New Mexico Envirothon
Tree Identification
Forestry Key Point #1

All pictures are from the Virginia Tech website unless otherwise noted. www.fw.vt.edu/dendro/dendrology

Tree Identification Study Guide

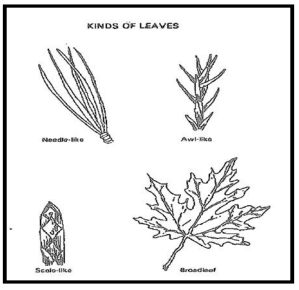
We will break the trees up into groups to study them:

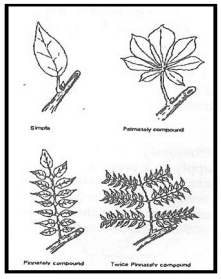
Coniferous trees (trees that have cones)

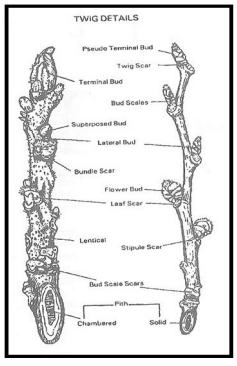
- Leaf Shape
- Cones

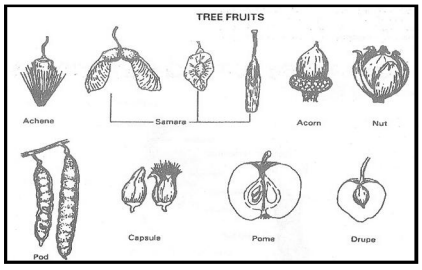
Deciduous trees (those that lose their leaves for a portion of the year)

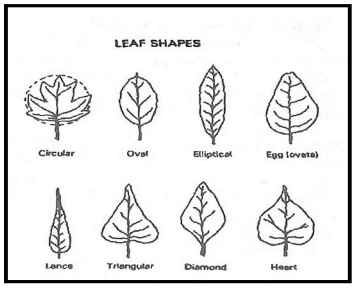
- Twig structure
- Leaf structure
- Thorns
- Fruit











Coniferous trees

- These trees have cones, and most have leaves that stay on the tree all year.
- Leaf structure can identify the genus of the plant. Other leaf characteristics can help identify the species.
- Conifer leaves are either needles, scales-like or awl-like. Some junipers may have both scale-like and awl-like leaves at the same time.

Scale-like

Awl-like

Needles

Conifer Trees in New Mexico

Oneseed juniper
Rocky Mountain juniper
Alligator juniper
Blue spruce (also called Colorado blue spruce)
Piñon pine
Engelmann spruce
Ponderosa pine
Subalpine fir
Southwestern white pine
Douglas-fir
White fir
Corkbark fir

Conifer trees with needles

- Pines – needles attached to the twig in fascicles (grouped together)
- Spruce – needles attached singly to the twig, sharp, square and stiff
- Fir – needles attached singly to the twig, flat, flexible and friendly

Pine Cones

Pine cones have more mass than other conifer cones.

Piñon pine cones are 2 inches long. They are as wide as they are long and each cone generally has two large edible seeds per scale.

Ponderosa pine cones are 3 to 6 inches long and have a prickle on the open end of the scales.

Southwestern white pine cones are cylindrical and 5 to 9 inches long and taper to a tip. The scales curl back when the cone is open.

Pine needles

There are 3 major pines in New Mexico.

Ponderosa pine

Pinus ponderosa

Ponderosa pine have 3 needles to each group. The needles are from 5 to 10 inches in length.

Southwestern white pine

Pinus strobiformis

Southwestern white pine have 5 needles to each group. The needles are from 2 to 3 inches long.

Piñon pine

Pinus edulis

Piñon pine needles are 1 to 2 inches long and look like the needle was sliced in half. Each half mirrors the other.

