

Forest Ecology & Management

Texas Master Naturalist Curriculum

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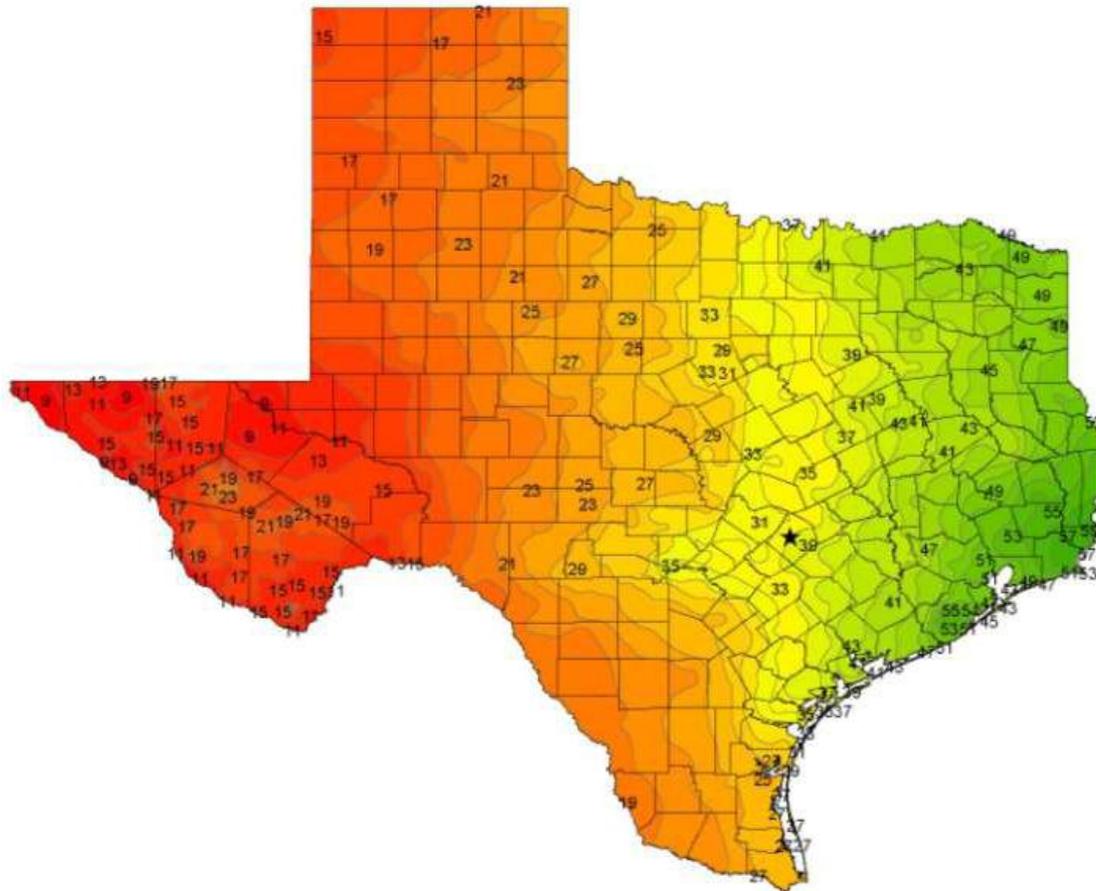
Texas Agrilife Extension Service

Introduction

- Forest Ecology – Study of the forest as a biological community, with the interrelationships between the various trees and other organisms constituting the community, and with the interrelationships between these organisms and the physical environment in which they exist (*Forest Ecology, 1980*)

Milam County

- Annual Rainfall – 35.52”



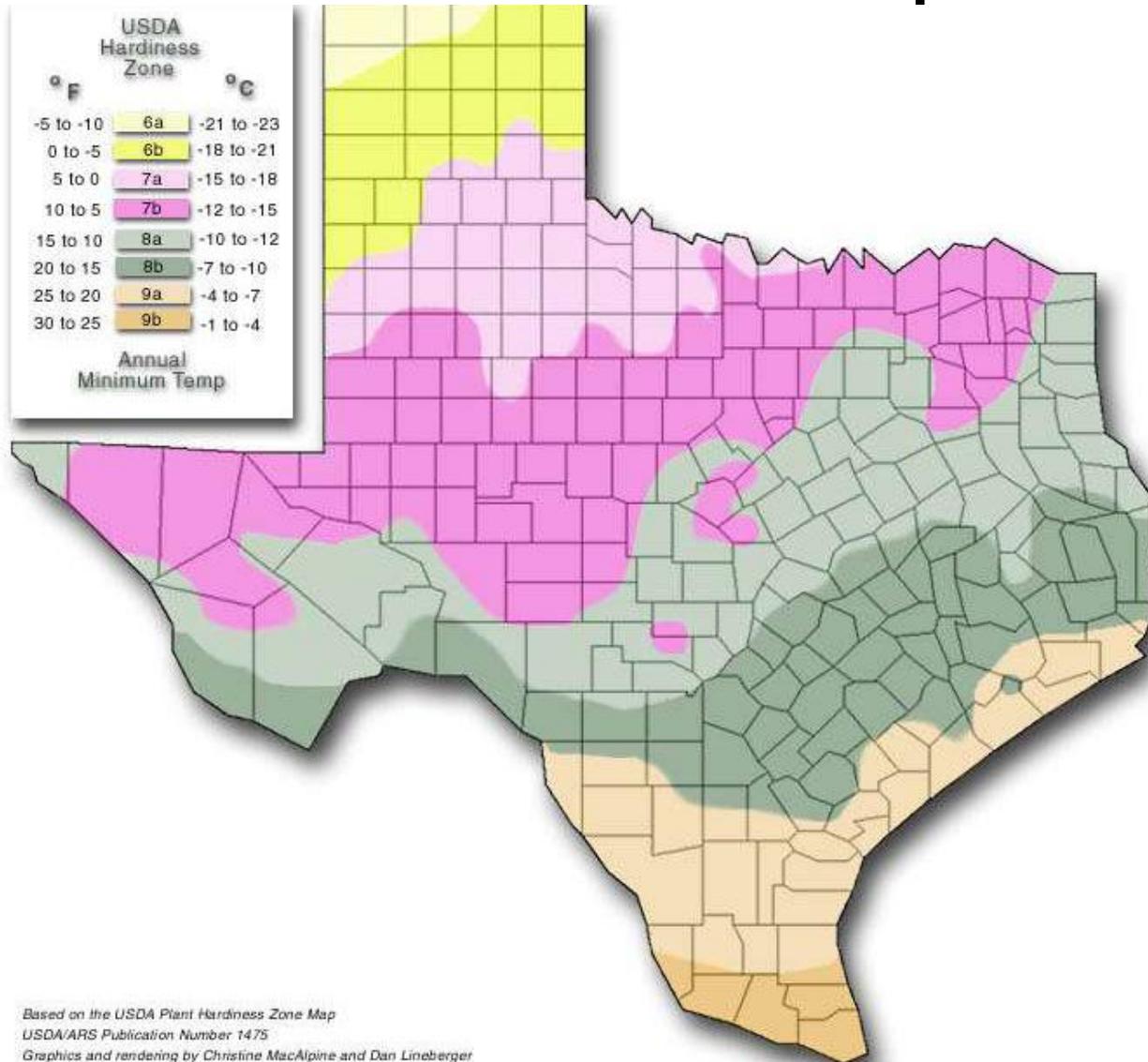
USDA Hardiness Zone Map

Average Annual
Minimum Temperature
Temperature (F) Zone

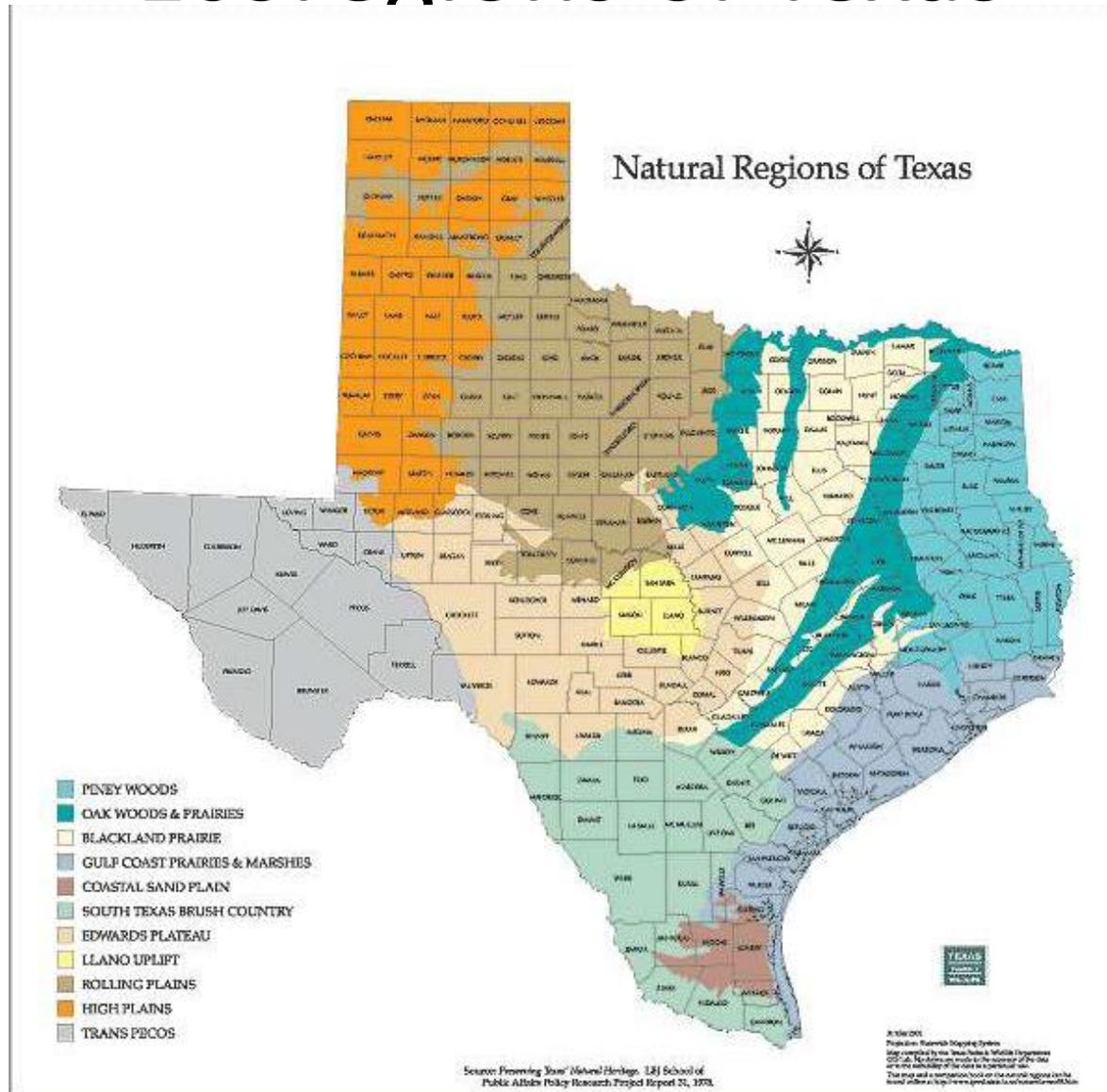
Below -50	1
-45 to -50	2a
-40 to -45	2b
-35 to -40	3a
-30 to -35	3b
-25 to -30	4a
-20 to -25	4b
-15 to -20	5a
-10 to -15	5b
-5 to -10	6a
0 to -5	6b
5 to 0	7a
10 to 5	7b
15 to 10	8a
20 to 15	8b
25 to 20	9a
30 to 25	9b
40 to 30	10



