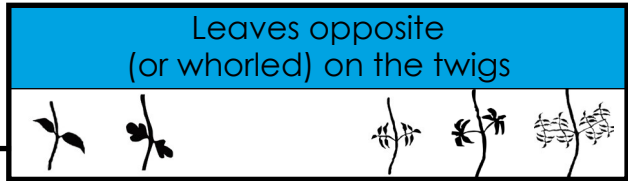


DICHOTOMOUS LEAF KEY

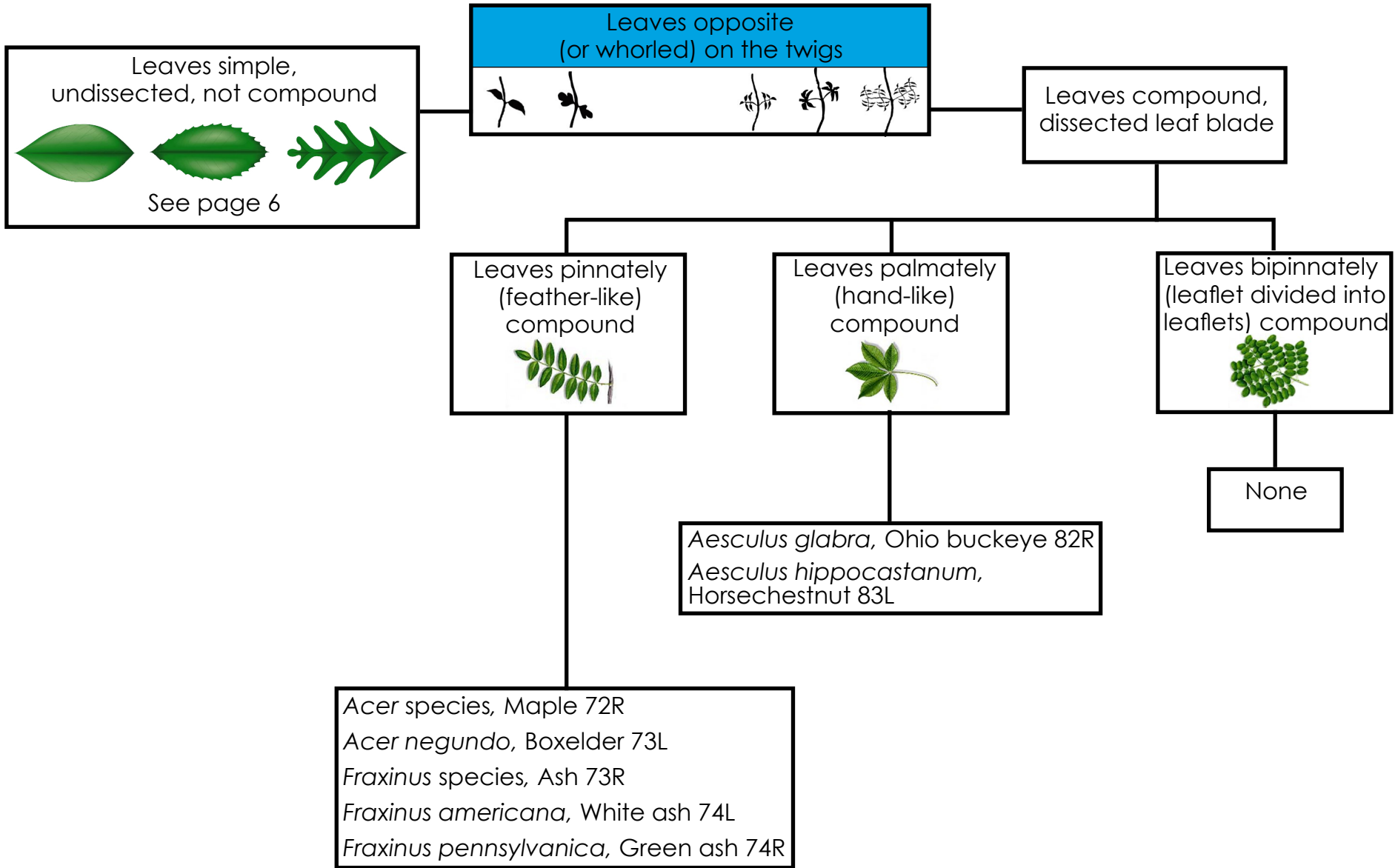
Scale-Leaved or Needle-Leaved Trees



Broad-Leaved Trees



Broad-Leaved Trees



Broad-Leaved Trees

Leaves alternate on the twigs



Leaves simple, undissected, not compound

Leaves compound, dissected leaf blade



See page 7

Leaf edge smooth (entire leaf margin)



Leaf edge toothed (dentate or serrate)



See page 9

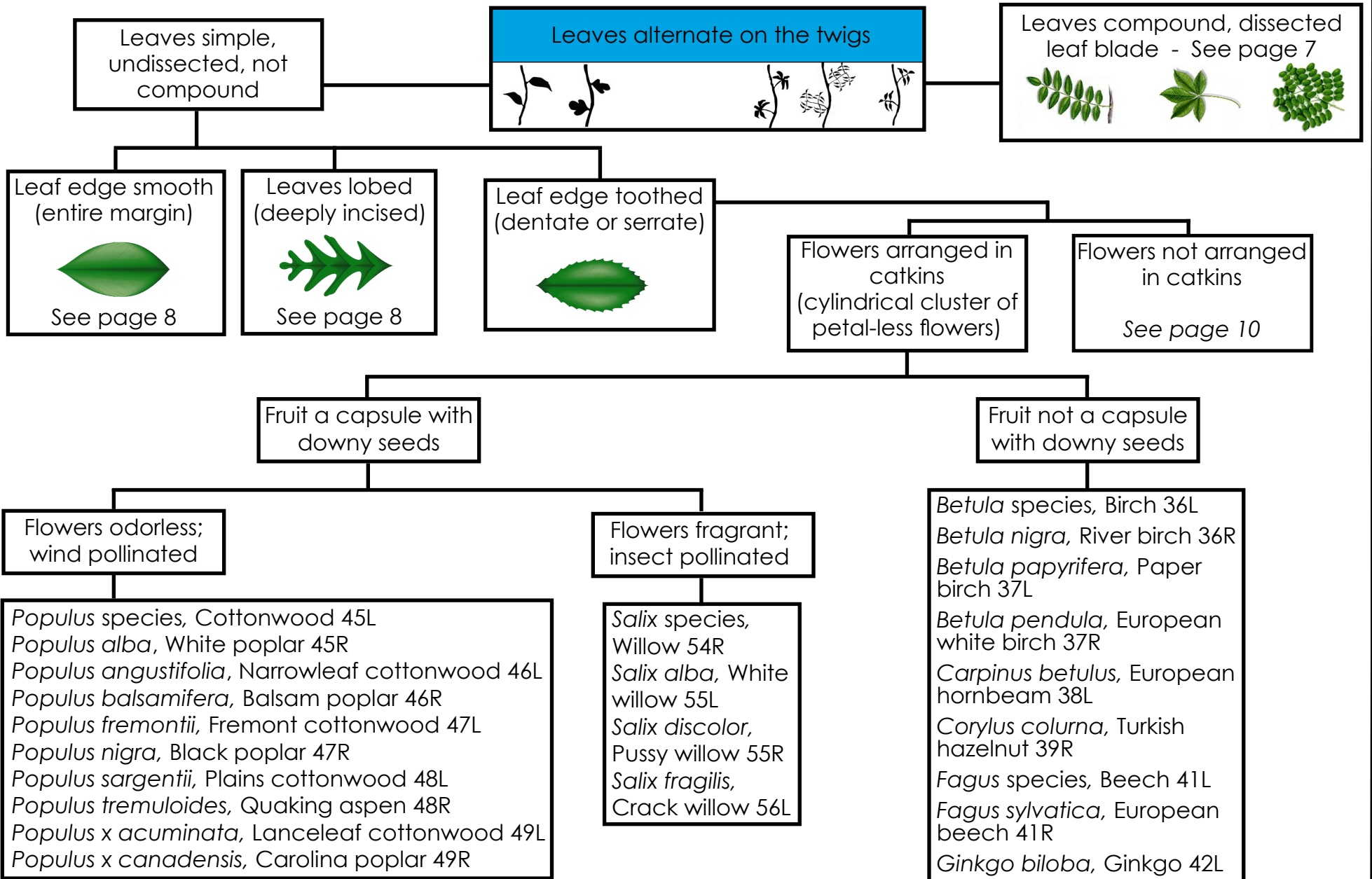
Leaves lobed (deeply incised)



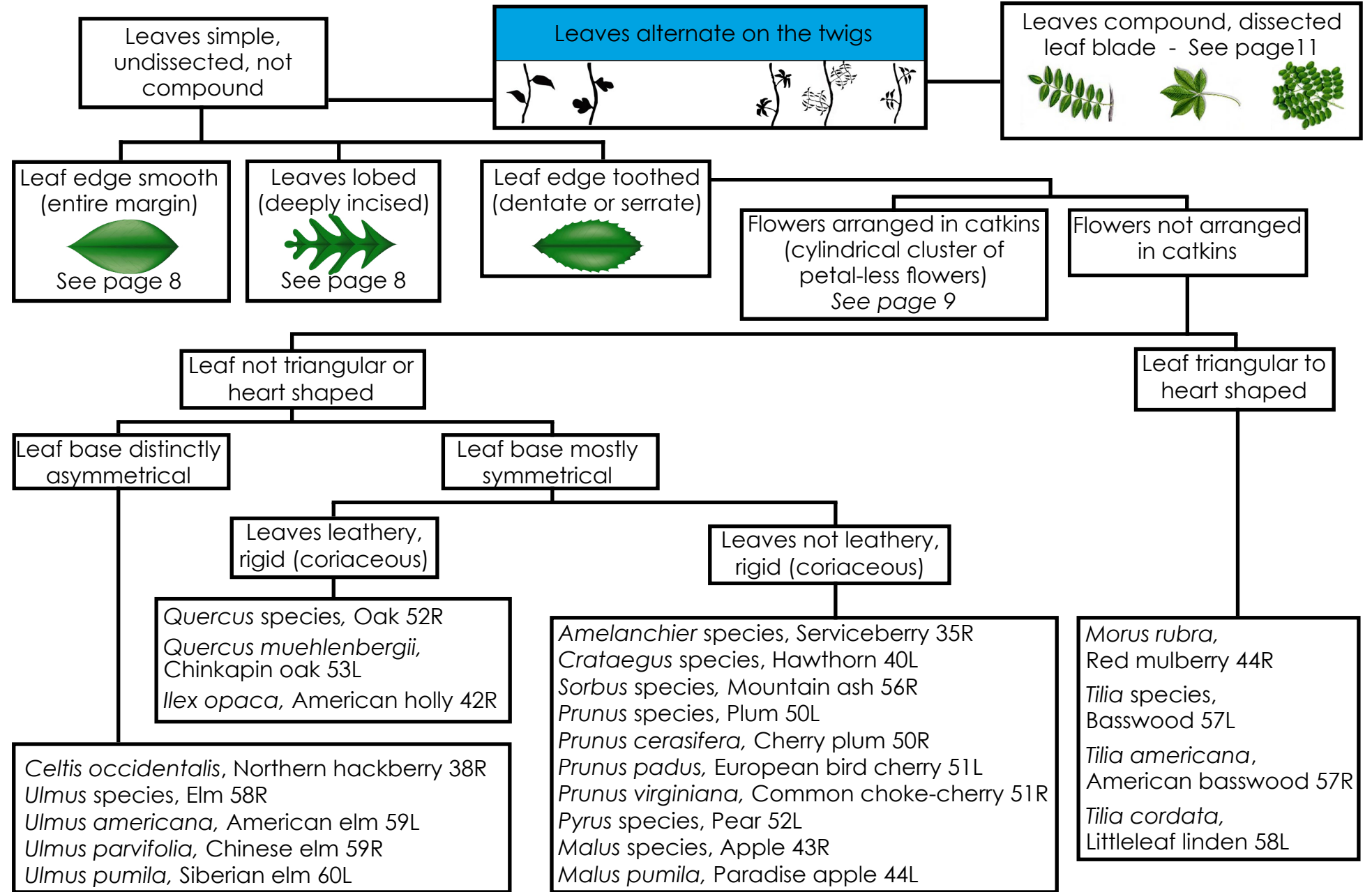
- Cercis canadensis*, Eastern redbud 39L
- Elaeagnus angustifolia*, Russian olive 40R
- Magnolia grandiflora*, Southern magnolia 43L
- Quercus* species, Oak 52R
- Quercus nigra*, Water oak 53R
- Rhus* species, Sumac 54L

- Crataegus* species, Hawthorn 40L
- Morus rubra*, Red mulberry 44R
- Quercus* species, Oak 68L
- Quercus bicolor*, Swamp white oak 68R
- Quercus coccinea*, Scarlet oak 69L
- Quercus macrocarpa*, Bur oak 69R
- Quercus palustris*, Pin oak 70L
- Quercus robur*, English oak 70R
- Quercus rubra*, Northern red oak 71L
- Quercus shumardii*, Shumard oak 71R
- Liquidambar styraciflua*, Sweetgum 67L
- Liriodendron tulipifera*, Tulip tree 67R

Broad-Leaved Trees



Broad-Leaved Trees



Broad-Leaved Trees

Leaves alternate on the twigs



Leaves simple, undissected, not compound

Leaves compound, dissected leaf blade

Leaf edge smooth (entire margin)



See page 8

Leaves pinnately (feather-like) compound



Leaves palmately (hand-like) compound



Leaves bipinnately (leaflet divided into leaflets) compound



Leaves lobed (deeply incised)



See page 8

None

Gymnocladus dioica, Kentucky coffeetree 84R

Fruit is a bean pod

Fruit not a bean pod

Leaf edge toothed (dentate or serrate)



See page 9

Fruit is a nut in a leathery husk

Fruit not a nut in a leathery husk (berry-like in clusters)

Carya species, Hickory 75R
Carya ovata, Shagbark hickory 76L
Juglans cinerea, Butternut 77L
Juglans nigra, Black walnut 77R

Rhus species, Sumac 78L
Rhus glabra, Smooth sumac 78R
Rhus typhina, Staghorn sumac 79L
Sorbus species, Mountain ash 80L
Sorbus americana, American mountain ash 80R
Sorbus aucuparia, European mountain ash 81L

Robinia pseudoacacia, Black locust 79R
Gleditsia triacanthos, Honeylocust 76R
Wisteria sinensis, Purple wisteria 81R



Broadleaf Deciduous General Tree Category Species code: BDL, BDM, BDS

Broadleaf deciduous trees have broad, flat leaves and are normally leafless at some time during each year. In comparison, conifers (and some others) have leaves resembling needles.

- Large (BDL):** greater than 40' at maturity. Examples: sycamore, cottonwood, ash, mulberry, *Populus*, walnut.
- Medium (BDM):** 20-40' at maturity. Examples: palo verde, most mesquite, *Albizia*, and some *Acacia* species.
- Small (BDS):** less than 20' at maturity. Examples: *Prunus*, *Pyrus*, crape myrtle, Texas ebony, pomegranate, *Vitex*, some *Acacia* species.

Broadleaf Evergreen General Tree Category Species code: BEL, BEM, BES

Broadleaf evergreen trees have broad, flat leaves that are normally retained year round. In comparison, conifers (and some others) have leaves resembling needles.

- Large (BEL):** greater than 40' at maturity. Examples: Many *Eucalyptus* species, silk oak, Indian laurel.
- Medium (BEM):** 20-40' at maturity. Examples: Olive, weeping fig, Chinese privet, African sumac.
- Small (BES):** less than 20' at maturity. Examples: Citrus, oleander, Texas mountain laurel, California pepper tree, some *Acacia* species.





Conifer Evergreen General Tree Category

Species code: CEL, CEM, CES

Conifer evergreen trees bear cones (in lieu of fruits and flowers) and have needle-like or scaly leaves that are normally retained year round. Scaly/needle-leaved flowering plants that are not conifers are included in this category.

Large (CEL): greater than 40' at maturity. Examples: Afghan pine, aleppo pine, atlas cedar, deodar cedar, athel tree, *Casuarina*, Italian cypress.

Medium (CEM): 20-40' at maturity. Examples: Canary Island pine, pinyon pine, Mexican pinyon pine.

Small (CES): less than 20' at maturity. Examples: Hollywood juniper, Arizona cypress.

Palm Evergreen General Tree Category

Species code: PEL, PEM, PES

Palm evergreen trees have well developed, usually unbranched, erect trunks that normally retain their leaves year round. Leaves are large, simple or most often fan or feather shaped. Flowers (3 part) and fruit (drupe or nut-like) form on a panicle hanging between leaves.