Spruce and Douglas-Fir Needles

Blue spruce

Picea pungens

Blue spruce needles are 3/4 to 1 1/4 inches long, square, stiff and very sharp (spine-like). Each is displayed nearly straight out from twig on a raised, woody peg called a sterigma.

Engelmann spruce

Picea engelmannii

Engelmann spruce needles angle more toward tip of twig and are less sharp to grasp. Needles are 4 sided and flexible with a blunt tip. Twigs are slightly fuzzy.

Douglas-fir

Pseudotsuga menziesii

Douglas-fir needles lack woody pegs or suction cups. When pulled from the twig they resemble miniature hockey sticks. The 3/4 to 1 1/4 inches long, flat needles have tips that are blunt or slightly rounded.

Spruce and Douglas-fir Cones

Spruce and fir cones are thin and easily broken apart.

Blue spruce cones grow downward on the tree and are 2 to 4 inches long. The scales are flexible and pointed with jagged erose margins.

Dave Powell, USDA Forest Service, United States

Engelmann spruce cones have an irregular shaped base and are less than 21/2 inches long with a smooth margin.

Douglas-fir cones grow downward on the tree and are 3 to 4 inches long with rounded scales. Three-lobed bracts extend beyond the cone scales and resemble dragon's tongues.

Fir

White fir

Abies concolor

White fir needles are 2 to 3 inches long and are flat and blunt at the tip. They extend at right angles from the twig and curve upward.

Corkbark fir

Abies laiocarps

var. *arizonica*

Dave Powell, USDA Forest Service, United States

Cork bark fir is a variety of subalpine fir. It's most distinguishing feature is small patches of cork-like bumps on the trunk.

Subalpine fir needles are about 1 inch long. The tips of the leaves are blunt and the leaf itself is flattened and flexible. Even though the leaves arise from twigs on all sides (spirally arranged), they all tend to grow upward. Buds are about ¼ inch long and orange colored.

Subalpine fir

Abies lasiocarpa

Fir Cones

White fir cones

White fir cones grow upright on the tree and are 3 to 5 1/2 inches long. These cones are difficult to find in one piece as they generally disintegrate while on the tree.

USDA Forest Service - Ogden Archive, USDA Forest Service, United States

Subalpine fir cones are produced in abundance each year near the tops of the tree. Male cones are in small clusters on underside of twig ends. Female (seed) cones are about 3-½ inches long and dark purple when mature. They always grow on upper branches in an erect position on twigs. When these cones mature, the cone scales and seeds fall off leaving an erect woody spike-like cone axis on the twig. Subalpine fir cones mature in one growing season.

Mary Ellen (Mel) Harte, , United States

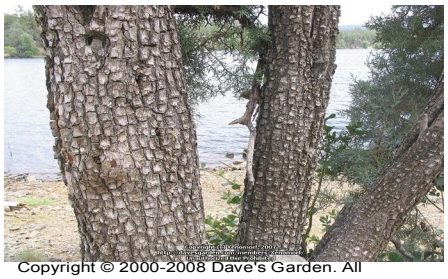
Corkbark Fir cones are generally longer and narrower that the subalpine fir. Just like sublapine fir, corkbark fir sheds its scales and seeds leaving spike-like core of cone. (Remember corkbark is a variety of subalpine fir.)

Junipers

Oneseed juniper leaves are scale-like and pointed. Most are tight and crowded on the twig in opposite pairs resulting in a slightly square twig. On vigorous shoots a few are awl-like and point away from the twig. These leaves are very stout and compact on the twig.

Alligator juniper

Juniperus deppeana



Alligator juniper is easily recognized by it square plated bark, becoming more prominent as the tree ages. The scale-like leaves are more pointed and less closely pressed to the stem. Foliage is more dense and thickly dotted with white resin.