Annual Minimum Temperature



Ecoregions of Texas



Diversity in Texas

Anywhere from 220 to 300 tree species in Texas (*~40% of all US species*)

- 500 species of grasses (*most in US*)

Wildlife in Texas

- 540 bird species (*75% of all US species*)
- 78 species of mammals (TPWD Fact Sheets)
- 17 National Wildlife Refuges (*470,000 acres*)

Diversity in Texas

Trees cover in Texas

- *60 million acres of forests & woodlands*
- *12 million acres of forest just in E. Texas*

Who owns the forests?

- Of the 12 million acres of forest in E. Texas, *63% are privately owned (NIPF), 29%- industry/investment, 8%- public*
- USDA Forest Service- *750,000 acres of National Forest & Grasslands in TX*

Forest/Woodland Changes

How have Texas forests changed?

- East Texas has gained almost *2 million acres* of forest since 1935
- Since 1992, NE Texas gained *270,000 acres* of forest (reverted pasture)
- Since 1992, SE Texas lost *159,000 acres of* forest (urban development)

Where we are?

- Milam County
 - Convergence of two distinct eco-regions
 - Post Oak Savannah
 - Blackland Prairie
 - Transition zones
 - Post Oak Savannah is actually considered a transition zone between the Blackland Prairie and the East Texas Pineywoods

What is a savannah?

- Post Oak Savannah Ecoregion. As the name implies, the original plant community associated with this region was a savannah dominated by native bunch grasses and forbs with scattered clumps of trees, primarily post oaks. Forested areas were generally restricted to bottomlands along major rivers and creeks, or in areas protected from fire. Soils within the area are unique. Sands and sandy loams are predominantly found on upland sites, while clay or clay loams are typically associated with bottomlands. A dense clay pan, that is almost impervious to water, underlies all soil types within the region at depths of only a few feet. (*TPWD Fact Sheet*)

What is a prairie?

- Blackland Prairie Ecoregion - Pre-settlement conditions of this region were that of a true prairie grassland community dominated by a diverse assortment perennial and annual grasses and forbs (weeds). Many early settlers who first encountered the Blackland prairie described it as a vast endless sea of grasses and wildflowers with sparsely scattered trees or mottes of oaks on uplands. Forested, or wooded areas were restricted to bottomlands along major rivers and streams, ravines, protected areas, or on certain soil types. (*TPWD Fact Sheet*)

What was it like?

The Blackland prairie and Post Oak Savannah landscapes were formed and maintained by two major forces: **frequent fire** and **grazing of bison**. Recurrent fires ignited either by lightning or humans (American Indian) were the major force that molded the prairie and savannah landscapes. These fires were typically very large in scale and would traverse the countryside until they reached landforms or conditions that would contain them (rivers, creek bottoms, soil change, topographical change, climatic change, or fuel change). Fire maintained these plant communities by **suppressing invading woody species** and stimulating growth of prairie grasses and forbs. Large herds of bison, sometimes as large as 1,000 animals, ranged the prairies and savannahs, where they would consume large quantities of grasses, trample organic matter, and then distribute seed into the disturbed soil. The grazing pressure was not continuous, however, and the large herds would move on allowing the range time to recover.

Common Tree Species

Post Oak Savannah

- Post Oak
- Plateau Live Oak
- Black Hickory
- Blackjack Oak
- Yaupon Holly
- Cedar Elm
- Sugarberry
- Eastern Red Cedar

Common Tree Species

Blackland Prairie

Uplands, Predominantly

- Post oak
- Blackjack oak
- American Elm
- Winged Elm
- Cedar Elm
- Sugarberry
- Green Ash
- Osage-Orange
- Honey Mesquite
- Eastern Red Cedar
- Live Oak
- Ashe Juniper

Bottomlands, Predominantly

- Pecan
- Black walnut
- Black willow
- American Sycamore
- Honey locust and
- Bur oak

East Texas Bottomland Forests

Trees

- Oaks
- White, Swamp Chestnut, Cherry
- Bark, Willow, Water, &
- Overcup Oak
- Other Hardwoods
- American Hornbeam, Red
- Maple, Blackgum, Green Ash,
- River Birch
- Baldcypress, Water Tupelo,
- Water Elm, Swamp Privet

Shrubs

- 🗒 PawPaw, Buttonbush,
- Possumhaw Holly, Privet

Vines

- 🗒 Supplejack, Peppervine,
- Honeysuckle

East Texas Upland Forests

Trees

- Oaks
- Post, Blackjack, Southern Red,
- Water, & Black Oak
- Pines
- Longleaf Pine (South), Shortleaf
- Pine (North), Loblolly Pine
- Other Hardwoods
- Black Hickory, Elm, Sweetgum,
- Sassafras, Red Mulberry

Shrubs

- ☐ Yaupon Holly, Sparkleberry,
- Winged Sumac, Wax Myrtle

Vines

- ☐ Greenbrier, Muscadine Grape,

Forest Succession

Succession is the vegetative change in community composition and structure through time.

Stages of succession

- **Disturbance (Land cleared of vegetation)**
- **Primary (The first plants show up)**
- **Secondary (Trees start to dominate)**
- **Climax (Vegetative restructuring levels off)**

Forest Disturbance

- Ice storms, tornados, inclement weather, hurricane damage
- Insects, disease, & invasive plants
- Wildfire
- Humans (development, clearing)

Fire And The Forest

- Natural fire regimes (lightning & humans)
 - Fire scars on trees
 - Fire evidence in forest floor

Influence of fire on ecosystems

Frequency & intensity of fire may determine

- the characteristics of a forest
- Stages of succession
- Wildlife
- Insects & Disease

Humans and our effect on the forest

- Urban Sprawl / Land Fragmentation
- Clearing forest for cropland
- Clearing forest for ranching

Environmental Schools of Thought

Preservation: Involves “hands-off” management, very restrictive, intends to keep land basically untouched (i.e. wilderness areas). “Let nature takes it’s course”.

- Conservation: Involves science-based management, and theory of multiple-use sustained yield (USFS).

Reasons for Forest Management

- Recreation
- Aesthetics
- Wildlife / Hunting
- Ranching
- Timber production

Common Milam County Tree Species

A list of commonly occurring Native, Introduced, and Invasive Tree Species found in the Post Oak Savannah and Blackland Prairie Regions

Post Oak - *Quercus stellata*



Post Oak - *Quercus stellata*

Tree Description:

- A common, medium to large tree with a short trunk and a compact, rounded crown, commonly reaching a height of 50 feet and a diameter of 2 feet, but sometimes considerably larger.

Range/Site Description: One of the most widespread oaks in Texas, common to both East and Central Texas, west to the Panhandle, growing on upland soils either deeply sandy or on gravelly clays with poor surface drainage.

Leaf: Simple, alternate, usually 4" to 6" long and nearly as broad, highly variable but typically 5-lobed, no bristle-tips, the lobes broadest at the ends and often forming a "cross" shape, thick and somewhat leathery, dark green and shiny on the upper surface, lighter green and finely-pubescent beneath.

Flower: Male and female flowers borne in spring on the same tree, the male flowers on drooping, clustered catkins, 2" to 4" long, the female flowers inconspicuous.

Fruit: An acorn, requiring one season to mature, oval, 0.5" to 0.75" long, set one-third to one-half its length in a gray, bowl-shaped cup which has thin scales, sometimes with a short stalk.

Bark: Thick, gray-brown, developing narrow, irregular fissures and scaly ridges on older trunks.