Large (PEL): exceeds 40' at maturity. Examples: Date palm, Canary Island date palm, California fan palm.

Medium (PEM): 20-40' at maturity. Examples: Queen palm, pindo palm.

Small (PES): less than 20' at maturity. Example: Mediterranean fan palm.



SINGLE NEEDLES

***Abies balsamea* (Balsam fir)****Family:** Pinaceae**Species code:** ABBA**Height:** 80' **Width:** 15-20'**Form:** Narrow, spire-like crown**Leaf:** Flattened needles, .75" long; blunt or notched at end; shiny dark green above, silvery-blue below**Bark:** Shiny silvery gray-brown; smooth with raised resin blisters; largest stems may be scaly**Fruit:** Resinous cones upright, 2 - 3.5" long; oblong to cylindrical; green with purple tinge; leaves of fruit shorter than deciduous scales**Flower:** Monoecious and insignificant; purple to yellow-brown males under leaf axils; purple females in upper crown**Common Insects/Disease:** Spruce budworm



Metasequoia glyptostroboides (Dawn redwood)

Family: Taxodiaceae **Species code:** MEGL
Height: 65' **Width:** 10-20'
Form: Conical
Leaf: Linear and needlelike; light green; bronze in fall; deciduous
Bark: Red-brown and exfoliating or furrowed
Fruit: Brown or green .25-.5" cone develops in summer
Flower: Monoecious and insignificant; flowers in spring
Common Insects/Disease: No significant



Abies concolor (White fir)

Family: Pinaceae **Species code:** ABCO
Height: 80-130' **Width:** 15-20'
Form: Young trees conical; older trees with dome-like crown
Leaf: Flattened silvery blue-green needles; 2-3" long; blunt at tip; extend at right angles from twig, often curving; citrus smell
Bark: Thin, smooth and gray, with resin pockets; older trees with thick, deep and irregular furrows
Fruit: Oblong cones upright; 3-5.5" long; yellow-green to purple; uneven shoulders; deciduous at maturity
Flower: Monoecious; males yellow to red-toned and catkin-like; yellow-brown females insignificant
Common Insects/Disease: Aphids, bagworm, beetle borers and mistletoe





Picea species (Spruce)

Family: Pinaceae **Species code:** P11
Height: 60-130' **Width:** 20-25'
Form: Erect with a conical shape and whorled branches
Leaf: Single needle attached to the branches in a spiral fashion, each needle on a small peg-like structure; dark green, blue-green or silver-gray
Bark: Dark brown to red brown and scaly or gray and furrowed
Fruit: Male cones are large (1.5-3" long) and yellowish-brown
Flower: Female cones reddish brown to purple; upright in the tops of trees
Common Insects/Disease: Aphids, beetle borers and scales

Picea abies (Norway spruce, European spruce)

Family: Pinaceae **Species code:** PIAB
Height: 100-150' **Width:** 20'
Form: Conical
Leaf: Dark green needle; evergreen
Bark: Red-brown and scaly
Fruit: Linear brown cones; over 3" long and a third as wide
Flower: Monoecious and insignificant; flowers in spring
Common Insects/Disease: Aphids, scales and spider mites





***Picea engelmannii* (Engelmann spruce)**

Family: Pinaceae **Species code:** PIEN
Height: 60-130' **Width:** 20-25'
Form: Conical
Leaf: Blue-green needle; evergreen
Bark: Red-brown to dark-brown and scaly
Fruit: Linear brown cones; over 1.5-3" long
Flower: Monoecious and insignificant; flowers in spring and summer
Common Insects/Disease: Aphids, scales and beetle borers

***Picea glauca* (White spruce)**

Family: Pinaceae **Species code:** PIGL1
Height: 65' **Width:** 20'
Form: Conical
Leaf: Gray-green to silver-gray needle; evergreen
Bark: Light green to light gray and scaly
Fruit: Green to reddish-tan cone; 1.5-3" long and a third as wide
Flower: Monoecious and insignificant; flowers in spring
Common Insects/Disease: Aphids, beetle borers and scales





***Picea pungens* (Blue spruce, Colorado spruce, Silver spruce)**

Family: Pinaceae **Species code:** PIPU
Height: 30-65' **Width:** 15-25'
Form: Narrow to broad pyramid; branches are horizontal to the ground
Leaf: Drab green to silvery blue; 1" long needles; stiff, stout and prickly; stomatal lines above and below
Bark: Light to dark gray and furrowed
Fruit: Light brown cones cylindrical; 2-4" long; scales thin and flexible
Flower: Monoecious and insignificant; flowers in spring
Common Insects/Disease: Aphids, scales and spider mites



***Picea mariana* (Black spruce, Bog spruce, Swamp spruce)**

Family: Pinaceae **Species code:** PIMA
Height: 40' **Width:** 10-15'
Form: Narrow, irregular and sometimes conical; branches thin and pendulous
Leaf: Dull blue-green; stomatal lines above and below; 4" long; straight or slightly curved and aromatic when crushed
Bark: Bark reddish or grayish-brown; thin, scaly or shredded
Fruit: Ovoid cones purple to gray-brown, 1-1.5" long and .5" wide; spherical when open; mature cones persist
Flower: Monoecious and insignificant; flowers in spring
Common Insects/Disease: Aphids, beetle borers and scales





***Pseudotsuga menziesii* (Douglas-fir)**

Family: Pinaceae **Species code:** PSME
Height: 80-160' **Width:** 20-30'
Form: Open pyramidal crown with a straight stem
Leaf: Yellow-green to blue-green single needles; .75-1.25 " long; tips blunt or slightly rounded; very fragrant; evergreen
Bark: Smooth and gray on young stems; red-brown with ridges and deep furrows on older trees
Fruit: Cones 3-4" long with rounded scales; three-lobed leaves extend beyond the cone scales; mature in late summer
Flower: Monoecious; males oblong, red to yellow; females reddish, with long leaves, both occurring near branch tips
Common Insects/Disease: Beetle borers, spruce budworm, scale, spider mites, red ring rot, mistletoe and pitch canker



***Picea rubens* (Red spruce)**

Family: Pinaceae **Species code:** PIRU
Height: 60-100' **Width:** 20-40'
Form: Straight, upright and narrow crown
Leaf: Shiny yellow-green, evergreen needles; .5" long; pointed and four-sided; upward curved; each on a peg
Bark: Grayish brown surface, reddish brown beneath; irregular with fine flaky patches
Fruit: Chestnut brown ovoid cone; 1-1.5" long; smooth scale edges; seeds disseminate in fall, cones drop in winter
Flower: Monoecious; males cylindrical and reddish turning yellow-brown; females purplish green
Common Insects/Disease: Aphids, beetle borers, scales, rust and sooty mold



CLUSTERED NEEDLES



Pinus species (Pine)



Family: Pinaceae

Species code: PI2

Height: 30-80' **Width:** 15-40'

Form: Generally symmetrical; conical, round or columnar shape

Leaf: Long needles either in groups of 2 or 3; light green to dark blue-green

Bark: Furrowed and gray to red-brown

Fruit: Cones from 2-9"

Flower: Insignificant

Common Insects/Disease: Aphids, beetle borers, spider mites, rust, *Phytophthora*, sooty mold and pitch canker





***Pinus contorta* (Lodgepole pine)**



Family: Pinaceae **Species code:** PICO

Height: 35-60' **Width:** 10-15'

Form: Slender with a narrow, loose crown

Leaf: Evergreen; yellow-green to green needles; 1.5 to 3" long in fascicles of 2; twisted, fascicle sheath present

Bark: Thin, grayish brown to dark brown; small close scales

Fruit: Woody, light brown to brown cone; 1-2" long, often asymmetrical; lumpy near base; scales with short spines

Flower: Monoecious; males yellow and cylindrical; females reddish purple in upper crown

Common Insects/Disease: Aphids, beetle borers, leaf miners and pitch canker



***Pinus cembroides* (Mexican pinyon)**



Family: Pinaceae **Species code:** PICE

Height: 10-30' **Width:** Equal to height

Form: Rounded crown but strongly tapered; branches spreading upward

Leaf: Blue- to gray-green needles; fascicles of 2-4; spreading to upcurved and 2-3-sided

Bark: Red-brown to dark brown; shallowly and irregularly furrowed; ridges broad and scaly

Fruit: Cones pale yellow to pale red-brown; 1.5-3" long, round to oval; short stalked and resinous

Flower: Monoecious; males yellow and cylindrical; females red-brown and ovoid

Common Insects/Disease: Aphids





Pinus edulis (Pinyon pine)



Family: Pinaceae **Species code:** PIED
Height: Up to 45' **Width:** 20-30'
Form: A small, spreading almost bushy tree with an irregular and rounded crown
Leaf: Evergreen needles, 1-2" long; usually two per fascicle; coarse, stiff, thick, and curved; blue-green or yellow-green
Bark: Scaly or with small plates and red-brown to gray
Fruit: Ovoid cones 2" long and short stalked; brown in color with very thick cone scales
Flower: Monoecious; males red and cylindrical in clusters near ends of branches; females purplish at branch tips
Common Insects/Disease: Aphids and scales

Pinus flexilis (Limber pine)



Family: Pinaceae **Species code:** PIFL
Height: 30-50' **Width:** 15-20'
Form: Often has many, plume-like tops; drooping branches
Leaf: Evergreen needles, 2.5-4" long; fascicles of 5; dark green and rigid with lengthwise rows of stomatal bloom
Bark: Initially thin, smooth and gray-white; later darkens to brown or black with deep fissures and square plates
Fruit: Moderately sized woody cone with a short stalk; turn from green to brown as they ripen
Flower: Monoecious; male cones small and reddish; female cones are bright reddish-purple
Common Insects/Disease: Aphids and white pine blister





***Pinus nigra* (Austrian pine, Austrian black pine)**



Family: Pinaceae **Species code:** PINI
Height: 50-100' **Width:** 20-30'
Form: Erect to spreading; dense crown that eventually develops a flat top
Leaf: Flexible and thick evergreen needles, 4-6" long; fascicles of 2; dark green
Bark: Brown to gray, developing gray-brown ridges and dark brown furrows
Fruit: Yellow-brown, ovoid cones 2-3" long
Flower: Monoecious; males cylindrical and yellow in large clusters along twigs; females oval and yellow to purple
Common Insects/Disease: No significant



***Pinus mugo* (Sweet mountain pine)**



Family: Pinaceae **Species code:** PIMU
Height: 15-30' **Width:** Equal to height
Form: Most planted cultivars are bushy, round shrubs
Leaf: Stiff, evergreen needles; fascicles of 2; curved, minutely serrated; 1.5-2.5" long; bright to dark green; some with grayish tinge; persist for 2-10 years
Bark: Thin and brownish gray; older stems have splits and irregular scaly plates; raised bumps on smaller stems
Fruit: Matte dark brown cones, singly or in clusters; 1-2" long
Flower: Monoecious; males cylindrical, yellow or red, in clusters; females yellow-green to purple
Common Insects/Disease: Mites, scales, caterpillars, beetle borers, spittle bugs, pine moth, needle cast, tip blight and rust





***Pinus ponderosa* (Ponderosa pine)**



Family: Pinaceae **Species code:** PIPO
Height: 50-100' **Width:** 25-30'
Form: Irregular crown, flat top or short conical crown
Leaf: Evergreen and 5-10" long; 3 (or 2) tough, yellow-green needles per fascicle; crushed needles yield turpentine odor (can be citrus-like)
Bark: Dark (nearly black) on young trees; developing cinnamon colored plates and deep furrows
Fruit: Ovoid cones 3-6" long; sessile and red-brown in color
Flower: Monoecious; males in yellow-red, cylindrical clusters near ends of branches; females reddish at branch tips
Common Insects/Disease: Aphids, beetle borers, ips, pitch canker, red ring rot, mistletoe and western gall rust

***Pinus strobiformis* (Southwestern white pine)**



Family: Pinaceae **Species code:** PIST2
Height: 100' **Width:** 50'
Form: Conical crown when young, later broader with flat top
Leaf: Thin needles, 2-3" long, fascicles of 5; serrated near tips; bluish-green with white stomatal lines on inner surfaces
Bark: Gray-brown and smooth when young; becoming furrowed with scaly, rounded ridges
Fruit: Woody cone; 5-9" long; yellow-brown; thick scales bend backwards and have a narrow tip
Flower: Monoecious; males cylindrical and pale yellow; females light green to reddish
Common Insects/Disease: White pine blister rust and dwarf mistletoe





***Pinus sylvestris* (Scotch pine, Scots pine)**



Family: Pinaceae **Species code:** PISY
Height: 30-70' **Width:** 25-30'
Form: Often twisted or poorly formed trunk; rounded crowns
Leaf: Stout, twisted evergreen needles; 1.5-3" long; fascicles of 2; blue-green with stomatal bands
Bark: Orange-brown and scaly or peeling when young and in upper crown; gray or red-brown furrows at maturity
Fruit: Yellow-brown ovoid cones 1.5-2.5" long; slightly stalked; umbo has a blunt spine; pyramid shaped swelling at the base of the stalk
Flower: Monoecious; males cylindrical, yellow, in large clusters; females oval, yellow-green to purple
Common Insects/Disease: Aphids, fusarium and *Phytophthora*



***Pinus strobus* (Eastern white pine)**



Family: Pinaceae **Species code:** PIST
Height: 50-80' **Width:** 20-40'
Form: Straight trunk; crown conical when young, wispy, horizontal, upturning branches when older
Leaf: Blue-green evergreen needles; fascicles of 5; 3-5" long; 3 lines of stomata on needles
Bark: Smooth, gray-green with light patches when young; later red-brown to gray-brown with scaly ridges and furrows
Fruit: Thick cylindrical cones 4-7" long with rounded cone scales; resinous, borne on a long stalk, maturing in summer
Flower: Monoecious; males in yellow clusters at branch tips; females light green and red tinged, at branch ends
Common Insects/Disease: Aphids and beetle borers



SCALY NEEDLES

**Juniperus species (Juniper)**

Family: Cupressaceae **Species code:** JU

Height: 20-50' **Width:** 8-20'

Form: Erect or spreading oval shape

Leaf: Scale-like; blue-green or silver-gray

Bark: Variable; can be blocky, rough and scaly to exfoliating; ridged or striated; light green, gray or red-brown

Fruit: Small (.25-.5") fleshy, brown or red cone that can look berry-like

Flower: Insignificant

Common Insects/Disease: Aphids, beetle borers, spider mites, spittlebugs and rust





***Juniperus communis* (Common juniper)**



Family: Cupressaceae **Species code:** JUCO1
Height: 1-30' **Width:** Equal to height
Form: Commonly prostrate, mat-forming shrub; sometimes upright shrub or small tree
Leaf: Linear-lanceolate, .3-.5" long in whorls of 3; white above, green below and without a stalk
Bark: Sheds in thin, fibrous strips; red- to gray-brown
Fruit: Round to oval berry-like cones; .25" diameter; green when young, bluish black when mature; waxy
Flower: Mostly dioecious; male cones small, yellow and solitary; female cones small, green, round and solitary
Common Insects/Disease: Aphids, spider mites and beetle borers

***Juniperus deppeana* (Alligator juniper)**



Family: Cupressaceae **Species code:** JUDE2
Height: 20-55' **Width:** 20-50'
Form: Dense rounded crown with a spreading canopy
Leaf: Sharply pointed scales; .325-.5" long; slightly square twig; bluish green, often with a whitish resin dot on backside
Bark: Nearly square blocking plates, giving it a checkered pattern (alligator-like); dark gray with nearly black fissures
Fruit: Round, berry-like cones; .5" diameter; reddish brown under a waxy coating
Flower: Males are small pale yellow in large clusters at ends of twigs; females are small, round and pale green
Common Insects/Disease: Aphids, spider mites, rust and beetle borers





Juniperus monosperma (One seed juniper)



Family: Cupressaceae **Species code:** JUMO
Height: 25-35' **Width:** Equal to or less than height
Form: Shrubby tree with upturned branches that develop close to the ground, producing an irregular, open crown
Leaf: Pointed needles; yellow to gray green; tight and crowded on twig in opposite pairs giving a square-ish stem
Bark: Brown to gray; irregular furrows; scaly; exfoliating ridges
Fruit: Round, berry-like cones; .25" diameter; waxy bluish brown; soft and juicy at maturity; 1 seed per fruit
Flower: Dioecious; males in small pale yellow large clusters at ends of twigs; females are small, round and pale green
Common Insects/Disease: Aphids, spider mites and beetle borers

Juniperus scopulorum (Rocky Mountain juniper)