Oneseed juniper

Juniperus monosperma

James L. Reveal @ USDA-NRCS PLANTS Database

Rocky Mountain juniper

Juniperus scopulorum

Al Schneider @ USDA-NRCS PLANTS Database

Rocky Mountain juniper leaves are small (1/8 inch), scale-like and tight against the branches. Back sides of needles bear inconspicuous glands. These leaves generally have are smaller and more spread out than Oneseed juniper leaves.

Juniper Cones

Alligator juniper has marble sized berries producing three to four seeds.

Oneseed juniper cones are berry-like, round, 1/4 inch in diameter and dark bluish with a whitish coat. They have 1 seed per fruit and mature in one growing season.

Rocky Mountain juniper cones are round, bluish berry-like cones with a whitish coat, 1/3 inch in diameter, and mature in two seasons. They usually have two seeds per cone.

Deciduous Trees

The deciduous trees – most of them lose their leaves in the fall - are divided by how their leaves and twigs are arranged. They are either opposite or alternate. Then the leaf structure is divided into simple (one leaf per bud) or compound (more than one leaflet per bud). Compound leaves are divided into pinnate (one stem back to a bud) and bipinnate (two stems back to a bud).

Bipinnate compound leaf

Compound leaf
(pinnate)

Simple leaf

Deciduous Trees

Opposite (3) vs. Alternate(18)
Simple(12) vs. Compound(6)
Pinnate(3) vs. Bipinnate(3)

Opposite
Rocky Mountain maple
Boxelder
Arizona ash

Alternate		
Simple	Compound	
Quaking aspen	Pinnate	Bipinnate
Rio Grande cottonwood	New Mexico locust	Catclaw acacia
Coyote willow	Pecan	Honey mesquite
Desert willow	Arizona walnut	Screwbean mesquite
Water birch		
Netleaf hackberry		
Thinleaf alder		
Arizona Sycamore		
Gambel oak		
Shrub live oak		
Algerita		
Salt cedar		

Opposite leaf/twig structure

Rocky Mountain maple

Acer glabrum

Leaves are opposite and will have 3 to 5 short-pointed lobes or can be divided into 3 lance-shaped leaflets. The leaves are doubly saw-toothed, green above with lighter veins, slightly paler below.

The fruit is a paired samara, one inch long that hang in clusters and dry to a light tan when mature.

Twigs are opposite, slender and pale green to red.

Buds are red and pointed. Lateral buds stand out from the twig.

Opposite leaf/twig structure

Boxelder

Acer negundo

The leaves are opposite and pinnately compound with 3 to 5 leaflets (sometimes 7) that are 2 to 4 inches long. The margin is coarsely serrate or somewhat lobed. The shape is variable but leaflets often resemble a classic maple leaf and are light green above and paler below.

The fruit is a paired V-shaped samara, 1 to 1 1/2 inches long. The drooping samara clusters are light tan when they are ripe and persist throughout the winter.

The twig is green to purplish green, moderately stout with narrow leaf scars that meet in raised points. They are often covered with a glaucous bloom. The buds are white and hairy, lateral buds lie flat against the stem.

Opposite leaf/twig structure

Arizona ash

Fraxinus velutina

The leaves are opposite, pinnately compound, 5 to 9 inches long, and typically have 5 leaflets (occasionally more or less). The leaflets are elliptical to ovate with margins entire (maybe wavy toothed). They are shiny green above and paler and pubescent below (maybe smooth).

The fruit is a single wing, straight samara, 1 to 1 1/2 inches long with a plump seed. The large hanging clusters mature in late summer.

The twig is stout and hairy when young. Color varies from gray to brown with age. The leaf scars are fairly large.

Alternate Simple Leaves

This group of twelve trees have alternate, simple leaves.

Quaking aspen

Populus tremuloides

USDA-NRCS PLANTS Database / **Herman, D.E. et al. 1996. *North Dakota tree handbook*. USDA NRCS ND State Soil Conservation Committee; NDSU Extension and Western Area Power Admin., Bismarck, ND.**

The leaves are alternate, simple, heart-shaped to nearly round with a fine toothed margin, 1 to 3 inches long. They are green above and paler below. The petiole is flattened.