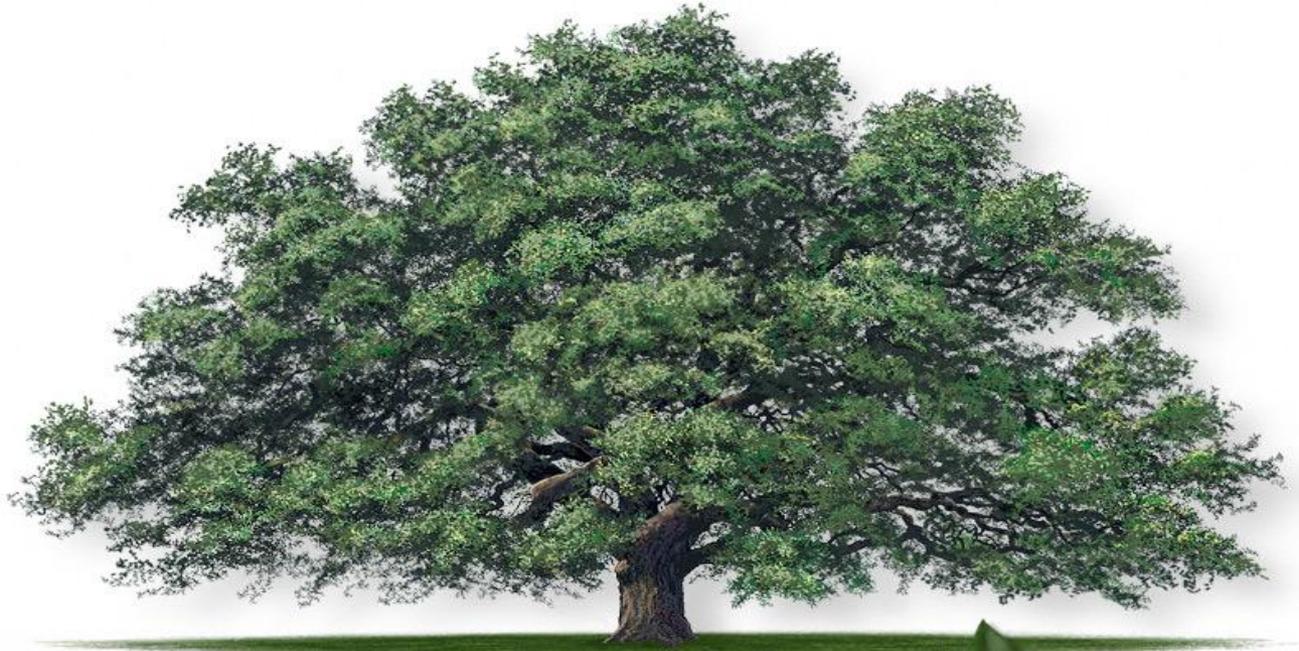
Wood: Heavy, hard, close-grained, light to dark brown and durable in contact with the soil; used for crossties and fence posts and occasionally for lumber.

Similar Species: Sand post oak (*Quercus margarettiae*) occurs on deep sands and has smaller leaves with downy pubescence; bottomland post oak (*Q. similis*) occurs on the wet lowlands of southeast Texas.

Interesting Facts:

- The species is so common it gives rise to the name for an entire ecoregion: the Post Oak Savannah.

Live Oak - *Quercus virginiana*



Live Oak - *Quercus virginiana*

Tree Description:

- A large, stately tree, commonly to 50 feet tall with a short, stout trunk of 4 feet or more in diameter, dividing into several large, twisting limbs that form a low, dense crown that can spread more than 100 feet, the limbs often touching the ground in open-grown settings.

Range/Site Description: Occurs on well-drained soils in the southern coastal plain, from Virginia through the Atlantic and Gulf states and into Texas, west to the Balcones Escarpment and south to Hidalgo county. Widely planted as a landscape tree in Texas.

Leaf: Simple, alternate, evergreen, thick, and leathery; oval, oblong, or elliptical in shape, 2" to 4" long and 0.5" to 2" wide; smooth, glossy, and dark green above, pale and silvery white beneath. Leaves can sometimes be toothed, especially towards the tip.

Flower: Borne in spring on the same tree, the male flowers on catkins up to 3" long, the female flowers on a peduncle 1" to 3" long in the leaf axils.

Fruit: An acorn, requiring one year to mature, about 1" long and 0.5" in diameter, oblong, dark brown and shiny, set about one-half its length in a gray, downy cup that is borne on a long stem or peduncle.

Bark: Dark brown, rough, and furrowed on trunk and large branches, developing very thick, interlacing ridges and deep furrows on older trees. Some specimens have thinner, paler, scaly bark.

Wood: Very heavy, hard, strong and tough, light brown with nearly white, thin sapwood; formerly used in shipbuilding and for wagon wheel hubs. Now primarily sold as a landscape tree in the nursery trade.

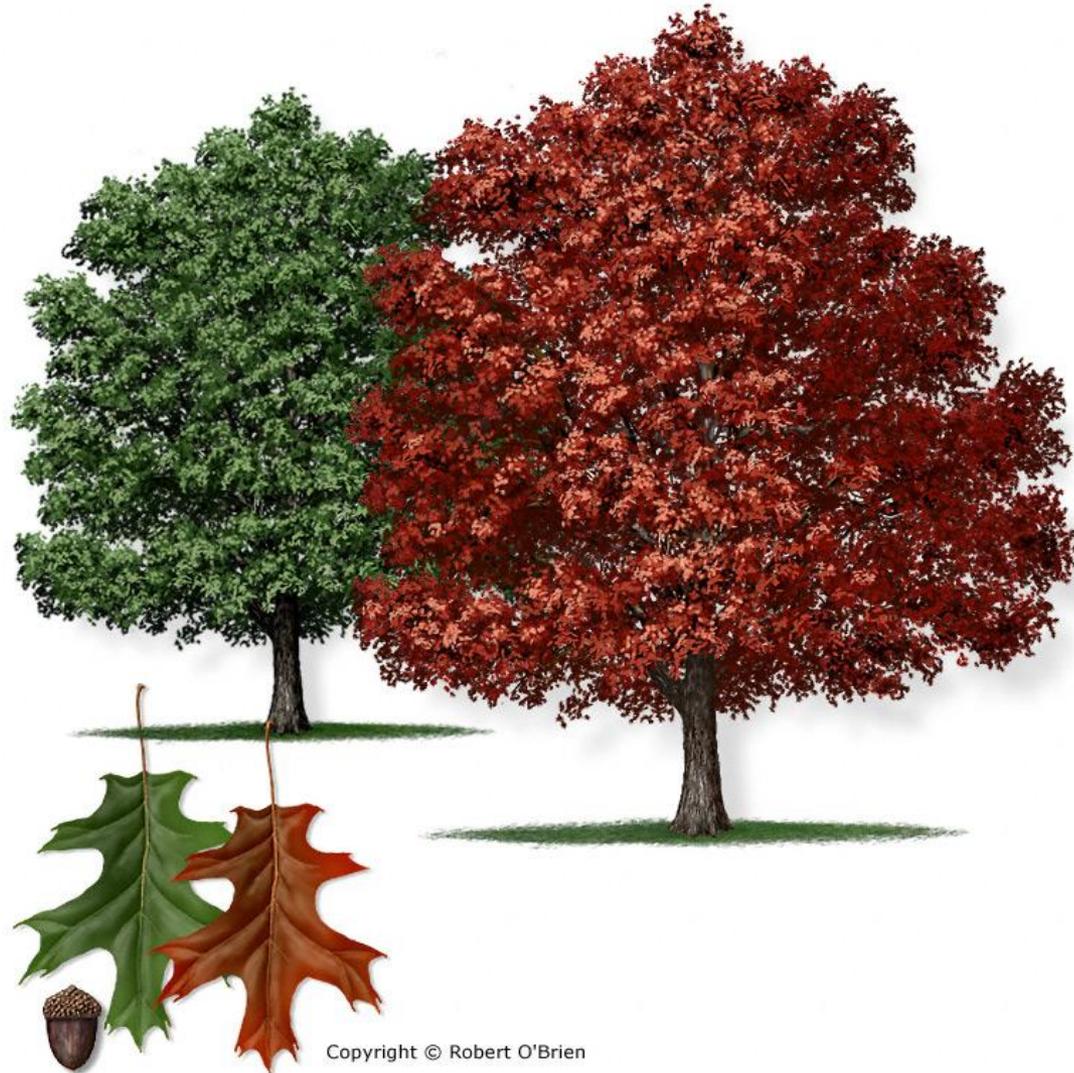
Similar Species: Texas live oak (*Quercus fusiformis*) occurs north and west of the Balcones Escarpment in Central Texas and tends to be smaller and multi-trunked. Mexican blue oak (*Q. oblongifolia*) is a rare evergreen oak that occurs in West Texas.

Interesting Facts:

- Live oaks were once prized for their naturally curved limbs and trunk, used by shipbuilders in the 18th Century to fashion the ribs and planking of tall sailing ships, such as "Old Ironsides." Refitting that ship in the 1980's included specialty pieces cut from live oaks in Texas that had been killed by the oak wilt fungus.

Texas oak - *Quercus buckleyi*

aka: Buckley oak, Texas red oak, Spanish oak



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aka: Buckley oak, Texas red oak, Spanish oak

Tree Description:

- Usually a medium-sized tree to 35 feet tall with one or more trunks 10" in diameter, but can reach heights of 70 feet on fertile sites.

Range/Site Description: Found on dry, limestone hills and ridges, and sometimes in the more fertile soils at their base, in Central Texas west to the Edwards Plateau.

Leaf: Simple, alternate, 3" to 5" long and 2.5" to 3" wide, widest above the middle, divided into 5 to 7 bristle-tipped lobes, with the terminal lobe often 3-lobed and the sinuses usually deep. Leaves have a slender petiole about 1" long, are dark green and shiny above, paler below, and turn deep shades of red in the fall.

Flower: Male and female flowers borne separately in spring on the same tree; male catkins 1.5" to 3.5" long, yellowish-green, female flowers reddish, about 0.5" long, usually solitary.

Fruit: An acorn, requiring two years to mature, usually single or in pairs, short-stalked, reddish-brown, pubescent, and often streaked with dark lines; measuring 0.25" to 0.75" long, ovoid, and set in a cup that covers one-quarter to one-half of the fruit.

Bark: Dark gray to black, smooth at first, then very rough with deep fissures and ridges.

Wood: Used for fuelwood and posts. Also used as a landscape tree in Central Texas.