Family: Cupressaceae **Species code:** JUSC
Height: 20-50' **Width:** 8-20'
Form: Small tree or large shrub; shape is variable but often short with a round crown
Leaf: Small, tight against the branches; green to gray-green
Bark: Thin and quite scaly with long narrow ridges; reddish brown; turns gray with age
Fruit: Round, bluish berry-like cones
Flower: Small (.125") at branch tips; yellow to green
Common Insects/Disease: Aphids, beetle borers, spider mites and rust





Juniperus virginiana (Eastern red cedar)



Family: Cupressaceae **Species code:** JUVI
Height: 40-50' **Width:** 15'
Form: Dense ovoid, conical or columnar crown
Leaf: Evergreen; two types: (1) scale-like .6" long, dark green, 4 sided and tight to twig; and (2) more needle-like, .25" long, dark blue-green, more common on young trees/shoots
Bark: Red-brown; long, fibrous exfoliated strips, gray beneath
Fruit: Berry-like cones, light green (spring), turning dark blue and waxy at maturity (fall); .25" diameter
Flower: Small and yellow-brown or light blue-green
Common Insects/Disease: Aphids, spider mites and beetle borers

Thuja species (Red cedar)



Family: Cupressaceae **Species code:** TH9
Height: 10-200' **Width:** A third to half the height
Form: Small to large evergreen trees with flattened branchlets
Leaf: Arranged in flattened fan shaped groupings; two types: (1) leaves with sharp, erect, free ends; and (2) crowded scale-like leaves flattened to branches, in alternating decussate pairs
Bark: Stringy-textured reddish-brown, exfoliating bark
Fruit: .5-1" long cones with overlapping leathery scales each containing 1-3 winged seeds
Flower: Monoecious and insignificant; at ends of branches
Common Insects/Disease: Beetle borers, leaf miners, spider mites and *Phytophthora*





Thuja plicata (Western red cedar)



Family: Cupressaceae **Species code:** THPL

Height: 50-120' **Width:** Half as wide

Form: Open, pyramidal crown; pendulous, frond-like branches; base of trunk often swollen and fluted

Leaf: Up to .15" long and in sets of four; square; yellow-green on top, butterfly pattern under; foliage and fallen leaves arranged in flattened sprays

Bark: Thin, stringy and striated; reddish brown; finely ridged and furrowed; exfoliates in long strips

Fruit: Uprturned woody cones (.5" long); scales in pairs

Flower: Monoecious; males small and insignificant; females small and reddish purple near branch tips

Common Insects/Disease: Beetle borers and spider mites

SIMPLE UNDISSECTED OPPOSITE LEAVES



Catalpa species (Catalpa)



Family: Bignoniaceae **Species code:** CA3

Height: Up to 80' **Width:** Up to 20'

Form: Spreading with a high canopy and rounded shape

Leaf: Generally cordate (heart-shaped); light to dark green

Bark: Light green, gray or reddish brown; generally scaly

Fruit: Long bean-like, hanging capsules

Flower: Very showy; white with yellow and purple spots on the insides; 5 fuzzy petals form an overall bell shape

Common Insects/Disease: Caterpillars, anthracnose, powdery mildew and *Verticillium*





Catalpa speciosa (Western catalpa)



Family: Bignoniaceae **Species code:** CASP
Height: 40-60' **Width:** 20-40'
Form: Spreading, crooked branches and an irregular crown
Leaf: Whorled, cordate; 5-12" long; pinnately veined with smooth edges; overall soft and flexible feeling, light green to green above and soft pubescence below
Bark: Gray to reddish brown with irregular shallow fissures
Fruit: Long bean-like, hanging capsules
Flower: Very showy; white (yellow and purple spots on insides), 5 fuzzy petals form an overall bell shape
Common Insects/Disease: Caterpillars, anthracnose and *Verticillium*

Cornus species (Dogwood)



Family: Cornaceae **Species code:** CO1
Height: 5-40' **Width:** Variable
Form: Mostly deciduous trees or shrubs; a few herbaceous species, some evergreen
Leaf: Simple and untoothed; veins curving as they approach leaf edges; most have opposite leaves, a few have alternate
Bark: Gray to brown; furrowed to smooth
Fruit: Drupes with one or two seeds, often brightly colored
Flower: Some have insignificant flowers surrounded by large, typically white, petal-like leaves; others have open clusters of petal-bearing flowers
Common Insects/Disease: Beetle borers, scales, anthracnose and *Phytophthora*





Lonicera species (Honeysuckle)



Family: Caprifoliaceae **Species code:** LOSP
Height: 6'-6' **Width:** Equal to or greater than height
Form: Most are twining climbers, some erect shrubs; many have strongly fibrous stems
Leaf: Simple opposite and oval; .5-5" long; most deciduous, some evergreen or semi-evergreen
Bark: Gray, brown, or red; smooth to fibrous, often exfoliating
Fruit: Red, blue or black berry containing several seeds; spherical or elongated
Flower: Many have sweetly-scented, tubular, bilaterally symmetrical flowers, often in clusters of two; produce sweet, edible nectar
Common Insects/Disease: No significant

Rhamnus cathartica (European buckthorn, Carolina buckthorn, Glossy buckthorn)



Family: Rhamnaceae **Species code:** RHCA
Height: 20' **Width:** 10-15'
Form: Large suckering shrub or small, low branching tree
Leaf: Simple opposite (partially alternate); elliptical to oval; 2-3" long; finely serrated (toothed); dark shiny green above, lighter below
Bark: Smooth; shiny gray to reddish brown; lenticels; later dark gray, scaly then rectangular blocky; inner bark yellow
Fruit: Small drupe (.25" diameter); shiny black when ripe
Flower: Small clusters of 4 petals; yellow-green
Common Insects/Disease: Aphids and anthracnose





Syringa species (Lilac)



Family: Oleaceae **Species code:** SYSP
Height: 6-30' **Width:** Equal to height
Form: Small trees and shrubs with 8-12" diameter stems
Leaf: Opposite (occasionally in whorls of three); heart-shaped to broad lanceolate; a few pinnately compound
Bark: Gray, red, or brown; some with lenticels
Fruit: Dry, brown capsule, splitting in two at maturity; two winged seeds
Flower: Large panicles .25-.75" long; tubular with 4 petals; often shades of purple, also white, yellow, pink, and burgundy
Common Insects/Disease: Beetle borers, leaf miners and scales

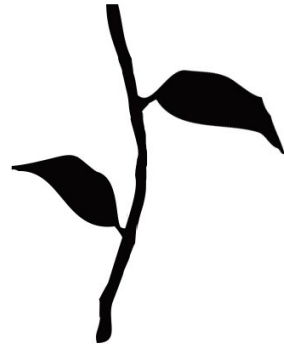
Syringa reticulata (Japanese tree lilac)



Family: Oleaceae **Species code:** SYRE
Height: 35' **Width:** Almost equal to height
Form: Small, upright tree; rounded to oval crown
Leaf: Simple, opposite and elliptical to ovate with smooth edges; 2-4" long; dull, dark green above, lighter below
Bark: Cherry-like; reddish brown to brown; prominent horizontal lenticels
Fruit: Dehiscent brown capsule .5-1" long; curved and in loose clusters
Flower: Showy, white and clustered in 4-12" terminal panicles (almost equal width), late spring or early summer
Common Insects/Disease: Beetle borers, leaf miners and scales



SIMPLE UNDISSECTED ALTERNATE LEAVES



Amelanchier species (Serviceberry)



Family: Rosaceae

Species code: AM

Height: 6"-50'

Width: Equal to height

Form: Small, multistemmed trees or clump-forming shrubs

Leaf: Deciduous, simple alternate; lanceolate to round; up to 4" long; thin to leathery; smooth to densely hairy

Bark: Gray or brown and smooth or fissuring

Fruit: Berry-like pome; red to purple to nearly black; .25-.5" diameter; flavorless to sweet

Flower: Terminal inflorescences of 1-20 flowers, erect or drooping; 5 white (rarely pink, yellow, or red streaked), linear to circular petals

Common Insects/Disease: Leaf miners, beetle borers, spider mites, aphids, leaf blight and rust





Betula species (Birch)



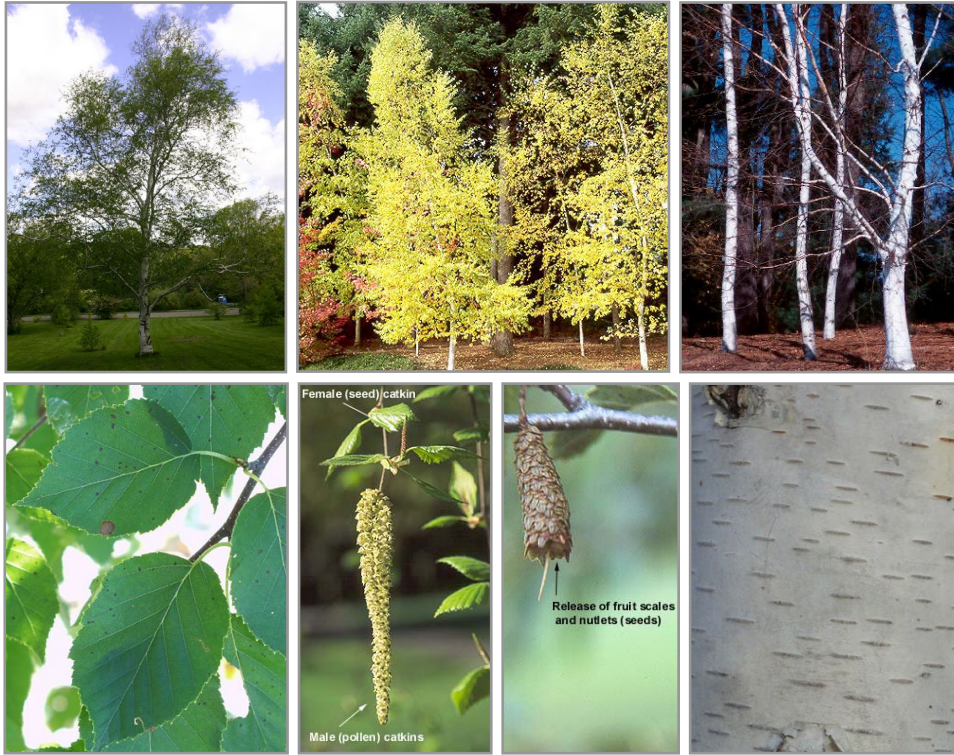
Family: Betulaceae **Species code:** BE
Height: 20-100' **Width:** A third to two thirds height
Form: Small to medium-sized trees or shrubs; open irregular to pyramidal crowns
Leaf: Usually ovate, serrate, dentate or lobed; pinnately veined with petioles and stipules, often in pairs
Bark: Gray, white, black, silver, pink, brown or yellow; long, horizontal lenticels; often separates into papery plates
Fruit: Small samaras, arising in female catkin scales, although wings obscure in some species; seeds mostly 3 per scale
Flower: Males long, cylindrical; female on shorter side shoots
Common Insects/Disease: Aphids, beetle borers and anthracnose

Betula nigra (River birch)



Family: Betulaceae **Species code:** BENI
Height: 50-90' **Width:** 40-60'
Form: Open canopy, often divided into several upright trunks
Leaf: Pinnately-veined and ovate; 1.5-3" long; doubly serrate
Bark: Pink to red-brown; smooth on young trees, developing papery scales; exfoliating horizontally revealing several colors (cream to orange-brown); coarse scales when older
Fruit: Red-brown, cone-like aggregate, 1-1.5" long with hairy scales; containing 3-winged seed
Flower: Males reddish green, 2-3" long, near branch tips; females light green, upright, .25-.5" long
Common Insects/Disease: Aphids, beetle borers and anthracnose





Betula papyrifera (Paper birch)



Family: Betulaceae **Species code:** BEPA
Height: 45-65' **Width:** 25-35'
Form: Pyramidal or irregular crown, often with several trunks
Leaf: Pinnately-veined and ovate; 3-5" long; doubly serrate edges; acute tip and rounded base (some heart-shaped)
Bark: Red-brown with lenticels on young stems; later white, papery strips; base brown to black, orange inner bark
Fruit: Cone like, cylindrical; 1-1.5" long, releasing elliptical 2-winged nutlets; mature in the fall
Flower: Monoecious; male catkins (groups of 2-5), .75-1.25" long; female upright, 1-1.25" long
Common Insects/Disease: Aphids, beetle borers and caterpillars

Betula pendula (European white birch)



Family: Betulaceae **Species code:** BEPE
Height: 40-50' **Width:** 15-25'
Form: Open, pyramidal crown, drooping fine branches
Leaf: Pinnately-veined and ovate to triangular; 2-4" long; pointed tip; doubly serrate edges
Bark: Red-brown with light lenticels when young; later white, generally smooth; base may have thick bark with dark furrows
Fruit: Cone like and cylindrical; 1" long; releases 2-winged nutlets
Flower: Monoecious; males with 1" long catkins (groups of 2-3) near branch tips; females upright, light green and 1" long
Common Insects/Disease: Aphids, beetle borers and sooty mold

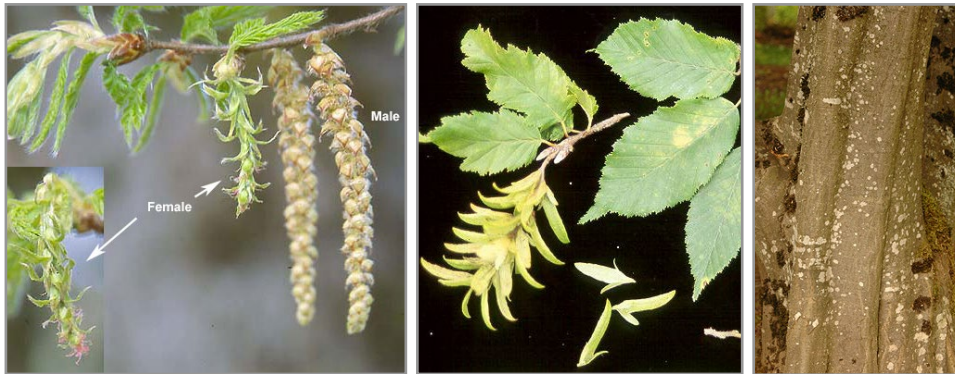




***Celtis occidentalis* (Northern hackberry)**



Family: Cannabaceae **Species code:** CEOC
Height: 40-60' **Width:** Almost equal to height
Form: Wide spreading crown; ascending arching branches
Leaf: Ovate, 2-5" long; serrated, pinnately veined, pointed tip; unequal base; green above, paler, pubescent below
Bark: Smooth and gray-brown when young; later corky, "warts" and irregular ridges
Fruit: Round drupe, .25-.4" diameter; reddish purple; dry, thin flesh, but edible and sweet with a large pit
Flower: Monoecious; 4 and 5 lobed calyx; small (.13"); light green; produced on stalks from new leaf axils
Common Insects/Disease: Beetle borers and caterpillars



***Carpinus betulus* (European hornbeam)**



Family: Betulaceae **Species code:** CABE
Height: 40-60' **Width:** 30-40'
Form: Pyramidal when young, later an oval to round crown; often with a crooked trunk
Leaf: Elliptical to ovate and doubly serrated; 3-5" long; pinnately veined; waxy, green above, paler below
Bark: Thin and smooth gray-brown when young; splitting into shallow furrows with a fluted trunk
Fruit: Ribbed nutlet on a lobed, serrated, folded leaf (1" long), which are clustered on 3" hanging stalks
Flower: Males on hanging catkins, yellow-green, 1-2" long; females with yellow green, 2-3" long leaves
Common Insects/Disease: Scales





***Cercis canadensis* (Eastern redbud)**



Family: Fabaceae **Species code:** CECA
Height: 30' **Width:** 10-20'
Form: A large shrub or small tree with a short, often twisted trunk and spreading canopy
Leaf: Cordate (heart-shaped); 3-5" long and wide, with a smooth edge; thin and papery
Bark: Initially smooth and brown; later ridged and furrowed to scaly and dark gray
Fruit: Flattened, dry legumes; brown when dry
Flower: Very showy pea-like flower; pink to light purple
Common Insects/Disease: Caterpillars, scales, anthracnose, crown rot, *Phytophthora* and *Verticillium*

***Corylus colurna* (Turkish hazelnut)**



Family: Betulaceae **Species code:** COCO2
Height: 35-50' **Width:** Half the height
Form: Broad pyramidal, symmetrical shape with horizontal limbs; usually with a short trunk
Leaf: Ovate to obovate; 2-6" long with a pointed tip; cordate base; serrated; dark green with pubescent veins under
Bark: Grayish brown, smooth; later a criss-cross pattern; flaky
Fruit: Edible brown nuts (.5" diameter) enclosed in leafy husk with protruding tube-like "beak"; initially green, then brown
Flower: Males are light brown-gray catkins (.75-1" long) in 2-3 clusters near branch tips; females red stigma and styles protruding from gray-brown buds
Common Insects/Disease: Powdery mildew and sooty mold