The twig is slender, glabrous, reddish brown often with a gray, waxy film. Buds are conical and reddish brown. The terminal bud is 1/4 inch long and may be slightly resinous.

The fruit is a catkin (2 to 4 inches long), with attached light green capsules which contain many small hairy seeds.

Paul Wray, Iowa State University, Bugwood.org

Alternate Simple Leaves

Rio Grande cottonwood

Populus deltoides ssp. wislizeni

The leaves are alternate, simple, pinnately veined, 3 to 6 inches long. The leaves are triangular (deltoid) in shape with a crenate/serrate margin. The petiole is flattened and glands are present at the top of the petiole.

W.L. Wagner @ USDA-NRCS PLANTS Database

The fruit is cottony seeds, 1/4 inch long borne in a dehiscent capsule. They mature in summer.

The twig is somewhat angled and yellowish. Bud scars are large and raised. The buds are 3/4 inch long and covered with several brown, resinous scales.

Alternate Simple Leaves

Coyote willow

Salix exigua

The leaves are alternate, simple, and lanceolate to linear, 2 to 5 inches long and very narrow. They may be entire or have a few scattered teeth and are green to gray-green above, paler and may be hairy below.

The twig is slender and pale green to tan. It may be reddish in winter and sometimes fuzzy. The buds are covered by a single cap-like scale.

The fruit is a small (1/4 inch), long-pointed capsule in long, narrow clusters. Each capsule contains numerous small fuzzy seeds.

Alternate Simple Leaves

Desert willow

Chilopsis linearis

The leaves are alternate and linear, often slightly curved, 3 to 5 inches long and 1/4 to 3/8 inches wide.

The twig is slender, initially green but turning gray-brown. Buds are very small.

The fruit is a long thin slightly twisted brown capsule, 6 to 12 inches long. It contains numerous fluffy, winged seeds that ripen in the fall.

Alternate Simple Leaves

Water birch

Betula occidentalis

Susan McDougall @ USDA-NRCS PLANTS Database

The leaves are 3/4 to 2 inches long, alternate, simple, ovate to diamond-shaped usually with 4 to 5 veins on each side. They are yellow-green above and initially sticky but change to smooth. They are paler and glandular below. Margins are distinctly serrated or doubly serrated, except near the base.

Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / **USDA NRCS. 1992. *Western wetland flora: Field office guide to plant species*. West Region, Sacramento, CA.**

The fruit is a 1 inch long cylindrical papery strobile (cone) that disintegrates at maturity. The seeds are tiny winged nutlets.

Young twigs are green and sticky, but turn reddish brown and resin-dotted. With age they eventually turn gray-brown and are smooth.

Alternate Simple Leaves

Netleaf hackberry

Celtis laevigata Willd. var. reticulata

Al Schneider @ USDA-NRCS PLANTS Database

The leaves are alternate, simple, pinnately veined, 2 to 4 inches long, leathery, ovate in shape with an entire margin or with a few widely spaced teeth. They are dark green and rough on the upper surface with conspicuous "net-like" raised veins on the lower surface.

The twig is slender, zigzag, brown with numerous lighter lenticels when hardened. It is fuzzy particularly when young with tightly appressed light brown lateral buds. It has a chambered pith.

The fruit is a fleshy, sweet, globose drupe, 1/4 to 3/8 inch in diameter. The fruit is reddish orange to purple when ripe in late summer.

Alternate Simple Leaves

The leaves are 2 to 4 inches long, alternate, simple, oval, thin, and doubly serrated with 6 to 10 nearly straight parallel veins on each side. Dull dark green above and paler and slightly hairy below.

Thinleaf alder

Alnus incana ssp tenuifolia

The fruit is cone-like, 1/2 to 3/4 inches long, and brown when ripe. 3 to 6 cones are clustered on slender, spreading, long stalks. Each scale encloses a very small winged seed. It matures in late summer and is persistent.