Similar Species: Shumard oak (*Quercus shumardii*) is very similar and the two species hybridize naturally where they occur together, but Shumard oak acorns are usually larger with a shallow cup and the leaves often have broader lobes.

Interesting Facts:

- The spread of oak wilt disease in Central Texas can often be linked to the movement of firewood from infected red oaks. These trees produce "fungal mats" under the bark where certain insects feed; it is these insects that can infect new trees where the firewood has been moved.

Blackjack Oak - *Quercus marilandica*



Blackjack Oak - *Quercus marilandica*

Tree Description:

- A medium to large tree that can reach a height of 60 feet and a diameter of 16" to 24", but is usually much smaller. Its stiff, drooping branches form an irregular, dense crown that often contains many persistent dead twigs or branches.

Range/Site Description:

- Occurs in East and Central Texas, as far west as Callahan county, on dry or poorly drained, gravelly clays, or sandy upland soils where few other forest trees thrive.

Leaf:

- Simple, alternate, 4" to 10" long and 3" to 5" wide, strongly obovate, usually with three main bristle-tipped lobes on the upper half of the leaf, the bottom half narrowing abruptly to the petiole. Leaves are leathery, dark green and glossy on top, lighter and tawny-pubescent below.

Flower:

- Separate male and female flowers appear in spring on the same tree. Male flowers borne on a yellowish catkin 2" to 4" long; the less conspicuous female flowers are reddish in color.

Fruit:

- An acorn, taking two years to mature, about 0.75" long, yellow-brown and often striped, enclosed for one-half to two-thirds its length in a thick, light-brown cup.

Bark:

- Black or dark gray, very rough and breaking into thick, squarish blocks on older trunks.

Wood:

- Heavy, hard and strong. It is used for firewood, posts, and is made into charcoal.

Similar Species:

- Water oak (*Quercus nigra*) has similar three-lobed leaves that are less than 4" long.

Interesting Facts:

- Several forms of the species with smaller leaves occur in Central Texas on limestone soils and bluffs.

Water Oak - *Quercus nigra* aka: Pin Oak



Water Oak - *Quercus nigra*

aka: Pin Oak

Tree Description:

- A large tree to 90 feet or more and a trunk to 3 feet in diameter, with a dense, round crown of dark green foliage.

Range/Site Description:

- Occurs along the borders of swamps and streams and on rich bottomlands in East Texas, west and south to the Colorado River.

Leaf:

- Simple, alternate, 2" to 4" long and 1" to 2" wide, obovate or slightly three-lobed at the outer end, bristle-tipped, thin, dull bluish-green above and lighter green beneath, persisting on the twigs late into winter. Juvenile leaves are highly variable and have a mix of sharp teeth and rounded lobes.

Flower:

- Separate male and female flowers appear on the same tree in spring when the leaves begin to unfold; male flowers are borne on a yellowish catkin 2" to 3" long; the female flowers are less conspicuous and clustered on a short stalk.

Fruit:

- An acorn, requiring two years to mature, 0.5" to 0.75" long and wide, light brown or yellowish-brown and enclosed only at the base in the thin, saucer-shaped cup.

Bark:

- Smooth, light brown to dark gray, with many thin scales over the surface; developing broad, smooth plates on older trunks.

Wood:

- Heavy, hard, and strong, light brown in color, with lighter-colored sapwood; utilized chiefly for crossties, fuelwood, and pulp.

Similar Species:

- Willow oak (*Quercus phellos*) has narrow, linear leaves and rougher bark; laurel oak (*Q. laurifolia*) occurs only on very wet sites and has semi-evergreen, elliptical leaves.

Interesting Facts:

- Along with several other oaks, water oak is commonly referred to as "pin oak" because of its similarities to the true pin oak (*Quercus palustris*), except for leaf shape. This name is almost generic for any unknown oak species.

Pecan - *Carya illinoensis*



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Pecan - *Carya illinoensis*

Tree Description:

- A large tree to 120 feet tall and a trunk to 4 feet in diameter, with a broad, spreading crown when grown in the open. In wooded settings it grows tall and slender, with ascending branches and a tight, flat-topped crown.

Range/Site Description:

- Occurs in rich, fertile bottomlands across most of the state, from the East Texas pineywoods throughout Central Texas and west to the Concho River valley. Planted widely as a landscape tree and in orchards for nut production.

Leaf: Alternate, once-compound, 12" to 20" long, with 11 to 17 leaflets, each 4" to 8" long and up to 2" wide, lanceolate in shape, often falcate or inequilateral, finely-toothed and long-pointed; largest leaflets are typically towards the end of the leaf. Branches, twigs, and leaves lack thorns or prickles.

Flower: Male and female flowers appear in early spring, separately on the same tree; male catkins are 3" to 6" long, female flowers in short spikes at the tips of the branches.

Fruit: A large, cylindrical or oval nut, 1" to 2" long and up to 1" in diameter, enclosed in a thin husk which opens along grooved seams when the fruit ripens in the fall. The nuts vary considerably in size and thickness of shell and are rich in protein, oil, and minerals.

Bark: Gray-brown and smooth at first, later breaking into thin scales that flake as the bark grows older, developing a rough texture of narrow, flat ridges and shallow fissures on older trunks.

Wood: Heavy, hard, brittle, not strong, used for flooring and cooking wood, especially for barbeques. The tree is cultivated widely for its nuts, and many varieties have been developed and are sold in large quantities.

Similar Species: Water hickory (*Carya aquatica*) grows on very wet sites in East Texas and has narrow leaves and a small, flattened nut; black walnut (*Juglans nigra*) has more leaflets, leaves that are pubescent underneath, and a large, round fruit without seams on the husk.

- Interesting Facts: Pecan is the state tree of Texas!

Black Hickory - *Carya texana* aka: Texas hickory



Black Hickory - *Carya texana*

aka: Texas hickory

Tree Description:

- A medium to large tree, usually 60 to 75 feet tall, with a dark trunk 2 feet in diameter and short, gnarled branches that give the tree a narrow, oval crown of dark green foliage..

Range/Site Description: From East Texas south and west to the Hill Country and San Antonio, growing on well-drained hillsides and sandy uplands with post and blackjack oaks.

Leaf: Alternate, once-compound, 8" to 12" long, with 5 to (usually) 7 leaflets; leaflets are 3" to 5" long and 2" wide, dark green and lustrous above, pale yellow-green beneath; undersides of leaves and the petiole have red-brown hairs when young, becoming smooth with age.

Flower:

Male and female flowers are borne separately on the same tree; the male catkins in groups of three, 2" to 3" long, the female flowers in short clusters at the tips of the branches.

Fruit:

A round nut, 1.25" to 2" long, ovoid or slightly narrowed to a short stalk at the base, enclosed in a thin husk 0.1" to 0.2" thick that splits to the middle or nearly to the base. The hard shell is slightly four-angled and holds the sweet-seeded nut.

Bark:

Dark gray to black, with tight, irregular, blocky ridges and deep furrows on older trunks.

Wood: Used chiefly for fuelwood, especially for cooking fires.

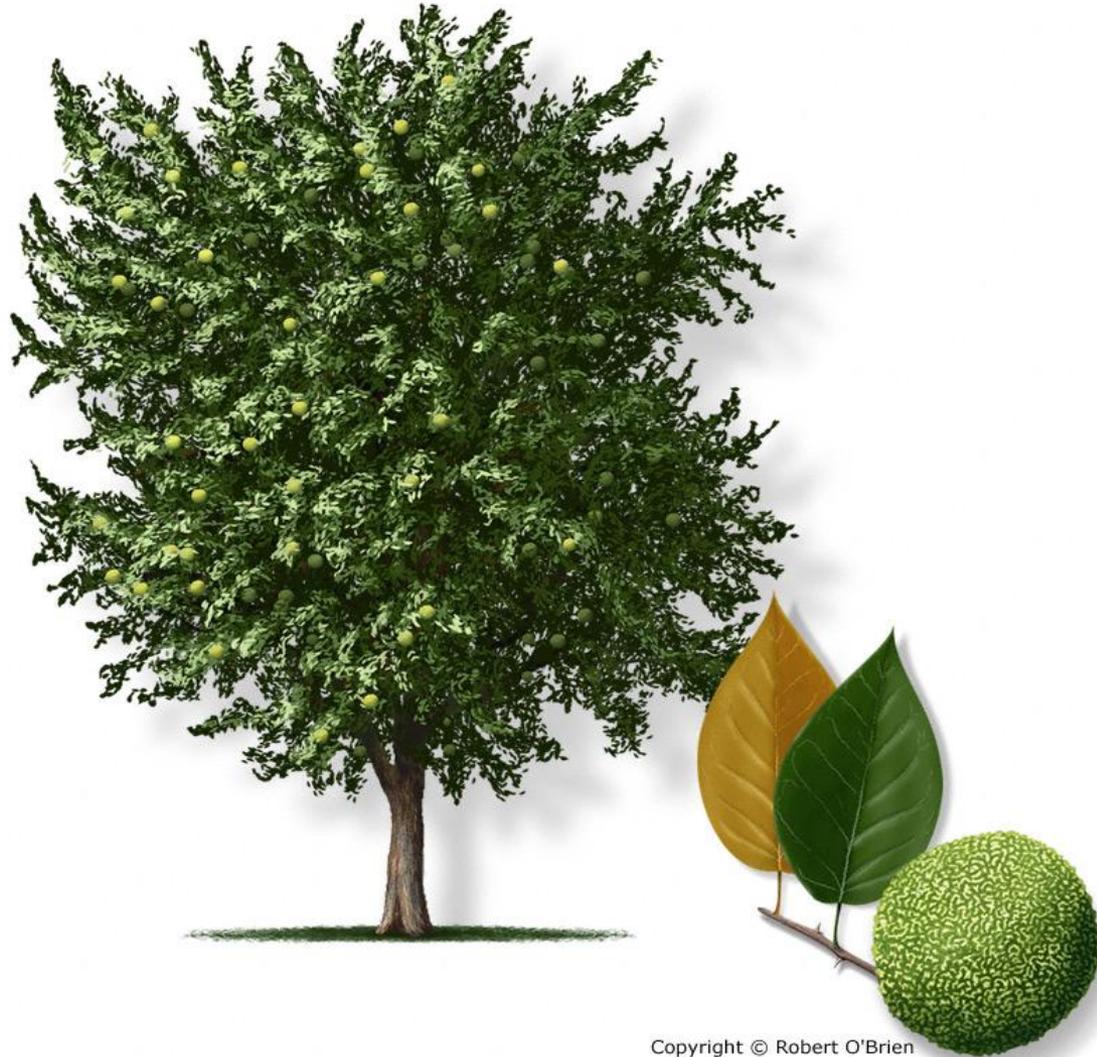
Similar Species:

- Mockernut hickory (*Carya alba*) has 7 to 9 leaflets and a wooly leaf rachis and leaf undersides; shagbark hickory (*C. ovata*) has gray, peeling bark.