Crataegus species (Hawthorn)

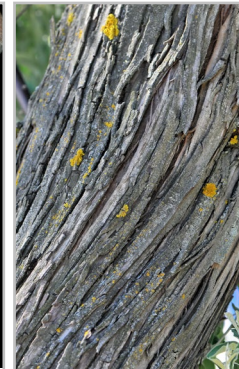


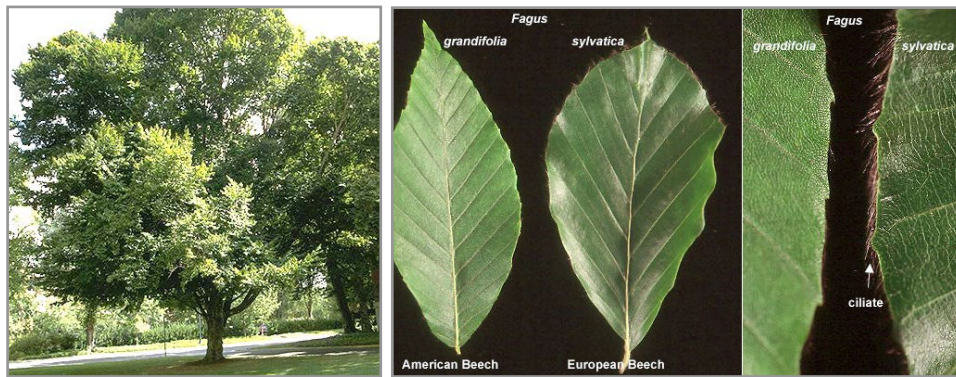
Family: Rosaceae **Species code:** CR
Height: Up to 25' **Width:** Equal to or less than height
Form: Generally very dense shrubs or small trees
Leaf: Highly variable; generally 2-4" long, serrate and lobed or unlobed; thorns beneath; green above and paler below
Bark: Smooth, gray-brown turning darker and scaly with age
Fruit: Small pomes (.25" diameter); yellow to red when mature
Flower: Usually small white flowers with 5 petals produced in clusters near the end of the twig
Common Insects/Disease: Depending in species, aphids, beetle borers, scales, spider mites, fire blight, powdery mildew, rust and sooty mold

Elaeagnus angustifolia (Russian olive)



Family: Elaeagnus **Species code:** ELAN
Height: Up to 40' **Width:** 15-20'
Form: Upright and rounded or shrub shape
Leaf: Linear to lanceolate with a smooth edge; scaly; 1-3" long, .5" wide; green to almost gray above and silvery below
Bark: Smooth and gray when young, becoming irregularly ridged and furrowed later
Fruit: Berry-like achene, .5" long; silvery reddish brown; sweet and edible but quite dry
Flower: Bell-shaped and very fragrant, lacking petals; silvery or whitish; appearing in spring
Common Insects/Disease: *Phytophthora* and *Verticillium*





Fagus species (Beech)



Family: Fagaceae **Species code:** FA
Height: 50-100' **Width:** Equal to height
Form: Open and spreading canopy; pyramidal to oval shape
Leaf: Smooth to toothed edges; 2-6" long; broad and two-ranked (emerging in the same horizontal plane)
Bark: Light gray and smooth even as tree ages
Fruit: Three-angled and edible nut, .5" long; singly or in pairs in soft-spined husks
Flower: Monoecious; flowers are small with males on catkins and females on shorter spikes; often in pairs
Common Insects/Disease: Aphids, scales, canker, powdery mildew, sooty mold, spider mites and *Phytophthora*

Fagus sylvatica (European beech)



Family: Fagaceae **Species code:** FASY
Height: 65' **Width:** Two thirds the height
Form: Stocky trunk and round crown
Leaf: Ovate or elliptical; 2-4" long; pinnately-veined, nearly smooth, toothed or wavy edges; fine hairs on edges and veins; shiny green with purple varieties
Bark: Dark gray-blue and smooth; may be mottled
Fruit: Irregularly triangular, shiny, brown nuts; found in pairs in a woody husk covered with spines; 1" long; edible
Flower: Monoecious; male flowers on rounded heads hanging on a slender stalk; female flowers on shorter spikes
Common Insects/Disease: Aphids, spider mites, canker, *Phytophthora* and sooty mold





***Ginkgo biloba* (Ginkgo)**

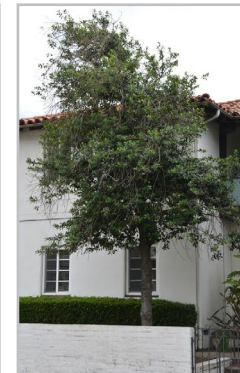


Family: Ginkgoaceae **Species code:** GIBI
Height: 65' **Width:** One third to half the height
Form: Usually narrow, oval crown when young; later irregular, broader crown of a few large branches; spur shoots obvious
Leaf: Fan-shaped; 1-3" long and wide; occur in clusters of 3-5 per spur or alternate on long shoots
Bark: Light gray-brown with irregular ridges; deep furrows develop with age
Fruit: Plum-shaped, 1" seed with a fleshy covering; green then tan or orange; messy and malodorous
Flower: Dioecious; males (pollen cones) are 1" long, catkin-like; females on 1.5-2" long stalks with two ovules at end
Common Insects/Disease: anthracnose

***Ilex opaca* (American holly)**



Family: Aquifoliaceae **Species code:** ILOP
Height: 30-40' **Width:** Generally greater than height
Form: Thick crown and pyramidal form
Leaf: Evergreen; elliptical; 2-4" long with spiny toothed edge; thickened and leathery, shiny dark green above, paler below
Bark: Light gray and smooth regardless of size
Fruit: Red berry-like drupe; rarely yellow when ripe; .25" in diameter; containing ribbed nutlets
Flower: Dull green-white; male flowers on 3-7 flowered cymes; female flowers are solitary with a pleasant odor
Common Insects/Disease: Leaf miner, scales, spider mites, anthracnose, canker and powdery mildew





Magnolia grandiflora (Southern magnolia)



Family: Magnoliaceae **Species code:** MAGR
Height: 80' **Width:** 70'
Form: Erect or spreading and requires ample growing space
Leaf: Elliptic to broadly ovate and glossy dark green
Bark: Gray and rough; furrowed in thick plates
Fruit: Very large purple or red follicle
Flower: Showy, fragrant and white
Common Insects/Disease: Aphids, scales, spider mites and Verticillium

Malus species (Apple)



Family: Rosaceae **Species code:** MA2
Height: 13-40' **Width:** 20-25'
Form: Erect or spreading with a low, oval or umbrella canopy
Leaf: Simple, alternate leaf with a serrated edge; 1-4" long
Bark: Gray, brown or reddish-brown; young trees are smooth while older trees have knotty bark
Fruit: Prolific red, yellow or mostly green pome (typical apple)
Flower: Flat-topped cluster of 5 petals; may be white, pink or red with a darker bud emerging in April or May
Common Insects/Disease: Aphids, beetle borers, codling moths and psyllid, brown rot, canker, crown rot, powdery mildew, scab and sooty mold





Malus pumila (Paradise apple)

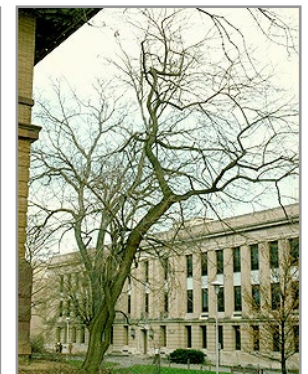


Family: Rosaceae **Species code:** MAPU
Height: Up to 25' **Width:** 70'
Form: Generally poor, with twisted trunks and low branching
Leaf: Elliptical to ovate; 1.5-3" long and pinnately veined; finely serrated; sometimes on spur shoots; green above and paler, white pubescent below and on the petiole
Bark: Variable; generally smooth when young; thin and scaly when older
Fruit: Very large purple or red follicle
Flower: Showy and white
Common Insects/Disease: Aphids, scales, spider mites and *Verticillium*

Morus rubra (Red mulberry)



Family: Moraceae **Species code:** MORU
Height: Up to 60' **Width:** 20-25'
Form: Short trunk that typically branches low
Leaf: Simple alternate; egg shaped (ovate) to almost circular; 3-5" long; serrated (toothed) edge
Bark: Gray-brown and quite irregular with long, scaly ridges
Fruit: Resembling blackberries; cylindrical; 1-1.25" long
Flower: Usually dioecious; small, pale green; male flowers are hanging catkins, 1-2" long; females are 1" long catkins; both appearing in late spring
Common Insects/Disease: Caterpillars





Populus species (Cottonwood)



Family: Salicaceae **Species code:** PO
Height: 60-100' **Width:** 20-100'
Form: Large open-crowned tree with massive trunk and branches
Leaf: Simple, lanceolate (tapered) and glossy; 2-3" across; light to medium green
Bark: Thick gray or brown bark with deep horizontal grooves
Fruit: Female cottonwoods produce fluffy, white, cotton-like covered seeds
Flower: Dioecious; catkins on males
Common Insects/Disease: Wood decay, fall webworm, leaf blight, Western tent caterpillar and epidermal miners

Populus alba (White poplar)



Family: Salicaceae **Species code:** POAL
Height: 40-60' **Width:** 25-40'
Form: Narrow crown
Leaf: Simple alternate; pinnately veined; 2-4" long; edges are coarsely toothed and sometimes lobed (maple-like); shiny green above and silvery white-wooly beneath
Bark: Smooth and milky greenish white for several years; later developing numerous lenticels which enlarge and develop into shallow dark splits and ridges
Fruit: Cottony seeds in dehiscent capsules which mature in late spring to early summer
Common Insects/Disease: Aphids





Populus balsamifera (Balsam poplar)



Family: Salicaceae **Species code:** POBA
Height: 65' **Width:** 20-40'
Form: Straight and cylindrical with an open crown
Leaf: Ovate or broadly lanceolate; shiny green above and pale green below with finely toothed edges
Bark: Smooth and light gray to gray-brown; furrows with age
Fruit: Small brown capsule (.25-.50" long) containing numerous small seeds; fruiting May through July
Flower: Clusters are 2-3.5" with many small flowers; male flowers have 20-30 reddish stamens; female catkins are 4-6"
Common Insects/Disease: Aphids, beetle borers, scales, thrip, anthracnose, canker, mistletoe and sooty mold



Populus angustifolia (Mountain cottonwood, Narrowleaf cottonwood)



Family: Salicaceae **Species code:** POAN
Height: 60' **Width:** 20-30'
Form: Narrow crown
Leaf: Simple alternate; lanceolate (tapered) and willow-like; 2-5" long; finely serrated edges; shiny green above, paler and blotchy orange below
Bark: Smooth light gray with many lenticels when young; later dark with furrows, ridges, often thick and rough
Fruit: Small (.25"), 2-valved, dry capsule on a catkin; each capsule contains numerous small, cottony seeds
Common Insects/Disease: Aphids





Populus fremontii (Fremont cottonwood)

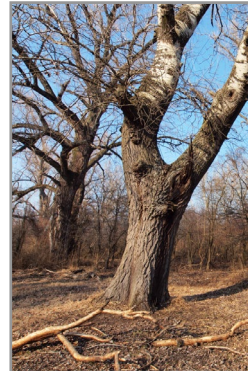


Family: Salicaceae **Species code:** POFR
Height: 20-90' **Width:** 30-50'
Form: Erect or spreading single stem
Leaf: Cordate (heart-shaped); 1-3" with an elongate tip; white veins and coarsely crenate (scalloped edges)
Bark: Smooth when young, becoming deeply fissured with whitish cracked bark on older trees
Fruit: Wind dispersed achene (like hanging patches of cotton)
Flower: Long drooping catkin, blooms from March to April
Common Insects/Disease: Aphids, beetle borers, anthracnose, fall webworm, Western tent caterpillar and mistletoe

Populus nigra (Black poplar)



Family: Salicaceae **Species code:** PONI
Height: Up to 60' **Width:** 10-15'
Form: Very slender upright crown (column-like)
Leaf: Triangular; 2-4" long; finely serrate-crenate but straight across the base; shiny dark green above, paler beneath
Bark: Initially smooth and gray-green, becoming darker (gray to nearly black) and irregularly furrowed
Fruit: Hanging cluster of light brown capsules containing numerous small fluffy seeds
Flower: Slender hanging catkins, 2-3"; reddish to yellow-green
Common Insects/Disease: Beetle borers, scales, thrip, anthracnose, branch blight, canker, crown rot and mistletoe





Populus sargentii (Plains cottonwood)



Family: Salicaceae **Species code:** POSA
Height: Up to 180' **Width:** 75-85'
Form: Erect or spreading with conical or oval crown
Leaf: Deltoid (triangular) to ovate (rounded) and dark green
Bark: Cream or light gray, furrowed or ridged
Fruit: Small brown or white capsule (.25-.5")
Flower: Male (pollen) catkins are reddish-purple, 2-4" long; female catkins are green, 3-5" long
Common Insects/Disease: Aphids, beetle borers, beetle leaves, anthracnose, canker, crown rot, mistletoe, rust and sooty mold

Populus tremuloides (Quaking aspen)



Family: Salicaceae **Species code:** POTR1
Height: 30-70' **Width:** 20-40'
Form: Small upright tree, which often occurs in thickets
Leaf: Cordate (heart-shaped) to nearly round with a fine toothed edge; 1-3" long; green above and paler below
Bark: At first smooth, creamy yellowish-white to very light green; later developing thick furrows and becoming dark
Fruit: Catkin (2-4" long), with attached light green capsules which contain many small hairy seeds
Flower: Dioecious; hanging catkins 1-3" long
Common Insects/Disease: Beetle borers, caterpillars, anthracnose and mistletoe





Populus x canadensis (Carolina poplar)



Family: Salicaceae **Species code:** POAC2
Height: 100' or greater **Width:** 30-40'
Form: Ovoid (spherical) crown with spreading branches
Leaf: Spirally arranged and vary in shape from triangular to circular or (rarely) lobed
Bark: Gray or brown; rough, thick and deeply furrowed
Fruit: Green to reddish-brown; 2- to 4-valved dehiscent capsule
Flower: Pale yellow in long, drooping, sessile or pedunculate catkins produced from buds
Common Insects/Disease: Aphids, beetle borers, scales, thrip, anthracnose, canker, crown rot, mistletoe and sooty mold

Populus x acuminata (Lanceleaf cottonwood)



Family: Salicaceae **Species code:** POAC5
Height: Over 40' **Width:** 30-40'
Form: Dense and pyramidal shape
Leaf: Lanceolate (tapered); about 2" wide and 3" long; glossy light to medium green; gold in fall; deciduous
Bark: Grey to brown and scaly
Fruit: Small, brown capsule (.25-.5"); fruiting in summer
Flower: Insignificant; flowers in spring or winter
Common Insects/Disease: Aphids, beetle borers, scales, thrip, anthracnose, canker, crown rot and mistletoe





Prunus cerasifera (Cherry plum)



Family: Rosaceae **Species code:** PRCE
Height: 15-30' **Width:** 15-25'
Form: Single stem with an erect or spreading and low canopy
Leaf: Rounded, elliptic or egg-shaped; thin with serrate (toothed) edges; up to 2.5" long
Bark: Dark brown and furrowed
Fruit: Small berries
Flower: White, showy and fragrant flowers
Common Insects/Disease: Aphids, beetle borers, caterpillars, scales, spider mites, rust, sooty mold and *Verticillium*



Prunus species (Plum)



Family: Rosaceae **Species code:** PR
Height: Generally between 12-30' **Width:** Equal to height
Form: Low crown with spreading branches; some with thorn-like side branches
Leaf: Usually lanceolate (tapered), unlobed and often with nectaries (glands) on the leaf stalk
Bark: Smooth and marked by lines running around the stem
Fruit: Fleshy drupe (a "prune") with a single large, hard-coated seed (a "stone")
Flower: White to pink, may be red; 5 petals and 5 sepals
Common Insects/Disease: Aphids, beetle borers, spider mites, rust, sooty mold and *Verticillium*





***Prunus padus* (European bird cherry)**



Family: Rosaceae **Species code:** PRPA
Height: 25-30' **Width:** 15-20'
Form: Single stem with an oval, rounded or umbrella canopy
Leaf: Elliptic and dark green; bronze or gold in fall
Bark: Black or dark gray and exfoliating or smooth
Fruit: Small black drupe (.25-.50"), fruiting in winter or summer
Flower: White, showy, and fragrant flowers
Common Insects/Disease: Rust and *Verticillium*