The twig is gray-brown to reddish brown, gummy, finely hairy, slightly zigzaged with lighter lenticels. The buds are stalked, plump and reddish brown. Pith is 3 angled

Alternate Simple Leaves

Arizona sycamore

Plantanus wrightii

The twig is zigzag, orange-brown and green and fuzzy when young. Circular leaf scars surround the reddish cone shaped bud covered with a single cap-like scale.

The fruit is a round and somewhat fuzzy tan ball (1 to 1 1/2 inches in diameter), 2 to 4 hanging from a slender pendant stalk. Each ball is composed of numerous tiny, tufted seeds (achenes). The balls disintegrate over winter, dispersing the seeds with the wind.

The leaves are alternate, simple, 6 to 9 inches long, with 3 to 5 pointed lobes and somewhat star-shaped. It has a swollen petiole base and is green above and pale green and fuzzy below.

Alternate Simple Leaves

Gambel oak

Quercus gambelii

The leaves are alternate, simple and have a leathery texture. The leaves are 3 to 6 inches long and 2 to 3 inches wide and are pinnately lobed with 5-9 moderate-to-deep rounded lobes. The leaves are usually widest above the midpoint. They are yellow-green and smooth above and paler and smooth to densely hairy below.

Young twigs are stout, reddish brown, and slightly hairy. Older twigs are darker and smoother. The terminal buds are clustered and have distinct overlapping scales.

The fruit is a rounded acorn 1/2 to 1 inch long. It has a shallow cap covering 1/4 to 1/3 of the nut. They mature in one season.

Alternate Simple Leaves

These next two trees are classified as deciduous even though their leaves are evergreen..

Shrub live oak leaves are simple compared to palmate trifoliate leaves of algerita.

Shrub live oak

Quercus turbinella

The leaves are alternate, evergreen, simple, elliptical and 1/2 to 1 1/2 inches long. They are spine-tipped lobes (holly-like), leathery and stiff and dull gray-green in color. They may have some whitish bloom. They also may be smooth or finely fuzzy beneath.

Patrick J. Alexander @ USDA-NRCS PLANTS Database

The twig is slender and reddish brown. Young twigs will have some fine tan fuzz on them. The buds are clustered and ball shaped.

The fruit is a narrow oblong acorn, 1/2 to 1 inch long. Its shallow, warty cap covers 1/4 to 1/3 of nut. The acorns ripen in one season in early fall or late summer.

Alternate Simple Leaves

Algerita

Mahonia trifoliata

The leaves are evergreen, alternate, spine tipped, leathery and sessile, with 3 to 7 lobes on a trifoliate, holly-like leaf. Leaflets are thick and leathery, lanceolate-oblong to elliptic, and have coarsely serrate or spinose margins. Leaflets are pale green to glaucous.

Clarence A. Rechenthin @ USDA-NRCS PLANTS Database

The fruit is bright red, somewhat flattened, 1/3 to 1/2 inch berry with 1 to several seeds.

The twigs are smooth and reddish-green when young but turn gray to reddish-brown with age. Young stems are red or green becoming dark reddish-brown or gray.

Alternate Simple Leaves

Salt cedar

Tamarix chinensis

The twig is a slender, drooping, green branch covered in scale-like foliage that later turns purplish. The leaf scars are very small, raised and numerous on the twig.

The leaves are alternate, very small (1/16 inch), scale-like and gray-green.

The fruit is a small, dry, brown, pointed capsules 1/8 inch long that contains numerous cottony seeds and ripens in summer.

Alternate Compound Pinnate Leaves

This group of 3 trees have alternate, pinnately compound leaves.

The leaves are alternate and pinnately compound. They have 11 to 19 elliptical leaflets each 1 to 1 1/2 inches long with entire margins.