Interesting Facts:

- The hickory with the westernmost native range, except for pecan.

Osage-Orange - *Maclura pomifera* aka: bois-d'arc, bodark, hedge-apple



Osage-Orange - *Maclura pomifera* aka: bois-d'arc, bodark, hedge-apple

Tree Description:

A medium-sized tree to 40 feet tall and a short trunk up to 3 feet in diameter, with many crooked, interweaving, thorny branches that form a dense, spreading crown.

Range/Site Description: Native to East and Central Texas, it attains its largest size in the valley of the Red River in the northeast part of the state, often on clay soils. The species has been transplanted to many areas in Texas and elsewhere.

Leaf: Simple, alternate, 3" to 5" long and 2" to 3" wide, ovate in shape and pointed at the tip, even at the base; leaf margin is smooth, and the top surface is glossy, dark green, lighter green underneath, and turning a clear yellow in the fall. The twigs are armed with stout, straight thorns and produce a sticky, milky sap when broken.

Flower: Male and female flowers borne on separate trees, in late spring; the male flowers form a short, linear cluster and the female flowers form a small, rounded ball in the leaf axils.

Fruit: A large, spherical, green fruit -- actually an aggregate of many small seeds -- ranging from 4" to 5" in diameter, resembling a green, wrinkled orange. Common names for the fruit are "horse apple" and "hedge apple."

Bark: Thin, brown to orange, divided into strips or flakes on older trunks. The bark contains tannin and was once used for tanning leather.

Wood: Wood is heavy, exceedingly hard, and very durable in contact with the soil. The heartwood is bright orange in color, turning brown upon exposure to the air. It is largely used for fenceposts.

Interesting Facts:

- The common name, "bois d'arc" is French for "bow-wood," a reference to the use by Native Americans for bows and war clubs. This species was also widely distributed and planted to make hedgerows and livestock pens prior to the invention of barbed wire.

Poison Ivy - Toxicodendron radicans



Poison Ivy - Toxicodendron radicans

Tree Description:

- A woody vine or semi-erect shrub that can be mistaken for a tree because it can climb and cover the trunks and branches of even large trees. Vines can grow to 1" or 2" in diameter, clinging to surfaces with a network of fine hairs. Leaves, bark, sap, fruit, and even the smoke from this plant contain toxic oils that may irritate and blister the skin: DO NOT TOUCH OR INGEST!

Range/Site Description:

- Occurs throughout Texas in moist, shady sites, especially in East Texas woods along streams.

Leaf: Alternate on the stem, once-compound, 1.5" to 8" long and up to 5" wide, with 3 leaflets; leaflet margins highly variable, ranging from smooth to coarsely-toothed, or even lobed; leaves are dark green and glossy on top, pale green below, turning orange to deep red in the fall.

Flower: Borne in spring on loose panicles 1" to 4" long, flowers greenish-white.

Fruit: A lustrous white, berry-like drupe, borne in slender, drooping clusters, maturing in September.

Fruits are eaten by birds and rabbits, but are poisonous to humans.

Bark: Vines are covered by a thick mat of red-brown hairs; older vines (like people) can lose enough hair to expose the warty, gray bark underneath.

Wood: The milky white sap can be used to make a black, durable varnish.

Similar Species: Boxelder (*Acer negundo*) has opposite leaves and at least some leaves with 5 leaflets; fragrant sumac (*Rhus aromatica*) has blunt teeth on leaflet margins; common hoptree (*Ptelea trifoliata*) is a shrub or small tree with wafer-like fruits; Virginia creeper (*Parthenocissus quinquefolia*) is a climbing vine with 5 or 7 palmately-compound leaflets.

Interesting Facts:

- This plant is the source of the saying, "leaves of three, leave it be!"

Hercules'-club - *Zanthoxylum clava-herculis* aka: prickly ash, tickle-tongue



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Hercules'-club - *Zanthoxylum clava-herculis* aka: prickly ash, tickle-tongue

Tree Description:

- A small tree, seldom over 30 feet in height, with a short trunk usually under 12" in diameter. Easily identified at a distance by the large, knobby warts on the trunk and branches.

Range/Site Description:

- East and Central Texas to the valley of the Colorado River. It seems to prefer a well-drained, light, sandy soil, and is often found growing on bluffs near rivers, at the edge of woodlands, or along fencerows.

Leaf: Alternate, once-compound, 5" to 8" long, with 7 to 17 leaflets, each 1" to 3" long, ovate or lanceolate, toothed, with several sharp prickles along the rachis.

Flower: The small, pale green flowers are borne in loose, widebranched terminal clusters, 4" to 5" long, blooming in early spring after the leaves emerge.

Fruit: Fruits ripen in early summer, producing a loose cluster of dark brown, one-seeded capsules. Once ripe, the valves open to expose the small seeds, which are quickly eaten by birds.

Bark: Light gray, thin, and covered by many sizes of knobby prickles, shaped somewhat like crocodile teeth, as large as 2" in diameter and 1" tall.

Wood: Soft, light brown, with no special value.

Similar Species:

- Texas Hercules'-club (*Z. hirsutum*) has 5 smaller leaflets and occurs in Central Texas; lime pricklyash (*Z. fagara*) has tiny leaves with winged rachis and occurs more in South Texas and the coast.

Interesting Facts:

- The twigs and inner bark can be chewed to produce numbness or a tingly feeling in the mouth, which was used as a home remedy to deaden toothache pain, giving the common names, "toothache-tree" or "tickle-tongue."

Green Ash - *Fraxinus pennsylvanica* aka: Red Ash



Green Ash - *Fraxinus pennsylvanica* aka: Red Ash

Tree Description:

- A large forest tree to 70 feet and a trunk to 2 feet in diameter, with spreading branches and an oval crown.

Range/Site Description:

- A common bottomland tree across the eastern third of Texas, as far west as the Guadalupe River. Prefers moist, fertile soils.

Leaf: Opposite, compound, 10" to 12" long, with 7 to 9 leaflets arranged pinnately; leaflets are 2" to 6" long and 1" to 2" wide, short-stalked, ovate to lanceolate, pointed at the tip, margin smooth or faintly toothed. Leaf color is dark green above and light green beneath, turning yellow in the fall. Buds sit on top of the half-moon-shaped leaf scars left on the twigs after leaf drop.

Flower: Male and female flowers borne on separate trees. Female flowers in loose clusters; male flowers appear as dark clusters of stamens near the end of the twigs, before the leaves.

Fruit: A flat, winged "samara," 1" to 1.5" long and 0.25" to 0.33" wide, the winged portion extending well down past the middle of the seed, maturing in late summer and distributed by the wind.

Bark: Light brown to gray, thick, with flat-topped narrow ridges forming an interlaced pattern, the furrows dark.

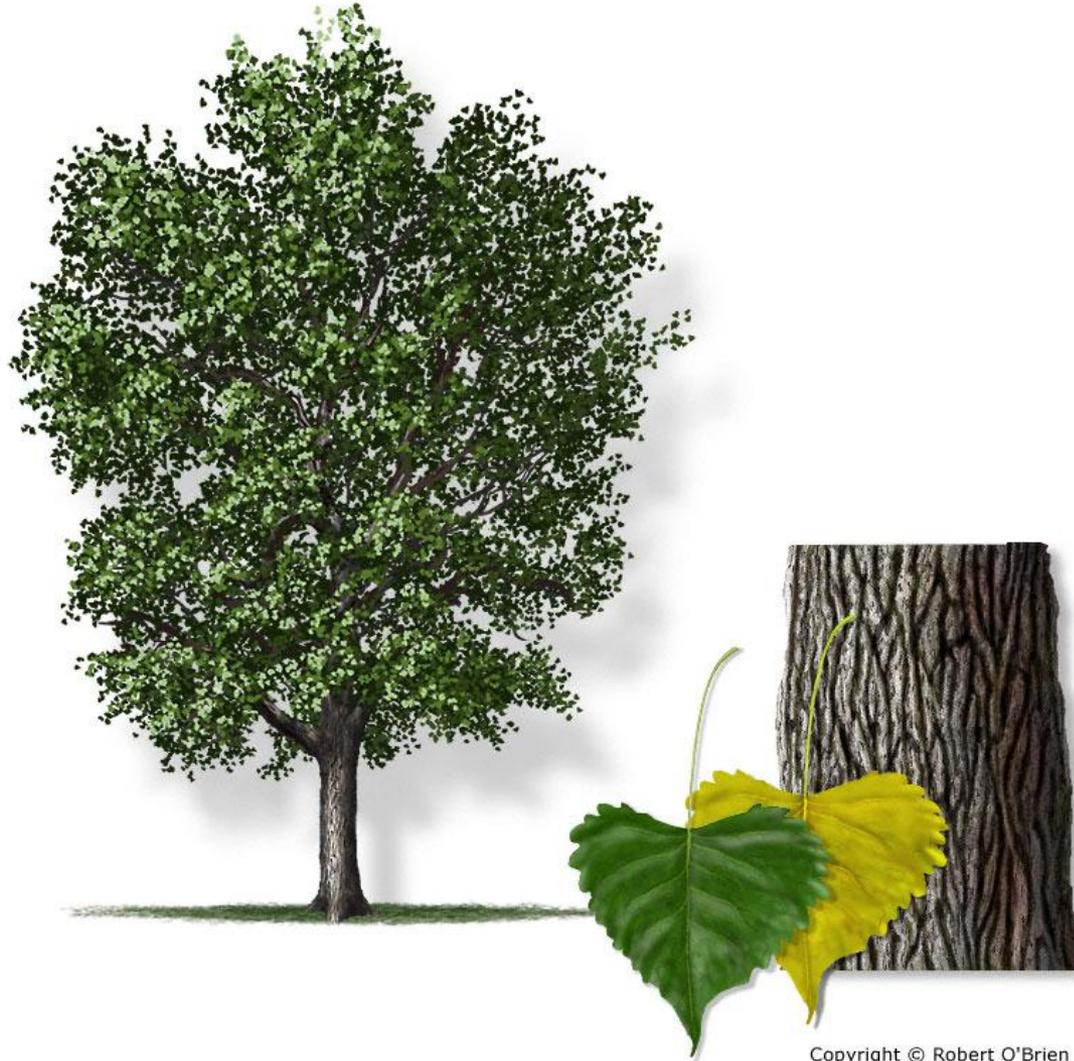
Wood: The wood is heavy, hard, rather strong, brittle, and coarse-grained. It is used for the same purposes as white ash but is not as desirable.