***Prunus virginiana* (Common chokecherry)**



Family: Rosaceae **Species code:** PRVI
Height: Up to 25' **Width:** Equal to height
Form: Small, upright tree often forming shrubby thickets
Leaf: Oval and 2-4" long; finely serrated edge; dark green above and paler below
Bark: Smooth, gray-brown, conspicuous lenticels that develop into shallow fissures; young stems have shallowly peeling, curling layers
Fruit: Dark red to purple drupe; .33" in diameter
Flower: White to pink, may be red; 5 petals and 5 sepals
Common Insects/Disease: Aphids, beetle borers, spider mites, rust, sooty mold and *Verticillium*





Pyrus species (Pear)



Family: Rosaceae **Species code:** PY
Height: 10-35' **Width:** A third the height
Form: Conical or oval; often with tall narrow crowns
Leaf: Broad oval to narrow lanceolate; 1-6" long; some glossy green, others with fine white hair; almost all deciduous
Bark: Dark brown to gray-green; blocky or furrowed
Fruit: Pomes, .5-2" in diameter in the wild; cultivated forms can be 7"; rounded or pyriform (pear-shaped)
Flower: Most white, some pale yellow or pink; 1-2" in diameter
Common Insects/Disease: Aphids, beetle borers, spider mites, rust, *Phytophthora*, sooty mold and pitch canker

Quercus species (Oak)



Family: Fagaceae **Species code:** QU
Height: 20-100' **Width:** Equal to height
Form: Over 600 species with much variability; often a wide, spreading tree; can also be shrubby
Leaf: Ovoid to linear with serrated or smooth edges; often dark green and shiny above, paler below
Bark: Gray to brown; fissured, scaly, some corky, some smooth
Fruit: Acorn
Flower: Often insignificant; occur on catkins
Common Insects/Disease: Beetle borers, caterpillars, insect galls, leaf miner, scales and oak wilt





Quercus muehlenbergii (Chinkapin oak)



Family: Fagaceae **Species code:** QUMU
Height: 20-70' **Width:** 50-70'
Form: Single trunk dividing into many branches
Leaf: Glossy and oblong to slightly round with deeply or shallowly crenate (rounded) edges
Bark: Light to dark gray; flaky to papery with deep, irregular furrows
Fruit: Small chestnut brown to nearly black acorn (up to .75" long); singly or in pairs; ripens in September or October
Flower: Insignificant monoecious yellowish-green flowers
Common Insects/Disease: Anthracnose, oak wilt, acorn weevils, spittlebugs and gypsy moth

Quercus nigra (Water oak)



Family: Fagaceae **Species code:** QUNI
Height: 40-70' **Width:** Equal to height
Form: A medium sized tree with a slender trunk, rounded crown and ascending branches
Leaf: Variable shape (from spatulate to lanceolate); 2-4" long; may be 0-5 lobed; edges may be smooth or bristle-tipped; axillary tufts may occur below
Bark: Dark and tight, smooth when young; later with irregular rough patches; much later developing wide, scaly ridges
Fruit: Acorn
Flower: Males on catkins; females on spikes with the leaves
Common Insects/Disease: Beetle borers, caterpillars, insect galls, leaf miner, scales and oak wilt





Rhus species (Sumac)

Family: Anacardiaceae **Species code:** RHSP
Height: 3-30' **Width:** Two thirds to equal the height
Form: Shrubs and small trees often with wide spreading branches and an open crown
Leaf: Alternate, sometimes spirally arranged; pinnately compound, some species trifoliolate or simple leaves
Bark: Gray to brown, smooth to furrowed, some with lenticels when young and scales later
Fruit: Dense terminal clusters of reddish drupes
Flower: Dense panicles or spikes, 2-12" long, individual flowers small, green, creamy white or red, five petals
Common Insects/Disease: Aphids, scales, canker and *Verticillium*

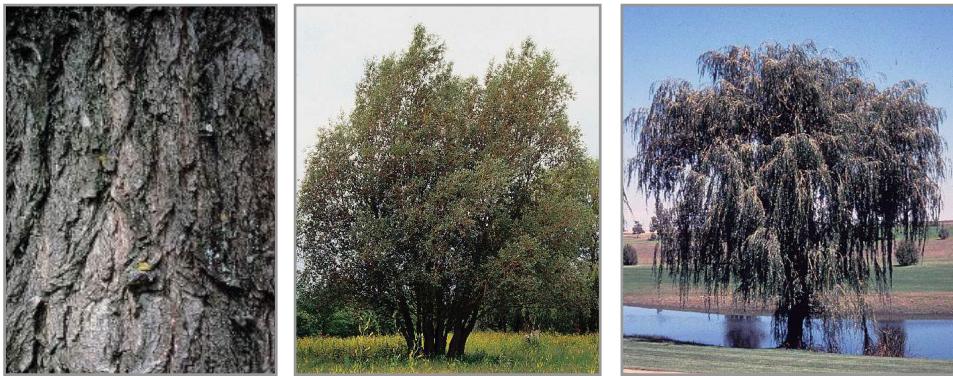


Salix species (Willow)



Family: Salicaceae **Species code:** SA
Height: 40-65' **Width:** 35-45'
Form: Single or branching stem
Leaf: Alternate leaves about 2-4.5" long and .25-.75" wide; occur along the twigs and shoots; narrowly elliptic or lanceolate in shape and finely serrated along edges
Bark: Gray, rough and deeply fissured
Fruit: Small brown capsule; fruiting in summer
Flower: Narrowly cylindrical catkins about 1-2.5" long
Common Insects/Disease: Aphids, fall webworm and Western tent caterpillar





Salix alba (White willow)



Family: Salicaceae **Species code:** SAAL4
Height: Up to 80' **Width:** 50-70'
Form: An upright tree with a wide spreading crown; trunk often splits low to the ground
Leaf: Lanceolate to narrow ovate, 2-4" long; finely serrated; shiny green above, nearly white and silky below
Bark: Grayish brown; irregularly furrowed into rough ridges
Fruit: 1-2" long clusters of valve-like, light brown capsules, containing many fine, cottony seeds
Flower: Upright, yellowish, fuzzy catkins
Common Insects/Disease: Aphids, beetle borers, caterpillars, spider mites, anthracnose, branch blight, *Phytophthora*, rust and sooty mold

Salix discolor (Pussy willow)



Family: Salicaceae **Species code:** SADI
Height: Up to 30' **Width:** 50-70'
Form: Rounded, umbrella or vase shape
Leaf: Elliptical to oblong and weakly serrated; 2-4" long; may be fuzzy, blue-green above while pale, almost white below
Bark: Gray-brown; initially smooth, becoming split and shallowly furrowed or scaly
Fruit: Small, brown capsules in clusters 2-2.5" long, each containing many small fuzzy seeds; ripens in late spring
Flower: Catkins very fuzzy and silvery gray; 1" long
Common Insects/Disease: Aphids, beetle borers, caterpillars, spider mites, anthracnose, branch blight, leaf blight, rust, *Phytophthora* and sooty mold





***Salix fragilis* (Crack willow)**



Family: Salicaceae **Species code:** SAFR
Height: 30-65' **Width:** 25-50'
Form: Often multi-trunked with an irregular, often leaning crown
Leaf: Lanceolate and bright green; 3.5-6" long and .6-1.2" wide with a finely serrated margin; finely hairy at first in spring, but soon become hairless
Bark: Dark grey-brown; coarsely fissured in older trees
Fruit: Capsules release numerous small cotton-tufted seeds
Flower: Catkins are 1.5-2.5" long
Common Insects/Disease: No significant

***Sorbus species* (Mountain ash)**



Family: Rosaceae **Species code:** SO
Height: 35-65' **Width:** 30-50'
Form: Oval, spreading, erect
Leaf: Most species pinnately compound odd; gray green or medium green; some simple alternate; turning red, gold, orange or multicolored in fall; deciduous
Bark: Light green or light gray and furrowed
Fruit: Prolific, small (.25" diameter) orange or red pomes in panicles; fruiting in fall, winter or summer
Flower: Showy, white, perfect flowers, in panicles; flowers in spring or summer
Common Insects/Disease: Canker, fire blight, rust and sooty mold





Tilia species (Basswood)

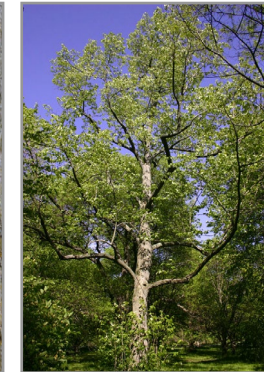


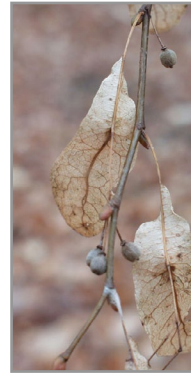
Family: Tiliaceae **Species code:** TI
Height: 30-80' **Width:** 20-50'
Form: Conical, oval or umbrella shaped
Leaf: Ovate to cordate; 2-6" long; serrate and pinnately veined; green above, paler below
Bark: Smooth, gray-green when young; turning gray-brown with long, shallow furrows and flat topped ridges; fibrous
Fruit: Round, nutlet (.25") in a cluster with gray-brown hair
Flower: Pale yellow located below leafy wing in a long branched cluster; flowers in early to mid-summer
Common Insects/Disease: Aphids, spider mites, scales, sooty mold and *Verticillium*

Tilia americana (American basswood)



Family: Tiliaceae **Species code:** TIAM
Height: Up to 80' **Width:** 20-50'
Form: Erect or spreading
Leaf: Ovate to cordate; 5-6" long with serrate edges; pinnately veined; green above and paler below
Bark: At first smooth and gray-green, later turning gray-brown and becoming ridged with long, shallow furrows and flat topped ridges; very fibrous
Fruit: Round, unribbed nutlet cluster (.25"); gray-brown hair
Flower: Pale yellow; below a long, curving leafy wing
Common Insects/Disease: Aphids, spider mites, scales, sooty mold and *Verticillium*





Tilia cordata (Littleleaf linden)



Family: Tiliaceae **Species code:** TICO
Height: Up to 70' **Width:** 15-30'
Form: Dense round crown
Leaf: Ovate to cordate; 2-4" long with serrate edges; pinnately veined; green above and paler below
Bark: Gray or brown; ridged with shallow furrows; young stems are brown and soon become ridged; fibrous
Fruit: Round, 4-ribbed nutlet (.25") covered with gray-brown hair in a hanging cluster
Flower: Pale yellow or white and showy; appearing in early to mid-summer
Common Insects/Disease: Aphids, sooty mold and *Verticillium*

Ulmus species (Elm)



Family: Ulmaceae **Species code:** ULS
Height: 50-130' **Width:** 35-100'
Form: Upright, open, and spreading; often with rounded crown and drooping branchlets
Leaf: Edges simple or serrate; usually asymmetric at the base and tapering to a point at the tip
Bark: Brown to gray often with scaly ridges and fissures
Fruit: Round wind-dispersed samara; bright green when tree is leafless (participates in photosynthesis)
Flower: Insignificant; without petals; often green and mostly wind-pollinated (although bees do visit them)
Common Insects/Disease: Aphids, beetle borers, scales, Dutch Elm disease, *Phytophthora*, sooty mold and *Verticillium*





Ulmus americana (American elm)



Family: Ulmaceae **Species code:** ULAM
Height: 100' **Width:** Equal to height
Form: Trunk often divided into large, ascending, arching limbs, ending in drooping branchlets
Leaf: Ovate to oblong; 3-5" long, 1-3" wide; serrate edges; green and mostly smooth above, paler and downy below
Bark: Dark gray with ridges; diamond-shaped fissures; outer bark shows buff and red-brown patches when sectioned
Fruit: Round, flat, papery, wafer-like samaras; .4-.5" wide
Flower: Monoecious; drooping clusters of 3 to 5
Common Insects/Disease: Aphids, beetle borers, scales, Dutch Elm disease, *Phytophthora*, sooty mold and *Verticillium*

Ulmus parvifolia (Chinese elm)



Family: Ulmaceae **Species code:** ULPA
Height: 40-60' **Width:** 25-40'
Form: Single stem with an open canopy; umbrella topped with small branches that are weeping
Leaf: Small, lustrous green, single-toothed leaves (.75-2" long and .75-1.25" wide)
Bark: Mottled greys with tans and reds
Fruit: Samara; elliptic to ovoid; 4-5" long and 2.25-3.25" wide
Flower: Greenish yellow in late summer
Common Insects/Disease: Aphids, beetle borers, caterpillars, scales, Dutch Elm disease, sooty mold and *Verticillium*





***Ulmus pumila* (Siberian elm)**

Family: Ulmaceae

Species code: ULPU

Height: 50-100' **Width:** Equal to height

Form: Umbrella or vase shaped; limb breakage and sprouting along trunk common

Leaf: Elliptical to ovoid; 1-2.5" long with a serrated edge; dark green and smooth above, paler and smooth below

Bark: Irregularly furrowed; light gray-brown; often streaked with lighter stains

Fruit: Thin, wafer-like samara, nearly round, notched at top, .5" diameter; pale green, later turning light brown

Flower: Small, pale green clusters in early spring

Common Insects/Disease: Aphids, beetle borers, scales, Dutch Elm disease, *Phytophthora*, sooty mold and *Verticillium*

**SIMPLE LOBED
OPPOSITE LEAVES**



Acer species (Maple)

Family: Aceraceae **Species code:** AC

Height: 20-145' **Width:** 20-50'

Form: Upright single trunked trees or shrubs with numerous trunks emerging at ground level

Leaf: Majority palmately veined and lobed (some palmately or pinnately compound, trifoliolate, pinnately veined, or unlobed); mostly deciduous, some evergreen

Bark: Gray to brown; smooth to striated

Fruit: Pairs of samaras with seeds flattened between papery wings causing them to spin to the ground when mature

Flower: Small, 5-petaled green, yellow, orange or red flowers

Common Insects/Disease: Beetle/flathead borers and caterpillars





Acer glabrum (Rocky mountain maple)



Family: Aceraceae

Species code: ACGL

Height: Up to 80' **Width:** 40'

Form: Slender, spreading branches; generally poor form and low branching

Leaf: Simple or compound varying widely across its range

Bark: Red-brown; smooth and tight

Fruit: Widely divergent 2-winged samaras; 1.5-2" long in clusters

Flower: Usually monoecious; yellow-green in small clusters

Common Insects/Disease: Aphids and *Verticillium*

Acer ginnala (Amur maple)



Family: Aceraceae

Species code: ACGI

Height: Up to 20' **Width:** Equal to height

Form: Multi-stemmed with a spreading crown

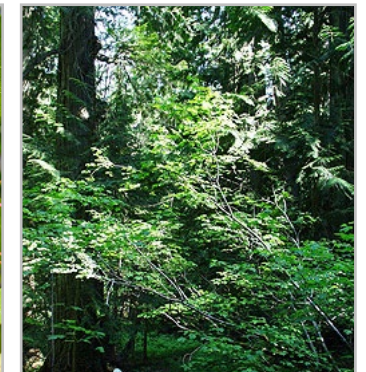
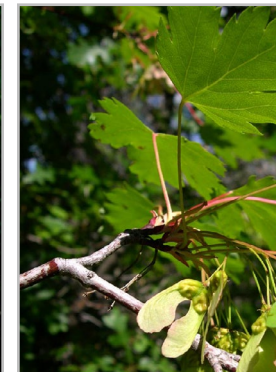
Leaf: Serrated; 2-4" long and 3 lobed; middle lobe is usually much longer than two side lobes; shiny green above, paler below

Bark: Grayish brown; smooth with darker striations or furrows with age

Fruit: Samara; .75-1" long; hangs at tight angles or parallel

Flower: Long-stemmed, tall clusters; pale yellow or cream

Common Insects/Disease: Aphids, beetle borers, scales, Dutch Elm disease, *Phytophthora*, sooty mold and *Verticillium*





Acer platanoides (Norway maple)



Family: Aceraceae **Species code:** ACPL

Height: Up to 80' **Width:** 40'

Form: Usually a dense rounded crown

Leaf: Palmately-veined; 5-7 lobed with long pointed teeth; dark green above, paler below; exudes milky white sap from the petiole when detached; purple (nearly black) leaf variety known as Crimson King is widely planted

Bark: Gray-brown and slightly corky

Fruit: Widely spaced 2-winged samaras, 1.5-2" long in clusters

Flower: Bright yellow-green in color and somewhat showy

Common Insects/Disease: Aphids, anthracnose, sooty mold, *Phytophthora* and *Verticillium*