New Mexico locust

Robinia neomexicana

The fruit is a flat pod, brown, 2 to 4 inches long and covered in gland tipped hairs.

The twig is a moderate size, zigzaged and somewhat angled or ridged. It has reddish hairs and a pair of spines at each leaf scar. The spines or thorns have a broad base like a rose thorn.

Alternate Compound Pinnate Leaves

Pecan

Carya illinoinensis

The fruit is 1 1/2 to 2 inch long oblong, brown, splotched with black, thin shelled nut. The husks are thin and usually occur in clusters on trees. They mature in the fall.

The leaves are alternate and pinnately compound with 9 to 15 finely serrate and often curved leaflets. The leaflet can be 12 to 18 inches long.

The twig is light brown and fuzzy (particularly when young). Leaf scars are large and three lobed (heart shaped). Buds are yellowish brown to brown, hairy, with terminal buds 1/4 to 1/2 inch long. Twigs have dark heartwood.

Alternate Compound Pinnate Leaves

Arizona walnut

Juglans major

The fruit is a round nut, 1 to 1 1/2 inches in diameter. The husk is thin and indehiscent, initially bright green but turning brown. The nut is grooved and matures in fall.

Steve Hurst @ USDA-NRCS PLANTS Database

Susan McDougall @ USDA-NRCS PLANTS Database

The leaves are alternate, pinnately compound with 9 to 15 leaflets, 7 to 13 inches long. The leaflets are narrowly ovate to lanceolate, somewhat curved with serrated margins, each 2 to 4 inches long. The are yellow-green above and paler below.

The twig is initially green but turns brown and fuzzy. Buds are scruffy light gray-brown and fuzzy. Leaf scars are very large, raised and 3-lobed (heart-shaped). The pith is chambered and has dark heartwood.

Alternate Bipinnate Compound Leaves

The last group of deciduous trees have bipinnate compound leaves and they also have thorns. Those include Catclaw acacia, Honey mesquite, and Screwbean mesquite.

Catclaw acacia

Acacia greggii

The twig is slender, brown, and angled, with numerous stout backward curving spines (1/4 inch). The spines or thorns are broad at the base like a rose thorn.

The fruit is a legume that is 3 to 6 inches long, 1/2 inch wide, flattened, and very twisted. It is brown and matures in mid to late summer.

The leaves are alternate and bipinnately compound, 1 to 2 inches long, with 1 to 3 pairs of major leaflets and 4 to 6 pairs of minor leaflets (1/4 inch long) The leaves are dull green.

Alternate Bipinnate Compound Leaves

Honey mesquite

Prosopis gladulosa

The leaves are alternate and bipinnately compound, 3 to 6 inches long, usually with only two major leaflets (may occasionally have 2 to 3 pairs). Each leaflet with 10 to 16 pairs of narrow minor leaflets (3/8 to 1 inch long) with entire margins and smooth surfaces, green to gray green above and paler below.

The twig is light brown and slightly zigzag with obvious paired slender, spines (up to 1 inch long) at the base of each leaf. Knobby spur branches may also be present.

The fruit is a 3 to 7 inch long, tubular legume, slightly swollen at seeds. It is light brown and ripens in mid to late summer.

Alternate Bipinnate Compound Leaves
Screwbean mesquite
Prosopis pubescens

The fruit is a very unique, tightly coiled legume, 1 to 2 inches long and light brown, ripening in mid to late summer.

The leaves are alternate and bipinnately compound, 1 to 2 inches long, usually with only two major leaflets (may occasionally have 2 to 3 pairs), each leaflet with 6 to 9 pairs of narrow minor leaflets (1/2 to 1 inch long) with entire margins and a fuzzy surface. They are green to gray-green above and paler below.

The twig is light reddish brown, slightly zigzag with obvious paired slender spines (up to 1 inch long) at the base of each leaf, spine is nearly white, knobby spur branches may also be present.

For Additional References

(We attempted to give credit for photos from their source which we may list below.)

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