Similar Species: Poison-sumac (*Toxicodendron vernix*) has alternate leaves and white fruits; Carolina ash (*Fraxinus caroliniana*) has fruits 1" to 3" long and 0.75" wide; white ash (*F. americana*) has whitish leaf undersides, and buds that sit down in the leaf scars.

Interesting Facts:

- The most widespread ash species in North America.

Eastern Cottonwood – *Populus deltoides* ssp. *Deltoides*



Eastern Cottonwood –

Populus deltoides ssp. *Deltoides*

Tree Description:

- A large tree to 100 feet tall and a stout trunk to 6 feet or more in diameter, with thick, heavy branches that form a rounded, spreading crown.

Range/Site Description:

- Occurs along streambanks, riverbottoms, and sandbars in East and Central Texas. Also planted as a fast-growing shade tree on rural homesteads.

Leaf: Simple, alternate, leaf blade 3" to 5" long and across, triangular in shape, on a flattened petiole 2" to 3" long; pointed at the tip, square at the base or slightly heart-shaped, and coarsely toothed on the margin; shiny and medium green on top, lighter beneath. The flat petiole makes the leaves twist and shimmer even in a light breeze.

Flower: Male and female flowers borne on separate trees before the leaves emerge; male catkins 2" long, female catkins 3" to 3.5" long, in loose clusters.

Fruit: A long string of capsules, 8" to 12" long, ripening in early summer, each containing several seeds with white silky hairs which permit the winds to carry them for long distances.

Bark: Thin, smooth, green to yellowish on twigs and young branches, turning brown with age; older branches and trunks are gray or brown, with thick, flattened ridges and deep furrows.

Wood: The light-colored wood is soft, light, and warps easily upon drying, but is used for boxes, paper pulp, veneer, and pallets.

Similar Species: Rio Grande cottonwood (*Populus deltoides* ssp. *wislizeni*) reach immense size in West Texas; quaking aspen (*P. tremuloides*) occurs only in the highest mountains of West Texas; Lombardy poplar (*P. nigra*) has a distinct 'columnar' form.

Interesting Facts: The sight of cottonwoods in the distance was a sure sign of water to early settlers during their travels west. Borrowing the Spanish word for 'cottonwood,' the Mission San Antonio de Valero is commonly known as 'The Alamo' because of the presence of nearby cottonwood trees.

American Elm - *Ulmus americana* aka: White Elm



American Elm - *Ulmus americana*

aka: White Elm

Tree Description:

- A large tree to 90 feet tall and a trunk diameter to 3 feet, with a buttressed base and upright branches that form a spreading, vase-shaped crown.

Range/Site Description:

- Occurs across a vast area of the eastern U.S., into East and Central Texas, occurring naturally on well-drained soils along streams and rivers, but also planted widely as a shade tree.

Leaf:

- Alternate, simple, 4" to 6" long and 2" to 3" wide, oval or ovate in shape, tip drawn to a point, lopsided at the base, and double-toothed along the margin; leaf surface is either smooth or rough above and pubescent or smooth below, with raised veins.

Flower:

- Appearing before the leaves in early spring as small, greenish clusters on slender stalks in the axils of the leaves.

Fruit:

- An oval "samara" (winged fruit), with the seed portion in the center surrounded entirely by a wing with a fuzzy edge, ripening in the spring. The hairs on the samara margin and the deep notch in the end are characteristic of the species.

Bark:

- Dark gray, divided into irregular flat-topped, thick ridges, with narrow fissures between. An incision into an outer ridge of bark will show alternating brown and cream colored layers.

Wood:

- Heavy, hard, strong, tough, and difficult to split; once used for wheel hubs, saddle trees, veneer for baskets and crates, and furniture parts.

Similar Species:

- Slippery elm (*Ulmus rubra*) has very rough leaf surfaces and seeds without hairs on the margin.

Interesting Facts:

- This species was the most common street tree in America at the beginning of the 20th Century, but was almost wiped out by Dutch Elm Disease.

Cedar Elm - *Ulmus crassifolia* aka: Texas Elm



Cedar Elm - *Ulmus crassifolia*

aka: Texas Elm

Tree Description:

- A large tree to 75 feet tall with a tall straight trunk 2 to 3 feet in diameter and stiff branches that form a narrow, oblong crown.

Range/Site Description:

- The most common elm tree in Texas, distributed widely in East, South, and Central Texas. Most often found near streams, in solid stands on flatwoods near rivers, or on dry limestone hills. Also planted widely as a landscape tree.

Leaf:

- Alternate, simple, 1" to 2.5" long and 0.75" to 1" wide, oval to elliptical in shape, finely-toothed or sometimes double-toothed along the margin, and blunt at the tip. The upper surface is dark green, shiny, and rough, while the lower surface and petiole are pubescent. Twigs sometimes have thin, corky "wings" and the leaves can turn gold to orange-red in the fall.

Flower:

- Appear in late summer or autumn as hairy, short-stalked clusters in the leaf axils.

Fruit:

- An oval "samara," 0.25" to 0.5" long, the seed centered in the middle of the wing, deeply notched at the tip and hairy all over, especially along the margin. Seeds are borne in the fall, which distinguishes this species from the other native elms.

Bark:

- Light brown to gray, with flattened ridges that break into thin, loose, flaky scales.

Wood:

- Reddish-brown, brittle, with a thick layer of light-colored sapwood. The wood is sometimes used to manufacture wheel hubs, furniture, and fencing. Commonly sold in the nursery trade as a landscape tree.

Similar Species:

- Winged elm (*Ulmus alata*) has larger leaves and seeds that mature in spring; varieties of Chinese elm (*U. parvifolia*) have similar leaves, but the bark is distinctly orange and flaky.

Winged Elm - *Ulmus alata*



Winged Elm - *Ulmus alata*

Tree Description:

- A medium or large tree to 70 feet tall and a trunk to 2 feet in diameter, with an open, somewhat vase-shaped crown, and graceful, pendant branches.

Range/Site Description:

- In East Texas, south to the valley of the Guadalupe River, on a variety of sites, from dry, sandy uplands to moist soils along streams and swamps.

Leaf:

- Simple, alternate, 2" to 4" long and 1" to 2" wide, oval or elliptical in shape, pointed at the tip, margin coarsely double-toothed, dark green and smooth above, paler and often pubescent below with prominent veins. Leaf base can vary from slightly lopsided to wedge-shaped. Twigs with prominent corky wings on the twigs, with gaps at the leaf nodes.

Flower:

- Borne in early spring, long before the leaves unfold, as drooping clusters. One of the first trees to flower, often in late January or early February.

Fruit:

- Ripening in spring about the time the leaves appear, as a reddish-brown, oblong, winged seed ("samara"), 0.25" to 0.33" long, hairy, especially along the margin, and tipped with two small, incurved beaks.

Bark:

- Light brown tinged with red, divided by irregular shallow fissures into flat ridges.

Wood:

- Similar to that of the other elms: heavy, hard, and difficult to split, occasionally used for tool handles or furniture parts.

Similar Species:

- Water-elm (*Planera aquatica*) occurs in wetlands in East Texas and has a small cone-like fruiting structure; cedar elm (*Ulmus crassifolia*) has smaller leaves, seeds that ripen in the fall, and corky wings on the twigs that don't have gaps at the leaf nodes.

Interesting Facts:

- Early settlers used the inner bark to fashion coarse rope to bind the covers of cotton bales.

Sugarberry - *Celtis laevigata* var. *laevigata*

aka:sugar hackberry, palo blanco



Sugarberry
Celtis laevigata



Sugarberry - *Celtis laevigata* var. *laevigata* aka:sugar hackberry, palo blanco

Tree Description:

- A very common, large tree to 90 feet tall and a trunk 2 feet or more in diameter, though usually smaller in stature, with a round or oval crown of light green foliage.

Range/Site Description:

- Distributed widely over the eastern two-thirds of the state, sugarberry occurs most abundantly and attains greatest size in rich alluvial soils along riverbottoms, but thrives on many other well-drained soil types.

Leaf: Alternate, simple, 2.5" to 5" long and 1" to 2" wide, ovate or lanceolate, base lopsided, margin smooth or with a few remote teeth near the base, and long-pointed; leaf texture thin, smooth, with 3 prominent veins at the base beneath; leaf color light green turning yellow in fall.