Acer rubrum (Red maple)



Family: Aceraceae **Species code:** ACRU

Height: Up to 90' **Width:** Up to 50'

Form: Trunk usually clear for some distance; in the open the trunk is shorter and the crown rounded

Leaf: Serrated edges; 3-5 palmate lobes

Bark: On young trees, smooth and light gray; with age becomes darker and breaks up into long, fine scaly plates

Fruit: Clusters of .5-.75" long samaras with slightly spaced wings on long slender stems

Flower: Small; in hanging clusters; bright red, sometimes yellow

Common Insects/Disease: Aphids, beetle borers, scales, *Phytophthora* and *Verticillium*





Acer saccharinum (Silver maple)

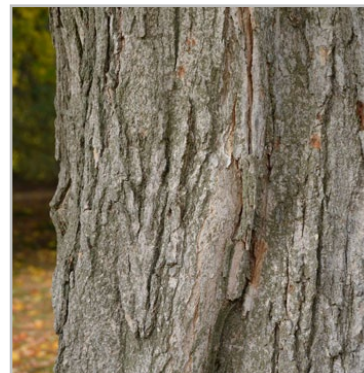
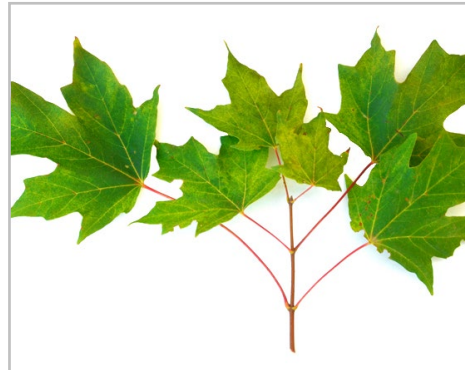


Family: Aceraceae **Species code:** ACPL
Height: 40-100' **Width:** 50'
Form: Trunk usually short, dividing into several subtrunks; long slender branches sweep downward and then curve upwards
Leaf: 5 deeply palmate sinuses; edges coarsely serrate; 2.5-5" long; light green above, pale, silvery white below
Bark: Light gray and smooth when young; breaks into long thin strips that are loose at ends when older
Fruit: Very large samara (1.5-2.5" long); divergent wings
Flower: Greenish to reddish flowers appear in dense clusters
Common Insects/Disease: Aphids, beetle borers, scales, branch blight, sooty mold and *Verticillium*

Acer saccharum (Sugar maple)



Family: Aceraceae **Species code:** ACSA2
Height: 50-80' **Width:** 35-50'
Form: Upright single trunked trees or shrubs with numerous trunks emerging at ground level
Leaf: Palmate; medium green; red, gold, orange or multicolored in fall
Bark: Black or dark brown and furrowed, ridged or scaly
Fruit: Beige or brown winged seed; .5-1.5" long
Flower: Insignificant; green or yellow
Common Insects/Disease: Aphids, beetle borers, scales, anthracnose, powdery mildew and *Verticillium*





Acer x freemanii (Freeman maple)

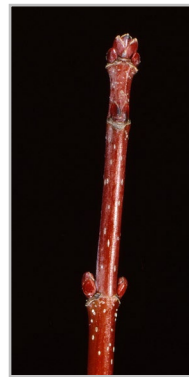


Family: Aceraceae **Species code:** ACFR
Height: 40-60' **Width:** 20-40'
Form: Upright oval, columnar or pyramidal in youth (depending on cultivar); developing several main branches
Leaf: Vibrant green with 3-5 lobed leaf blades, turning yellow or red in fall
Bark: Gray, smooth and thin in youth; becoming slightly furrowed with age
Fruit: When present, 2 joined samaras per stalk; semi-divergent wings in pendulous clusters from the stems
Flower: Small and 5-petaled; green, yellow, orange or red
Common Insects/Disease: *Verticillium*

Acer tataricum (Tatar maple)



Family: Aceraceae **Species code:** ACTA
Height: 20-25' **Width:** 35-50'
Form: Erect or spreading with a low oval or rounded canopy
Leaf: Ovate and medium green; bronze, red, gold or multicolored in fall; deciduous
Bark: Dark brown or light green and smooth or striated
Fruit: Medium red winged seed (.5-1.5")
Flower: Insignificant; green, white or yellow; flowers in spring
Common Insects/Disease: Aphids and *Verticillium*



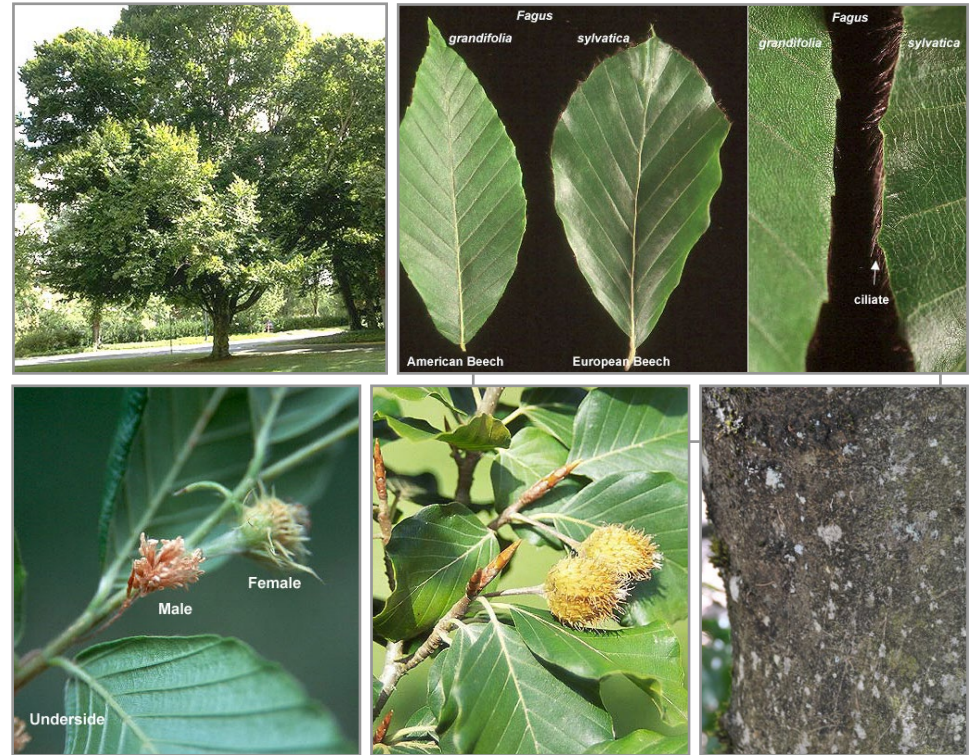
**SIMPLE LOBED
ALTERNATE LEAVES**



Fagus species (Beech)



Family: Fagaceae **Species code:** FA
Height: 50-100' **Width:** Equal to height
Form: Open and spreading canopy; pyramidal to oval shape
Leaf: Smooth to toothed edges; 2-6" long; broad and two-ranked (emerging in the same horizontal plane)
Bark: Light gray and smooth even as tree ages
Fruit: Three-angled and edible nut, .5" long; singly or in pairs in soft-spined husks
Flower: Monoecious; flowers are small with males on catkins and females on shorter spikes; often in pairs
Common Insects/Disease: Aphids, scales, canker, powdery mildew, sooty mold, spider mites and *Phytophthora*





Liquidambar styraciflua (Sweetgum)

Family: Hamamelidaceae **Species code:** LIST

Height: 80' **Width:** 40'

Form: Conical

Leaf: Lobed and palmate; dark green but red, gold, purple or multicolored in fall; deciduous

Bark: Light green or light gray and furrowed

Fruit: Prolific capsules with winged seeds; brown, beige or mostly green; large (1.5-3")

Flower: Insignificant

Common Insects/Disease: Aphids, caterpillars, scales, spider mites, anthracnose, chlorosis and sooty mold



Liriodendron tulipifera (Tulip tree)



Family: Magnoliaceae **Species code:** LITU

Height: 60-80' **Width:** 40'

Form: Erect or spreading with a conical or oval canopy

Leaf: Lobed and light green, turning bronze or gold in fall; deciduous

Bark: Dark gray or light green and fissured

Fruit: Large brown cone of samaras (1.5-3"); fruiting in fall

Flower: Showy and fragrant; green, orange or yellow

Common Insects/Disease: Aphids, scales, anthracnose, chlorosis, fusarium, sooty mold and *Verticillium*





Quercus species (Oak)



Family: Fagaceae **Species code:** QU
Height: 20-100' **Width:** Equal to height
Form: Over 600 species with much variability; often a wide, spreading tree; can also be shrubby
Leaf: Ovoid to linear with serrated or smooth edges; often dark green and shiny above, paler below
Bark: Gray to brown; fissured, scaly, some corky, some smooth
Fruit: Acorn
Flower: Often insignificant; occur on catkins
Common Insects/Disease: Beetle borers, caterpillars, insect galls, leaf miner, scales and oak wilt

Quercus bicolor (Swamp white oak)



Family: Fagaceae **Species code:** QUBI
Height: Up to 80' **Width:** 40'
Form: Erect or spreading; rounded, umbrella or oval canopy
Leaf: Obovate and 3-7" long, 2-4.5" wide; edges with large irregular blunt teeth; dark green and shiny above, very pale below
Bark: Gray and scaly, developing irregular fissures and ridges
Fruit: Tan acorn; 1" long; occur singly or double on a long (2") stalk; bowl-shaped cap covers about a third of the nut
Flower: Male catkins long (2-4") and yellow-green; females green to red and very small in leaf axils
Common Insects/Disease: Anthracnose and *Phytophthora*





Quercus macrocarpa (Bur oak)



Family: Fagaceae **Species code:** QUMA1

Height: 60-80' **Width:** 30'

Form: Erect and spreading

Leaf: Obovate and lobed; 6-12" long; green above, paler and fuzzy below

Bark: Gray to brown and scaly; vertically ridged on large trees

Fruit: Acorns (1.5" long) half enclosed in warty cap with long-fringed edge

Flower: Monoecious; male flowers yellow-green, 2-4" long catkins; female flowers green tinged with red that appear singly on short spikes

Common Insects/Disease: Aphids and spider mites



Quercus coccinea (Scarlet oak)



Family: Fagaceae **Species code:** QUCO

Height: 60-80' **Width:** 30'

Form: Erect and spreading

Leaf: Elliptic and lobed; glossy medium green, turning bronze, red, orange or multicolored in fall; deciduous

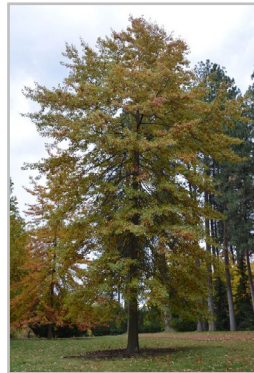
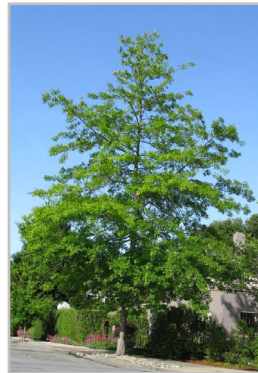
Bark: Black or dark brown and furrowed, scaly or smooth

Fruit: Medium brown acorn (.5-1.5"); fruiting in fall or winter

Flower: Monoecious and insignificant; flowers in spring

Common Insects/Disease: Caterpillars and scales





Quercus palustris (Pin oak)



Family: Fagaceae **Species code:** QUPA

Height: 60-80' **Width:** 30'

Form: Spreading with conical, rounded or umbrella shape

Leaf: Oval in outline; 5-9 bristle-tipped lobes and irregularly deep sinuses that extend nearly to the midrib; 3-6" long

Bark: Gray-brown and very tight and thin; remains smooth for many years, eventually developing thin ridges and furrows

Fruit: Round, striated acorns are .5" long; flattened at the cap; thin and saucer-like cap

Flower: Monoecious; male flowers on slender, drooping, yellow-green catkins; females reddish green on short spikes in new leaf axils

Common Insects/Disease: Scales

Quercus robur (English oak)



Family: Fagaceae **Species code:** QURO

Height: Over 100' **Width:** 30'

Form: Rounded

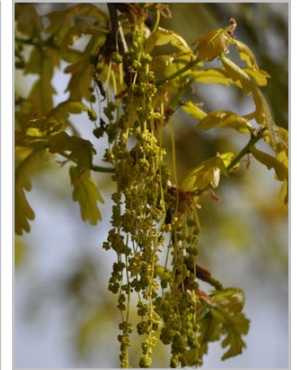
Leaf: Obovate to oblong; 4-6" long; 3-7 pairs of rounded lobes with sinuses going halfway to midvein; very small ear-lobes at leaf base; very short petiole; dark shiny green above, paler blue-green below

Bark: Gray-brown and becoming deeply fissured with age

Fruit: Narrow acorn; .75-1" long; singly or in clusters on a long stalk; cap covers about a third of the acorn

Flower: Males are slender, yellow-green catkins 2-3" long; females are very small, in clusters of 2-4 in leaf axils

Common Insects/Disease: Scales





Quercus shumardii (Shumard oak, Shumard red oak)



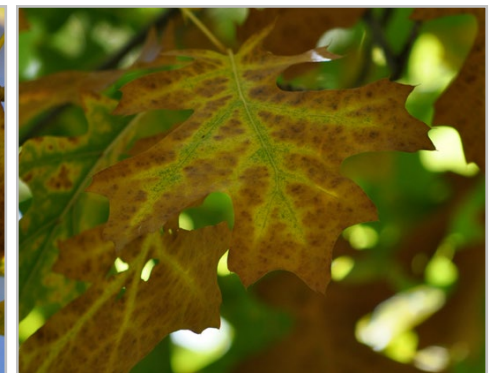
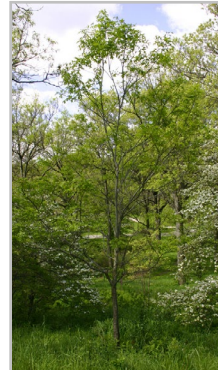
Family: Fagaceae **Species code:** QUSH
Height: 65' **Width:** 30'
Form: Oval, round or umbrella shaped and erect or spreading
Leaf: Elliptic and lobed; medium to dark green, turning red, gold, orange or multicolored in fall; deciduous
Bark: Dark or light gray and fissured
Fruit: Brown acorn; .5-1.5" long; fruiting in fall or winter
Flower: Monoecious and insignificant
Common Insects/Disease: Beetle borers, caterpillars, insect galls, leaf miner and scales



Quercus rubra (Northern red oak)



Family: Fagaceae **Species code:** QURU
Height: Up to 90' **Width:** 45'
Form: Develops a short trunk and round crown when open grown; straight with a clear, long trunk when grown with competition
Leaf: Elliptic and lobed; medium to dark green but bronze, red, orange or multicolored in fall; deciduous
Bark: Dark gray or red brown and fissured
Fruit: Medium brown acorn (.5-1.5"); fruiting in fall or winter
Flower: Insignificant; flowers in spring
Common Insects/Disease: Aphids, caterpillars, insect galls, anthracnose and *Phytophthora*



**PINNATELY COMPOUND
OPPOSITE LEAVES**



Acer species (Maple)



Family: Aceraceae

Species code: AC

Height: 20-145' **Width:** 20-50'

Form: Upright single trunked trees or shrubs with numerous trunks emerging at ground level

Leaf: Majority palmately veined and lobed (some palmately or pinnately compound, trifoliolate, pinnately veined, or unlobed); mostly deciduous, some evergreen

Bark: Gray to brown; smooth to striated

Fruit: Pairs of samaras with seeds flattened between papery wings causing them to spin to the ground when mature

Flower: Small, 5-petaled green, yellow, orange or red flowers

Common Insects/Disease: Beetle/flathead borers and caterpillars





Acer negundo (Boxelder)



Family: Aceraceae **Species code:** ACNE2
Height: Up to 60' **Width:** Up to 50'
Form: Poor form often with multiple trunks
Leaf: Edges coarsely serrate or somewhat lobed; shape variable but leaflets often resemble a classic maple leaf; 3-5 leaflets (sometimes 7); 2-4" long; light green above and paler below
Bark: Thin with shallow interlacing ridges; gray to light brown
Fruit: Paired V-shaped samaras; 1-1.5" long
Flower: Yellow-green in drooping racemes
Common Insects/Disease: Aphids, beetle borers, branch blight, fusarium, powdery mildew and *Verticillium*

Fraxinus species (Ash)