Flower: Borne on slender stalks in the leaf axils in April or May, inconspicuous, greenish-white in color.

Fruit: Ripening in September as an orange-red, round or oblong drupe, about 0.25" in diameter, on a stalk up to 0.5" long, turning dark purple to black later in the fall.

Bark: Gray or gray-brown, smooth and thin at first, developing the distinctive warty bumps and ridges on larger trunks and branches.

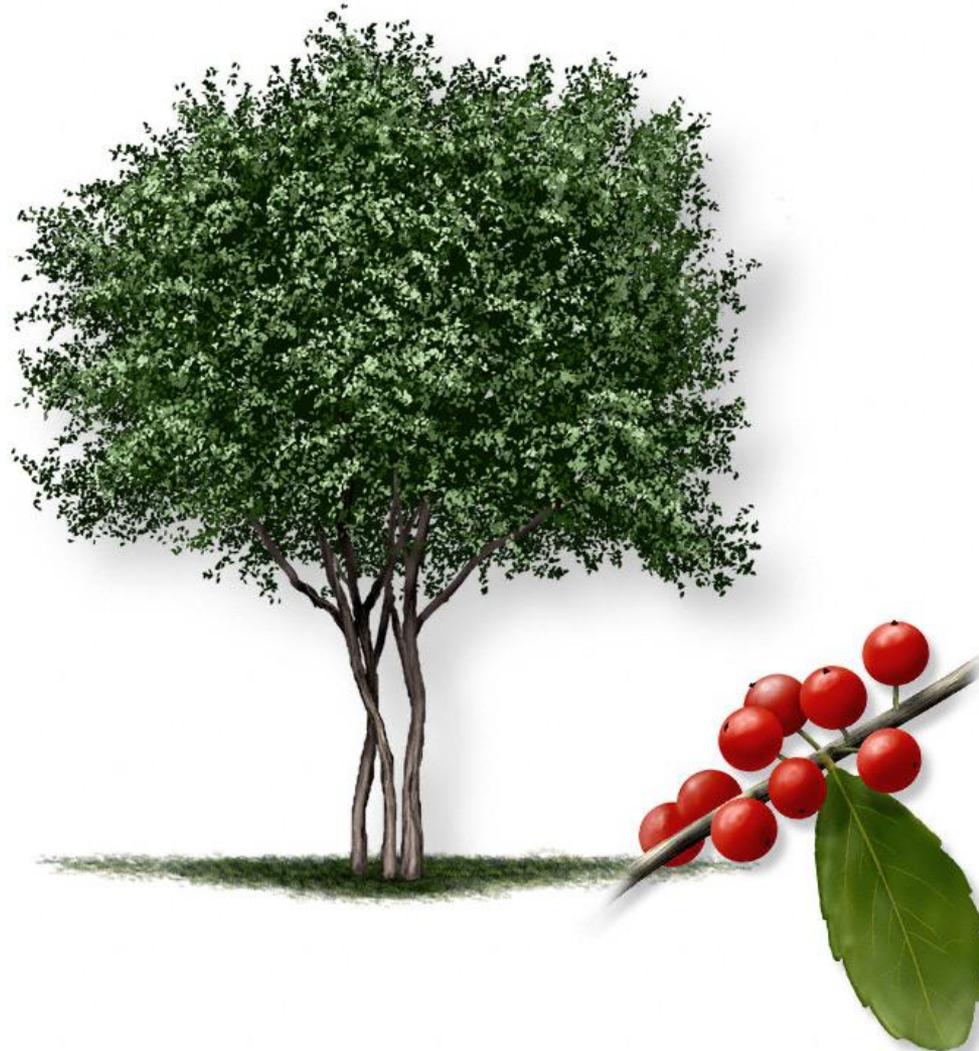
Wood: Soft, weak, close-grained, and light yellow, used occasionally for flooring and furniture, but chiefly for fuelwood.

Similar Species: Netleaf hackberry has leaves 2" long or less, with raised veins underneath that form a net-like appearance, occurring in West Texas; Lindheimer's hackberry has grayish-green leaves and only occurs in Central Texas. Sugarberry has narrower leaves with smooth margins; netleaf hackberry has a wider West Texas distribution and smaller leaves with net-like veins underneath.

Interesting Facts:

- This species occurs in all ecoregions except Mountain Forests.

Yaupon - *Ilex vomitoria* aka: Yaupon Holly



Yaupon - *Ilex vomitoria*

aka: Yaupon Holly

Tree Description:

- A thicket-forming shrub or small, multi-trunked tree to 25 feet tall and stems up to 6" in diameter, with a dense, conical or rounded crown of dark green foliage.

Range/Site Description:

- Common on the fertile, moist soils of East Texas bottomlands, but also south to Matagorda Bay and west to the edge of the Edwards Plateau.

Leaf:

- Simple, alternate, 1" to 2" long by 0.5" to 1" wide, oval, leathery, with blunt teeth along the margin. Leaves are glossy and dark green above, paler below, evergreen, and persistent for 2 to 3 years

Flower:

- Small, whitish, not showy; male and female flowers are borne on separate plants.

Fruit:

- A red, translucent, berry-like drupe, about 0.25" in diameter, on a short stalk, ripening in late fall and often produced in great abundance by the female plants.

Bark:

- Light gray, smooth or leathery, sometimes developing thin scales and blotches on larger stems.

Wood:

- Wood is of little commercial value except for fuel; plants are commonly sold in the nursery trade as a landscape specimen.

Similar Species:

- Chinese privet (*Ligustrum sinense*) has opposite leaves and a spike of small, blue fruits.

Interesting Facts:

- Yaupon leaves contain a small amount of caffeine and can be steeped into a weak tea. They also have been used ceremonially by native Americans as a purgative called the "Black Drink," thus providing the source for the Latin species name, 'vomitoria.' The berries are favored by several bird species.

Honeylocust - *Gleditsia triacanthos*



Honeylocust - *Gleditsia triacanthos*

Tree Description:

- A large tree with a trunk diameter of 30" and a height of 80 feet or more. The trunk, branches, and twigs have strong, sharp, brown thorns, either straight or branched, which form on the one-year-old wood and remain for many years.

Range/Site Description:

- Occurs in East and Central Texas, under a wide variety of soil and moisture conditions. Thornless horticultural varieties are popular for landscape plantings in the drier parts of Texas.

Leaf:

- Alternate, with two kinds of leaves: most are once-compound, 5" to 10" long, with 15 to 30 oval leaflets; on vigorous shoots the leaves can be double-compound, consisting of 4 to 7 pairs of pinnae, each 6" to 8" long, and either alternate or opposite on the rachis.

Flower:

- Borne in spring after the leaves in a dense greenish spike, 2" to 5" long, in the leaf axils.

Fruit:

- A dark brown pod, 10" to 18" long and 1" to 1.5" wide, flat and often twisted, containing a yellow, sweetish pulp and dark brown seeds.

Bark:

- Dark gray to black, smooth, but developing shallow fissures separating broad plates, sometimes curled at the edges.

Wood:

- Coarse-grained, hard, strong, and moderately durable in contact with the soil, used for tools, lumber, posts, crossties, and fuelwood.

Similar Species:

- A thornless variety (*Gleditsia triacanthos* var. *inermis*) is used widely for landscape plantings; Texas honeylocust (*Gleditsia x texana*) is a hybrid with waterlocust (*G. aquatica*) and has smaller pods.

Interesting Facts:

- Honeylocust flowers yield a good honey. The Cherokee Indians pounded the ripe seed pods and soaked them in water for a sweet beverage.

Southern Magnolia

Magnolia grandiflora



Southern Magnolia

Magnolia grandiflora

Tree Description:

- A large forest or landscape tree, reaching heights of 90 feet or more and a trunk to 4 feet in diameter, with a dense, pyramidal or oval crown, the spreading branches often reaching the ground in open settings.

Range/Site Description:

- Occurs on rich, moist, well-drained soils on streambanks or the borders of river swamps in southeast Texas. It has been widely cultivated as an ornamental tree outside its native range.

Leaf:

- Simple, alternate, 6" to 8" long and 2" to 3" wide, elliptical or oval in shape, thick, leathery, dark green and glossy above, rusty and pubescent beneath, with prominent midribs. They remain on the tree for about two years.

Flower:

- Large, showy and fragrant, 6" to 8" across, cup shaped, with pure white petals surrounding a splash of bright purple in the center, borne in spring and summer.

Fruit:

- A rounded or oval aggregation of seeds, shaped like a cone, 3" to 4" long, containing many seeds. The fruits open in the fall and display the bright red seeds dangling on slender threads.

Bark:

- Gray-brown, smooth at first and developing scales on larger branches and trunks.

Wood:

- Moderately heavy, hard, and cream-colored; was used chiefly for furniture, Venetian blinds, and fuelwood, but is now highly valued as a landscape specimen.

Similar Species:

- Sweetbay magnolia (*Magnolia virginiana*) has smaller, semi-evergreen leaves and flowers.

Interesting Facts:

- Magnolias are an ancient genus, one of the oldest flowering plants, extending back approximately 130 million years.

Honey Mesquite

Prosopis glandulosa var. *glandulosa*



Honey Mesquite

Prosopis glandulosa var. *glandulosa*

Tree Description: A thorny, multi-trunked shrub, or a medium-sized tree to 40 feet tall and one or more leaning, crooked trunks 18" to 24" in diameter, with a spreading, open, irregular, crown of drooping foliage.

Range/Site Description: One of the most common species in Texas, occurring statewide except for East Texas where it occurs rarely, on salty soils. Mesquite is quite invasive in cattle pastures and open, unmaintained fields.

Leaf: Alternate, compound, bi-pinnate, with the two pinnae attached to a long petiole; each pinna consists of 10 to 20 leaflets attached to a central rachis, 8" to 10" long. The leaflets are linear, 2" long by 0.25" wide, smooth, medium green, often blunt or rounded at the tips.