Family: Oleaceae **Species code:** FRXX
Height: 20-100' **Width:** Often three quarters the height
Form: Medium to large upright, spreading tree often with oblong to oval crowns
Leaf: Opposite (rarely whorls of three); mostly pinnately compound (rarely simple)
Bark: Gray to brown; often furrowed, occasionally smooth
Fruit: One-winged samara; dry, often papery and in clusters
Flower: Mostly dioecious; small; males often purple to yellow-green; females often yellow-green and in small clusters
Common Insects/Disease: Aphids, spider mites, white fly, anthracnose, mistletoe, sooty mold and *Verticillium*





Fraxinus pennsylvanica (Green ash)



Family: Oleaceae **Species code:** FRPE

Height: 70' **Width:** 25'

Form: Poorly formed trunk and an irregular to round crown

Leaf: Pinnately compound odd leaf; medium to dark green

Bark: Dark brown or dark gray; furrowed, ridged or scaly

Fruit: Beige, brown, yellow or mostly green winged seed

Flower: Light green to purplish with no petals; females occurring in loose panicles; males in tighter clusters

Common Insects/Disease: Beetle borers, scales and anthracnose



Fraxinus americana (White ash)



Family: Oleaceae **Species code:** FRAM

Height: 80' **Width:** Up to 50'

Form: Typically a straight, clear trunk with an oblong crown

Leaf: 7 serrate to smooth edged leaflets that are ovoid to somewhat lanceolate; 8-12" long; green above and slightly paler below

Bark: Ashy gray to brown in color with interlacing corky ridges forming obvious diamonds

Fruit: A one-winged, dry, flattened samara

Flower: Light green to purplish

Common Insects/Disease: Caterpillars, scales, white fly, anthracnose, sooty mold and *Verticillium*



PINNATELY COMPOUND ALTERNATE LEAVES



Carya species (Hickory)



Family: Juglandaceae **Species code:** CA1

Height: 60-100' **Width:** 30-50'

Form: Large with spreading crowns or open rounded tops

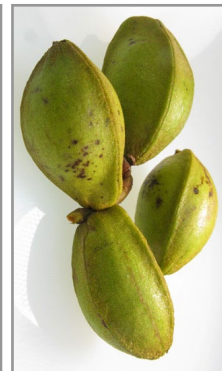
Leaf: Often 6-14" long with 5-11 leaflets; medium green

Bark: Often smooth gray when young, becoming narrowly fissured into thin strips; shaggy or scaly

Fruit: Round or oval nut, 1-2" long and .5-1" diameter, with 4-valved dehiscent husk; nut shell thick and hard in most species, thin in a few (notably *C. illinoensis*)

Flower: Monoecious; males yellow-green catkins 2-4" long; females often four angled at branch tips; wind-pollinated

Common Insects/Disease: Aphids, beetle borers and mistletoe





Carya ovata (Shagbark hickory)



Family: Fabaceae **Species code:** CAOV
Height: 120' or greater **Width:** 50'
Form: Straight trunk and an open round to oblong crown
Leaf: Pinnately compound odd; gray green or medium green; turning bronze or gold in fall
Bark: Dark gray or light gray and exfoliating or scaly
Fruit: Large, brown nut enclosed in a husk (1.5-3" long) fruiting in fall
Flower: Monoecious; male flowers are yellow-green catkins, hanging in 3's, 2-3" long; females are very short, in clusters at the end of branches
Common Insects/Disease: Aphids, chlorosis and sooty mold

Gleditsia triacanthos (Honeylocust)




Family: Fabaceae **Species code:** GLTR
Height: Up to 80' **Width:** Equal to or less than height
Form: Typically short trunk and an airy, spreading crown
Leaf: Pinnate and 5-8" long with 15-30 leaflets or bipinnate with 4-7 pairs of minor leaflets; leaflets are .5-1.5" long
Bark: Gray-brown to bronze; smooth with many horizontal lenticels, later breaking into long, narrow, curling plates
Fruit: 6-8" long, flattened, red-brown, leathery pod that becomes dry and twisted
Flower: Small, greenish yellow, displayed on 2-3" long narrow, hanging clusters; not showy, but very fragrant
Common Insects/Disease: Caterpillars, insect galls, pod gall midge, spider mites and mistletoe






Juglans cinerea (Butternut)

Family: Juglandaceae **Species code:** JUCI 
Height: Up to 80' **Width:** 35-50'
Form: Erect or spreading
Leaf: Pinnately compound odd; medium to dark green turning gold in fall
Bark: Dark brown or light gray; furrowed or ridged
Fruit: Brown, beige or mostly green nut in a fleshy husk; large (1.5-3"); fruiting in fall
Flower: Insignificant; flowers in spring
Common Insects/Disease: Beetle borers, beetle leaves, caterpillars and anthracnose

Juglans nigra (Black walnut)

Family: Juglandaceae **Species code:** JUNI 
Height: Up to 100' **Width:** 50'
Form: Erect or spreading with an oval or rounded canopy
Leaf: Pinnately compound odd; medium to dark green
Bark: Black or dark brown and fissured
Fruit: Prolific and large (1.5-3") brown, yellow or mostly green nut in fleshy husk
Flower: Insignificant; flowers in spring
Common Insects/Disease: Beetle borers, caterpillars, anthracnose, *Phytophthora*, root rot and virus





Rhus species (Sumac)



Family: Anacardiaceae **Species code:** RHSP
Height: 3-30' **Width:** Two thirds to equal the height
Form: Shrubs and small trees often with wide spreading branches and an open crown
Leaf: Often spirally arranged; some species trifoliolate or simple
Bark: Gray to brown; smooth to furrowed; some with lenticels when young and scales with age
Fruit: Dense terminal clusters of reddish drupes
Flower: Dense panicles or spikes 2-12" long; individual flowers are small and green, creamy white or red with 5 petals
Common Insects/Disease: Aphids, scales, canker and *Verticillium*

Rhus glabra (Smooth sumac)



Family: Anacardiaceae **Species code:** RHGL
Height: Up to 20' **Width:** Equal to height
Form: Short or multi-stemmed trunk with a wide spreading, open crown
Leaf: Pinnately compound odd; dark green turning red in fall
Bark: Dark or light gray and smooth
Fruit: Small red drupe (.25-.5"); fruiting in fall
Flower: Insignificant; flowers in summer
Common Insects/Disease: Aphids and *Verticillium*





Robinia pseudoacacia (Black locust)

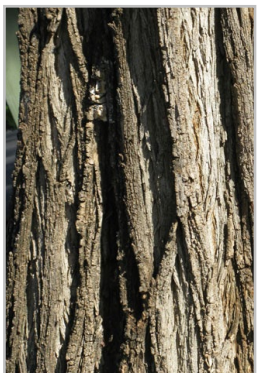


Family: Fabaceae **Species code:** ROPS
Height: 65' **Width:** Equal to height
Form: Straight trunk with crown of crooked branches
Leaf: Smooth edges; 1" long; 7-19 leaflets oval (8-14" long)
Bark: Gray or light brown; thick, fibrous, heavily ridged and furrowed; resembles woven rope
Fruit: Light brown, flattened legume; 2-4" long; contains 4-8 kidney-shaped, smooth, red-brown seeds; ripen in fall
Flower: Showy, fragrant and white; 1" long; pea-like, in long (5") hanging clusters; appear in mid to late spring
Common Insects/Disease: Aphids, beetle borers, fusarium, *Phytophthora* and *Verticillium*

Rhus typhina (Staghorn sumac)



Family: Anacardiaceae **Species code:** RHTY
Height: Up to 25' **Width:** Equal to height
Form: Often poorly formed trunk and spreading, open crown; branches repeatedly and widely fork
Leaf: 16-24" long with 11-31 lanceolate leaflets (2-5" long) with serrate edges; rachis fuzzy; green above and paler below
Bark: Fuzzy for several years, turning gray-brown and smooth with numerous lenticels or becoming a bit scaly
Fruit: Small, round, red, fuzzy drupe in upright dense clusters
Flower: Small with yellow-green petals in an upright, dense terminal cluster up to 8" long; appearing in mid-summer
Common Insects/Disease: Aphids, spider mites and *Verticillium*





Sorbus species (Mountain ash)

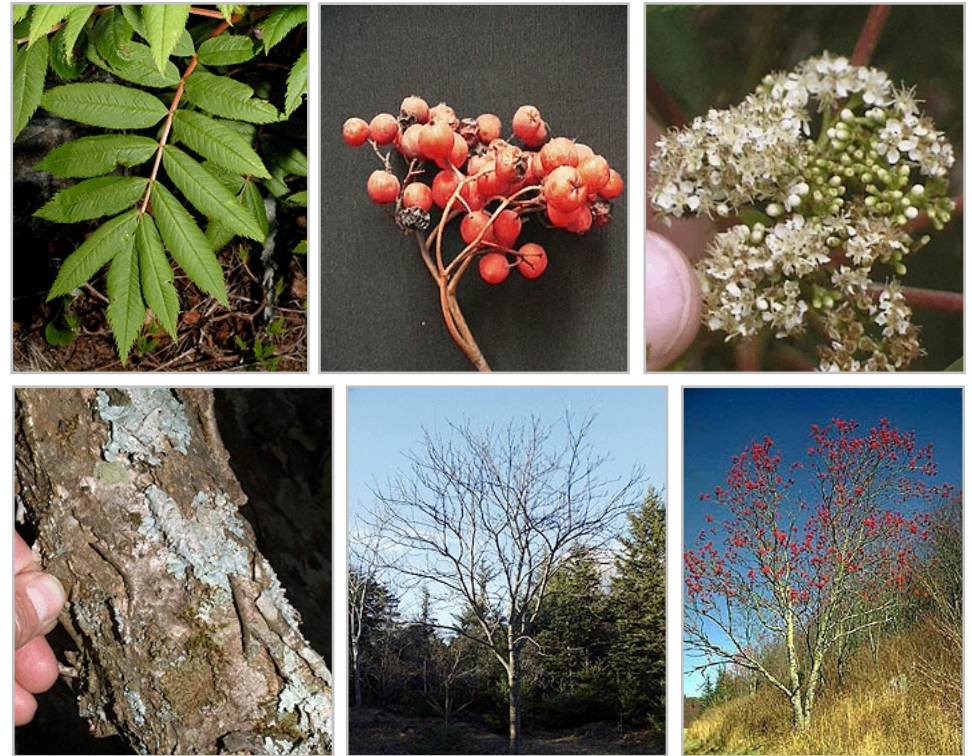


Family: Rosaceae **Species code:** SO
Height: 35-65' **Width:** 30-50'
Form: Oval, spreading and erect
Leaf: Most species pinnately compound odd; some simple alternate; gray green or medium green turning red, gold, orange or multicolored in fall; deciduous
Bark: Light green or light gray and furrowed
Fruit: Prolific and small (.24" diameter), orange or red pomes in panicles; fruiting in fall, winter or summer
Flower: Showy, white, flowers in panicles
Common Insects/Disease: Canker, fire blight, rust and sooty mold

Sorbus americana (American mountain ash)



Family: Rosaceae **Species code:** SOAM
Height: Up to 40' **Width:** 15'
Form: Crown initially narrow, becoming wider with age
Leaf: 6-10" long with 11-17 lance-shaped, serrated leaflets (2-2.5" long); often arching; dark green above, paler below
Bark: Smooth with numerous lenticels; grayish brown; developing cracks, splits and scaly patches with age
Fruit: Clusters of small, red (.25-.5" diameter) pomes; showy
Flower: Showy clusters of small white flowers; clusters 3-5" across; appearing in late spring to early summer
Common Insects/Disease: Fire blight, mildew, caterpillars and beetle borers





***Sorbus aucuparia* (European mountain ash)**



Family: Rosaceae **Species code:** SOAU
Height: Up to 40' **Width:** 15-25'
Form: Crown is initially narrow, but becoming wider with age
Leaf: Pinnately compound odd; gray green or medium green
Bark: Light green or light gray and furrowed
Fruit: Very small (less than .25") orange or red pome
Flower: Showy and white; flowers in spring or summer
Common Insects/Disease: Beetle borers, canker, fire blight, rust and sooty mold

***Wisteria sinensis* (Purple wisteria)**



Family: Fabaceae **Species code:** WISI
Height: Up to 40' **Width:** 30-50'
Form: Woody, deciduous climbing vine
Leaf: Pinnately compound alternate; 7-13 ovate leaflets each 2-4" long; dark green above
Bark: Smooth, gray-brown, and fluted; older specimens can reach 1' diameter
Fruit: Finely fuzzy, pea-like pods, 3-6" long
Flower: Purple or white pea-like flowers; occurring in long hanging clusters, 8-12" long
Common Insects/Disease: No significant



**PALMATELY COMPOUND
OPPOSITE LEAVES**



***Aesculus glabra* (Ohio buckeye)**



Family: Sapindaceae **Species code:** AEGL

Height: 60-80' **Width:** 30-40'

Form: Oblong crown with pendulous upturning branches

Leaf: Dark green above, paler below; 5 oval to obovate leaflets 3-6" long with a serrated edge

Bark: Initially smooth and ashy gray; developing corky, scaly patches; becoming quite rough and darker gray

Fruit: Prickly, leathery husk enclosing usually one smooth chestnut brown seed (1-1.5" diameter)

Flower: Light yellow; 4-7" and showy; upright clusters

Common Insects/Disease: Canker, fire blight, rust and sooty mold





***Aesculus hippocastanum* (Horsechestnut)**



Family: Sapindaceae **Species code:** AEHI

Height: 40-60' **Width:** 30-40'

Form: Erect or spreading with a round or oblong crown

Leaf: Dark green; 5-7 leaflets; each leaflet is 5-12" long, making the whole leaf up to 24" across; the leaf scars left on twigs after the leaves have fallen have a distinctive horseshoe shape

Bark: Dark brown and exfoliating or scaly

Fruit: Large, brown capsule (1.5-3")

Flower: Showy, fragrant and cream color; flowers in spring

Common Insects/Disease: Caterpillars, *Phytophthora*, powdery mildew, rust and *Verticillium*

**BIPINNATELY COMPOUND
ALTERNATE LEAVES**



***Gymnocladus dioica* (Kentucky coffeetree)**



Family: Fabaceae

Species code: GYDI

Height: 80' **Width:** 40-50'

Form: Medium sized tree with a wide spreading crown

Leaf: Very large (1-3' long) with numerous 1.5-2" ovoid leaflets; smooth edges; green above, slightly paler below

Bark: Dark grayish brown and scaly; developing deep fissures with scaly ridges

Fruit: Reddish brown, flat thickened pod; 3-8" long

Flower: Males and females in long (3-4") branched clusters; whitish; appearing in late spring

Common Insects/Disease: No significant



GLOSSARY

Achene: simple dry fruit containing one seed produced by many species of flowering plants

Acute: pointed at the end

Alternate: leaf attachments are singular at nodes, and leaves alternate direction, to a greater or lesser degree, along the stem

Apex: the end furthest from where the leaf attaches to the stalk; terminus

Asymmetric: not identical on both sides of a central line

Axillary: the upper (adaxial) angle between a leaf and a stem; often the location of a bud

Bilateral symmetry: the arrangement of parts such that it can only be split into similar halves along one given plane (e.g. most leaves can be divided into similar halves by cutting along the midrib)

Bipinnate: pinnately compound leaves in which the leaflets are themselves pinnately compound

Calyx: the outermost group of floral parts; the sepals

Catkin: a slim, cylindrical flower cluster, with insignificant or no petals, usually wind-pollinated; contain many, usually unisexual flowers, arranged closely along a central stem which is often drooping

Conifer: mostly needle-leaved or scale-leaved, chiefly evergreen, cone-bearing gymnospermous trees or shrubs such as pines, spruces, and firs

Cordate: heart-shaped, with the petiole or stem attached to the cleft

Crenate: leaf margin or edge is wavy-toothed; dentate with rounded teeth

Cultivar: plant or grouping of plants selected for desirable characteristics that can be maintained by natural reproduction

Cymes: an inflorescence in which the primary axis bears a single central or terminal flower that blooms first

Deciduous: a tree that sheds leaves annually

Decussate pairs: leaves arranged in pairs each at right angles to the next pair above or below

Dehiscent: The spontaneous opening at maturity of a plant structure, such as a fruit, to release its contents (e.g. seeds)

Dentate: a leaf having a toothed edge

Dioecious: a species that has male and female reproductive parts on different plants

Drupe: any fruit consisting of an outer skin, a usually pulpy and succulent middle layer, and a hard and woody inner shell usually enclosing a single seed, as a peach, cherry, plum, etc.

Elliptic: leaf edges curve with the widest section in the middle

Evergreen: having green leaves throughout the entire year, the leaves of the past season not being shed until after the new foliage has been completely formed

Exfoliating: the removal or loss of leaves from a plant or when bark peels off in thin layers

Fascicle: a bundle or cluster of leaves or flowers

Fissured: a long narrow opening; a crack or cleft; a natural division or groove

Fluted: long and slender, sometimes with grooves

Follicle: dry open fruit which splits on one side only; may contain one or many seeds

Herbaceous: a plant that has leaves and stems that die down at the end of the growing season to the soil level; plants that have no persistent woody stem above ground

Inflorescence: a group or cluster of flowers arranged on a stem that is composed of a main branch or a complicated arrangement of branches

Lanceolate: tapering from a rounded base toward an apex; lance-shaped

Legume: fruit or seed from a plant in the family Fabacea (or Leguminosae); a pod, such as that of a pea or bean, that splits into two valves with the seeds attached to one edge of the valves

Lenticel: one of the small, corky or spongy pores or narrow lines on the bark of woody plants that allows the interchange of gases between the interior tissue and the surrounding air

Linear: elongated leaf shape with parallel edges

Lobed: leaf shape with deeply indented edges

Monoecious: male and female flowers occur on the same plant

Nectaries: a gland-like organ, located outside or within a flower, that secretes nectar

Nutlet: a small nut

Oblong: leaves almost resemble a rectangle, except that their corners are rounded; at least twice as long as they are wide

Obovate: leaves are shaped like an egg, with the broader end of the leaf farthest from the petiole

Opposite: leaves occur one on each opposite side of the stem; attachments are paired at each node

Ovate: leaves are shaped like an egg, with the broader end of the leaf nearest the petiole

Ovoid: egg-shaped with the broader end at the base

Ovules: a structure in the ovary of a seed plant that develops into a seed following fertilization

Palmate: consisting of leaflets or lobes radiating from the base of the leaf

Palmately lobed: indented with the indentations reaching to the center

Panicles: a branched cluster of flowers

Pedunculate: attached to a base by means of a peduncle, or slender stalk

Pendulous: hanging down loosely or swinging freely

Petiole: the stalk attaching the leaf blade to the stem

Photosynthetic: process by which plants use energy from the sun and chlorophyll to convert carbon dioxide, water, and certain inorganic salts into carbohydrates

Pinnate: featherlike compound leaf that is divided up into many small leaflets, arranged in rows along either side of an axis

Pinnate compound: once-divided leaf blades having leaflets arranged on both sides of a rachis (main axis of a compound structure)

Pinnate compound odd: leaflets occur on each side of the petiole with a single leaflet at the tip of the petiole

Pinnately veined: secondary veins paired oppositely

Pome: fleshy fruit with a thin skin, not formed from the ovary but from another part of the plant; seeds are contained in chambers in the center of the fruit as in apple and pear

Prolific: producing in large quantities or with great frequency

Pubescence: fine covering of down or soft short hairs

Raceme: a type of flower that is unbranched and indeterminate and bears flowers on short floral stalks along the axis

Rachis: the main axis or stem of an inflorescence (flower) or compound leaf

Resin/resinous: a substance exuded by certain plants particularly when wounded

Samara: type of dry fruit where one seed is surrounded by papery tissue that helps carry the seed away from the tree as the wind blows; often found in large groups on the tree

Sepals: one of the four basic parts of a flower; found below the petals and often small and green; when flowers do not have petals the sepals may be big and colorful

Serrate: saw-toothed with asymmetrical teeth pointing forward

Sessile: flowers or leaves are attached directly to the base and therefore lack a petiole, or stalk

Sinus: a space or indentation between two lobes or teeth on a leaf

Spatulate: having a spoon or spatula shape; broad rounded tip and narrow base

Spur shoots: short, woody side shoots growing along the branches of some trees and shrubs such as apples and pears

Stamen: the pollen-producing reproductive organ of a flower; typically consists of a stalk called the filament and an anther

Stigma: The receptive tip of the carpel (leaf of the female reproductive structure), which receives pollen at pollination and on which the pollen grain germinates

Stipule: one of a pair of lateral appendages, often leaflike, at the base of a leaf petiole (stalk)

Stomata/stomatal: pores found in the leaf and stem epidermis that is used for gas exchange

Striated/striation: a series of ridges, furrows or linear marks

Style: the narrow elongated part of the pistil (female reproductive part of a flower) between the ovary and the stigma

Trifoliolate: a leaf divided into three leaflets

Umbo: a knoblike protuberance arising from a surface, as the projection at the scale tip of a seed-bearing cone

Whorl: three or more leaves attach at each point or node on the stem

INDEX OF SCIENTIFIC AND COMMON NAMES

Species Code	Scientific Name	Common Name	Page
ABBA	<i>Abies balsamea</i>	Balsam fir	14R
ABCO	<i>Abies concolor</i>	White fir	15L
ACGI	<i>Acer ginnala</i>	Amur maple	62L
ACGL	<i>Acer glabrum</i>	Rocky mountain maple	62R
ACNE	<i>Acer negundo</i>	Boxelder	73L
ACPL	<i>Acer platanoides</i>	Norway maple	63L
ACRU	<i>Acer rubrum</i>	Red maple	63R
ACSA1	<i>Acer saccharinum</i>	Silver maple	64L
ACSA2	<i>Acer saccharum</i>	Sugar maple	64R
AC	<i>Acer species</i>	Maple	61R, 72R
ACTA	<i>Acer tataricum</i>	Tatar maple	65L
ACFR	<i>Acer x freemanii</i>	Freeman maple	65R
AEGL	<i>Aesculus glabra</i>	Ohio buckeye	82R
AEHI	<i>Aesculus hippocastanum</i>	Horsechestnut	83L
AM	<i>Amelanchier species</i>	Serviceberry	35R
BENI	<i>Betula nigra</i>	River birch	36R
BEPA	<i>Betula papyrifera</i>	Paper birch	37L
BEPE	<i>Betula pendula</i>	European white birch	37R
BE	<i>Betula species</i>	Birch	36L

Species Code	Scientific Name	Common Name	Page
CABE	<i>Carpinus betulus</i>	European hornbeam	38L
CAOV	<i>Carya ovata</i>	Shagbark hickory	76L
CA1	<i>Carya species</i>	Hickory	75R
CA3	<i>Catalpa species</i>	Catalpa	31R
CASP	<i>Catalpa speciosa</i>	Western catalpa	32L
CEOC	<i>Celtis occidentalis</i>	Northern hackberry	38R
CECA	<i>Cercis canadensis</i>	Eastern redbud	39L
CO1	<i>Cornus species</i>	Dogwood	32R
COCO2	<i>Corylus colurna</i>	Turkish hazelnut	39R
CR	<i>Crataegus species</i>	Hawthorn	40L
ELAN	<i>Elaeagnus angustifolia</i>	Russian olive	40R
FA	<i>Fagus species</i>	Beech	41L, 66R
FASY	<i>Fagus sylvatica</i>	European beech	41R
FRAM	<i>Fraxinus americana</i>	White ash	74L
FRPE	<i>Fraxinus pennsylvanica</i>	Green ash	74R
FR	<i>Fraxinus species</i>	Ash	73R
GIBI	<i>Ginkgo biloba</i>	Ginkgo	42L
GLTR	<i>Gleditsia triacanthos</i>	Honeylocust	76R
GYDI	<i>Gymnocladus dioicus</i>	Kentucky coffeetree	84R
ILOP	<i>Ilex opaca</i>	American holly	42R

Species Code	Scientific Name	Common Name	Page
JUCI	<i>Juglans cinerea</i>	Butternut	77L
JUNI	<i>Juglans nigra</i>	Black walnut	77R
JUCO1	<i>Juniperus communis</i>	Common juniper	27L
JUDE2	<i>Juniperus deppeana</i>	Alligator juniper	27R
JUMO	<i>Juniperus monosperma</i>	One seed juniper	28L
JUSC	<i>Juniperus scopulorum</i>	Rocky mountain juniper	28R
JU	<i>Juniperus species</i>	Juniper	26R
JUVI	<i>Juniperus virginiana</i>	Eastern red cedar	29L
LIST	<i>Liquidambar styraciflua</i>	Sweetgum	67L
LITU	<i>Liriodendron tulipifera</i>	Tulip tree	67R
LOSP	<i>Lonicera species</i>	Honeysuckle	33L
MAGR	<i>Magnolia grandiflora</i>	Southern magnolia	43L
MAPU	<i>Malus pumila</i>	Paradise apple	44L
MA2	<i>Malus species</i>	Apple	43R
MEGL	<i>Metasequoia glyptostroboides</i>	Dawn redwood	15R
MORU	<i>Morus rubra</i>	Red mulberry	44R
PIAB	<i>Picea abies</i>	Norway spruce, European spruce	16R
PIEN	<i>Picea engelmannii</i>	Engelmann spruce	17L
PIGL1	<i>Picea glauca</i>	White spruce	17R
PIMA	<i>Picea mariana</i>	Black spruce, Bog spruce, Swamp spruce	18L

Species Code	Scientific Name	Common Name	Page
PIPU	<i>Picea pungens</i>	Blue spruce, Colorado spruce, Silver spruce	18R
PIRU	<i>Picea rubens</i>	Red spruce	19L
PI1	<i>Picea species</i>	Spruce	16L
PICE	<i>Pinus cembroides</i>	Mexican pinyon	21L
PICO	<i>Pinus contorta</i>	Lodgepole pine	21R
PIED	<i>Pinus edulis</i>	Pinyon pine	22L
PIFL	<i>Pinus flexilis</i>	Limber pine	22R
PIMU	<i>Pinus mugo</i>	Sweet mountain pine	23L
PINI	<i>Pinus nigra</i>	Austrian pine, Austrian black pine	23R
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine	24L
PI2	<i>Pinus species</i>	Pine	20R
PIST2	<i>Pinus strobiformis</i>	Southwestern white pine	24R
PIST	<i>Pinus strobus</i>	Eastern white pine	25L
PISY	<i>Pinus sylvestris</i>	Scotch pine, Scots pine	25R
POAL	<i>Populus alba</i>	White poplar	45R
POAN	<i>Populus angustifolia</i>	Mountain cottonwood, Narrowleaf cottonwood	46L
POBA	<i>Populus balsamifera</i>	Balsam poplar	46R
POFR	<i>Populus fremontii</i>	Fremont cottonwood	47L
PONI	<i>Populus nigra</i>	Black poplar	47R
POSA	<i>Populus sargentii</i>	Plains cottonwood	48L

Species Code	Scientific Name	Common Name	Page
PO	<i>Populus species</i>	Cottonwood	45L
POTR1	<i>Populus tremuloides</i>	Quaking aspen	48R
POAC5	<i>Populus x acuminata</i>	Lanceleaf cottonwood	49L
POCA2	<i>Populus x canadensis</i>	Carolina poplar	49R
PRCE	<i>Prunus cerasifera</i>	Cherry plum	50R
PR	<i>Prunus species</i>	Plum	50L
PRPA	<i>Prunus padus</i>	European bird cherry	51L
PRVI	<i>Prunus virginiana</i>	Common chokecherry	51R
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir	19R
PY	<i>Pyrus species</i>	Pear	52L
QUBI	<i>Quercus bicolor</i>	Swamp white oak	68R
QUCO	<i>Quercus coccinea</i>	Scarlet oak	69L
QUMA1	<i>Quercus macrocarpa</i>	Bur oak	69R
QUMU	<i>Quercus muehlenbergii</i>	Chinkapin oak	53L
QUNI	<i>Quercus nigra</i>	Water oak	53R
QUPA	<i>Quercus palustris</i>	Pin oak	70L
QURO	<i>Quercus robur</i>	English oak	70R
QURU	<i>Quercus rubra</i>	Northern red oak	71L
QUSH	<i>Quercus shumardii</i>	Shumard oak, Shumard red oak	71R
QU	<i>Quercus species</i>	Oak	52R, 68L

Species Code	Scientific Name	Common Name	Page
RHCA	<i>Rhamnus cathartica</i>	European, Carolina or Glossy buckthorn	33R
RHGL	<i>Rhus glabra</i>	Smooth sumac	78R
RHSP	<i>Rhus species</i>	Sumac	54L, 78L
RHTY	<i>Rhus typhina</i>	Staghorn sumac	79L
ROPS	<i>Robinia pseudoacacia</i>	Black locust	79R
SAAL4	<i>Salix alba</i>	White willow	55L
SADI	<i>Salix discolor</i>	Pussy willow	55R
SAFR	<i>Salix fragilis</i>	Crack willow	56L
SA	<i>Salix species</i>	Willow	56R
SOAM	<i>Sorbus americana</i>	American mountain ash	80R
SOAU	<i>Sorbus aucuparia</i>	European mountain ash	81L
SO	<i>Sorbus species</i>	Mountain ash	56R, 80L
SYRE	<i>Syringa reticulata</i>	Japanese tree lilac	34R
SYSP	<i>Syringa species</i>	Lilac	34L
THPL	<i>Thuja plicata</i>	Western red cedar	30L
TH9	<i>Thuja species</i>	Red cedar	29R
TIAM	<i>Tilia americana</i>	American basswood	57R
TICO	<i>Tilia cordata</i>	Littleleaf linden	58L
TI	<i>Tilia species</i>	Basswood	57L
ULAM	<i>Ulmus americana</i>	American elm	59L

Species Code	Scientific Name	Common Name	Page
ULPA	<i>Ulmus parvifolia</i>	Chinese elm	59R
ULPU	<i>Ulmus pumila</i>	Siberian elm	60L
ULS	<i>Ulmus species</i>	Elm	58R
WISI	<i>Wisteria sinensis</i>	Purple wisteria	81R

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Page 12L: iii, BL (mesquite); i, TL (ash), TC (sycamore), BC (crape myrtle); iv, TR (ironwood); Native Plants for Southwestern Landscapes, Judy Mielke (1993)

Page 12R: i, TL (Grevillea), TC (Eucalyptus), TR (African sumac), BC (oleander), BR (citrus); ix, BL (olive)

Page 13L: i, TC (Aleppo pine), TCR needle, TR (Canary Island pine), BL (juniper), BC (Italian cypress), BR (Mexican pinyon); ix, TL, (Casuarina),

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- Page 18L:** i, TL tree, TC leaves, TR cones, BL 'flowers', BC cones; iv, BR bark
- Page 18R:** i, TL tree, TRC leaves, BL 'flowers', BLC cones, BR bark; iii, TLC tree, TR leaves, BRC cone
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- Page 19R:** i, all
- Page 20R:** i, TL tree, TC "flower" male, TR "flower", BL bark, BC leaves, BR cone
- Page 21L:** i, TL tree, TR leaves, BL leaves, cones, BR bark; iv, TC tree, BC old cone
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- Page 22L:** i, TL branch tip, TR branch, BL bark, BC cone; v, BR tree
- Page 22R:** ii, BL bark; i, all other
- Page 23L:** i, TL tree, TC leaves, cone, TR landscape tree, BL leaves, BR bark; iv, BC leaves, cone
- Page 23R:** i, all
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- Page 30L:** i, all
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- Page 32L:** i, all
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- Page 34R:** ii, TL tree, TR flowers, BLC fruit; i, TC leaves, BL old fruit, BRC bark, BR bark
- Page 35R:** i, TL tree, TC leaves, TR flowers, BL flowers, BLC fruit, BCR bark, BR twig
- Page 36L:** i, TL tree, TLC canopy, TR leaves, BLC fruit, BRC bark, BR bark; iii, TRC trees, BL flowers

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Page 43R: viii, TL leaves, TR flowers, BR tree, Herman, D.E., et al. 1996. North Dakota tree handbook. USDA NRCS ND State Soil Conservation Committee, NDSU Extension and Western Area Power Administration, Bismarck; xiii, BL bark

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Page 46R: vii, TL leaves, Lynden Gerdes. USDA NRCS. 1995. Northeast wetland flora: Field office guide to plant species.

Northeast National Technical Center, Chester. Courtesy of USDA NRCS Wetland Science Institute; viii, TR flower, BL bark, BR tree, J.S. Peterson@USDA-NRCS PLANTS Database & Sheri Hagwood@USDA NRCS PLANTS Database & Susan McDougall @ USDA-NRCS PLANTS Database; ii, TC leaf

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Special thanks to the pilot inventory communities:

City of Bisbee
Lake Havasu City
City of Mesa
Town of Prescott Valley
Town of Pinetop-Lakeside
Arizona State Parks: Oracle State Park
University of Arizona Campus Arboretum

Publication information: Arizona State Forestry Division – Urban and Community Forestry (April, 2015). Arizona Urban Tree Map Field Guide: North Climate Region. Retrieved from <http://azsf.gov/azutm>

Major funding provided by the USDA Forest Service State and Private Forestry Program. Collaborators include the University of Arizona Campus Arboretum and the School of Natural Resources and the Environment.

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