Flower: Long, cylindrical spikes, 2" to 4" long, of small, yellow flowers appear from the leaf axils in spring or early summer.

Fruit: A reddish-brown or purplish pod about 4" to 9" long, like a pea pod but constricted slightly between the 10 to 20 seeds, which are enclosed in a thick, sweet pulp; used by native peoples as food and eagerly sought by wildlife and livestock.

Bark: Twigs and branches armed with stout, straight thorns up to 2" long. Bark is thin and brown or gray at first, breaking into a dark, rough, scaly surface on branches, and then into dark brown or black ridges and furrows on the trunk.

Wood: Wood is heavy, hard, and dark brown in color, with lighter sapwood, and is used for fuelwood, barbeque wood, fenceposts, flooring, furniture, and paneling. Flowers make an excellent honey, and the seeds are sometimes used as livestock forage during droughts. Also used as a drought-tolerant landscape tree.

Interesting Facts:

- Known as a "phreatophyte" because of the ability of its very large and spreading root system to draw scarce water from grasslands, fields, and streams, it is considered a weed species by farmers and ranchers. Leaf-out in springtime is a sign to local farmers that the last frost has passed.

Black Walnut - *Juglans nigra* aka: Eastern Black Walnut



Black Walnut -*Juglans nigra* aka: Eastern Black Walnut

Tree Description:

- A large tree to 100 feet tall and a trunk to 3 feet or more, with a straight stem often clear of branches for half of its height, and an open, rounded crown of foliage.

Range/Site Description:

- Occurs in East Texas on rich bottomlands and moist fertile hillsides, as far west as the San Antonio river.

Leaf: Alternate, once-compound, 12" to 24" long, yellowish-green in color, pubescent beneath, consisting of 15 to 23 leaflets, each 3" to 5" long and 1" to 2" wide, the largest ones in the middle of the leaf, finely-toothed along the margin and tapering to a long point at the tip.

Flower: Male and female flowers borne separately on the same tree in early spring; the male flowers as stout, greenish-yellow catkins 2" to 5" long; female flowers occur in groups of 1 to 4 on new growth at the end of twigs.

Fruit: A large, round nut, borne singly or in pairs, 1.5" to 2.5" in diameter, enclosed in a solid green, leathery husk that does not split even after ripening; the nut is black, with a thick, hard, finely-ridged shell that holds the oily, but edible, kernel.

Bark: Thick, dark brown, with blocky or rounded ridges divided by deep fissures. The trunk, branches, and leaves are free of prickles or thorns.

Wood: The chocolate-brown heartwood is heavy, hard and strong, and is surrounded by a thin band of cream-colored sapwood. The wood is free from warping and checking, takes a high polish, and is durable, making it highly prized for furniture, cabinet work, and gunstocks.

Similar Species:

- Arizona walnut (*Juglans major*) has fewer leaflets, a smaller fruit and nut, and a more western distribution.

Interesting Facts:

- Black walnut releases a chemical compound from its roots, called "juglone," into the soil which inhibits the growth of nearby plants. This property is called "allelopathy" and plants that do this are called "allelopathic."

Black Willow - *Salix nigra*



Black Willow - *Salix nigra*

Tree Description:

- A large tree usually growing to 50 feet tall, but can reach 100 feet, with one or more trunks to 3 feet in diameter and an upright branching habit. In winter the reddish-brown or golden twigs are conspicuous.

Range/Site Description:

- Occurs throughout Texas, along streams, in wet areas, and on riverbanks, frequently in groups or thickets.

Leaf:

- Simple, alternate, 3" to 6" long and 0.5" to 0.75" wide, linear-lanceolate in shape, leaf margin finely-toothed; leaves are bright green on both sides, turning pale yellow in the fall.

Flower:

- Male and female flowers are borne on separate trees in the spring as catkins, 1" to 3" long.

Fruit:

- A long, cylindrical string of capsules, 3" to 4" long, each containing numerous small seeds with long silky hairs which enable them to be blown long distances.

Bark:

- Light brown, gray, or black, developing broad plates that separate from the trunk and give it a somewhat shaggy appearance.

Wood:

- Wood is soft, light, and not strong. A high grade of charcoal, used in the manufacture of gunpowder, is obtained from willow wood, and it is also used in manufacture of artificial limbs.

Similar Species:

- Weeping willow (*Salix babylonica*) has long branchlets that droop to the ground and is often planted near wet areas.

Interesting Facts:

- Willow bark was used by native peoples and early settlers as a headache remedy because it contains salicylic acid, the active ingredient of aspirin.

Tallow Tree - *Triadica sebifera* aka: Chinese tallow



Tallow Tree - *Triadica sebifera*

aka: Chinese tallow

Tree Description:

- A small to medium-sized tree with a crooked trunk 12" to 18" in diameter and a height to 50 feet at maturity.

Range/Site Description:

- Native of Japan and China, tallowtree is now found in yards, pastures, fencerows, and other unmaintained areas through coastal and southeast Texas. Tolerates all soil conditions, but not cold-hardy in North or West Texas.

Leaf:

- Simple, alternate, 2" to 4" long, generally triangular, with a wedge-shaped leaf base and a long, pointed tip; leaf edge smooth. Fall color varies from yellow, orange, red, and purple, sometimes on the same tree.

Flower:

- A long, yellow spike of flowers, 8" to 10" long, appearing after the leaves in the spring.

Fruit:

- Dark gray, 0.5" diameter, three-parted seed clusters open to reveal white, popcorn-like waxy seeds in late fall or winter. Birds eat and spread the seeds.

Bark:

- Tan and bumpy when young, developing flattened ridges that flake outward on older trunks to give a slightly shaggy appearance.

Wood:

- Wood is weak and soft, decays easily. Seeds can be harvested for the waxy coating to make soaps and fuel oil.

Similar Species:

- Native shrub coralbean (*Erythrina herbacea*) has similar leaves, but fruit is a pod. Quaking aspen (*Populus tremuloides*) occurs only in the highest mountains of West Texas.

Interesting Facts:

- First introduced to the Gulf coast by the USDA in the 1900's to develop a soap-making industry from the seeds.

Ashe Juniper - *Juniperus ashei* aka: Mountain Cedar



Ashe Juniper - *Juniperus ashei*

aka: Mountain Cedar

Tree Description:

- A shrub or small to medium-sized tree, to 30 feet tall and a trunk to 16" in diameter, usually with forks or branches very close to the ground forming a dense, dark green, conical crown of foliage.

Range/Site Description:

- The common juniper throughout Central Texas. This tree often forms extensive low forests or dense "cedar breaks" on the limestone hills and slopes of the Hill Country and the Edwards Plateau. Considered an invasive weed species over much of its range.

Leaf:

- Scale-like, dark green, blunt pointed, and fringed with minute teeth. On vigorous young plants the leaves are sharp pointed and longer, up to 0.5" long.

Flower:

- Male and female cones on separate trees; male conelets oblong, very small, at the tips of branchlets; female cones oval, inconspicuous.

Fruit:

- On the female trees, a round, dark blue, berrylike cone that is covered with glaucous bloom; it has a thin, pleasant-scented, sweet flesh, enclosing 1 or 2 seeds, and ripens in one season.

Bark:

- Reddish-brown and peeling into long strips; developing shallow fissures on old trunks.

Wood:

- Light, hard, light brown, close-grained but weak, the wood is extensively used for fence posts and fuelwood.

Similar Species:

- Eastern redcedar (*Juniperus virginiana* var. *virginiana*) occurs in East Texas and has an upright, conical form.

Interesting Facts:

- The strips of bark are used by the endangered golden-cheeked warbler to make its nests. Many people are allergic to the pollen, resulting in outbreaks of "cedar fever" in late winter.

Tree Management

- The Death of a Tree
 - Accumulation of environmental and cultural factors contribute to ultimate death of a tree specimen
 - Drought
 - Overwater
 - Defoliation (disease, storm)
 - Compaction
 - Land Use
 - Disease
 - Other factors

To kill a tree...

- Chainsaw
- Select class of herbicides
- Select disease agents (oak wilt, dutch elm)
- Bulldozer

Most naturally occurring tree deaths/dieoffs can be attributed to many factors

Hypoxylon Canker

- Secondary disease agent
- Causes grayish brown fungal mat to develop under sloughed off bark of declining tree
- Present in all tree bark in nature
- Presents itself in trees that are undergoing decline or death
- Safe to use wood for firewood, not contagious
- Usually seen as the “causative agent” of tree death

Oak Wilt

- Only present in Red oak varieties (red oak, live oak)
- Not dangerous to White Oak species (post oak, blackjack oak, pin oak)
- Spread through
 - live fungal mats
 - Dormant fungal mats
 - Select boring beetle
 - Mechanical transmission
- Rapid death
- “Firing” of leaf veins



Tree Management

- Management Practices
- Pruning
- Competing Plants

Management Practices

- Avoid disturbance under dripline
- Avoid use of soil-active herbicides in vicinity of tree dripline
- Maintain safe distances from established trees during construction/excavation
- Typically, additional water/irrigation of mature trees is feudal and can be more harm than good

Tree Management

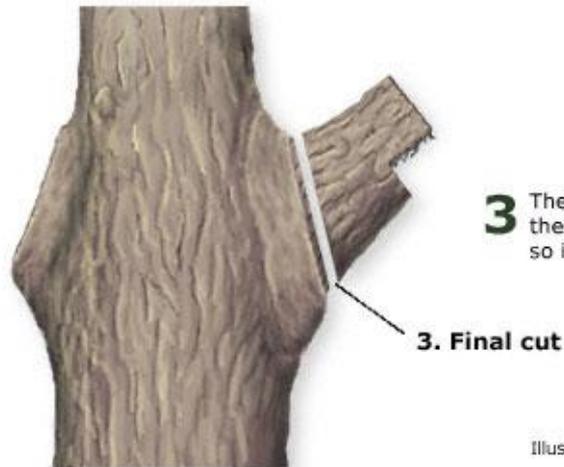
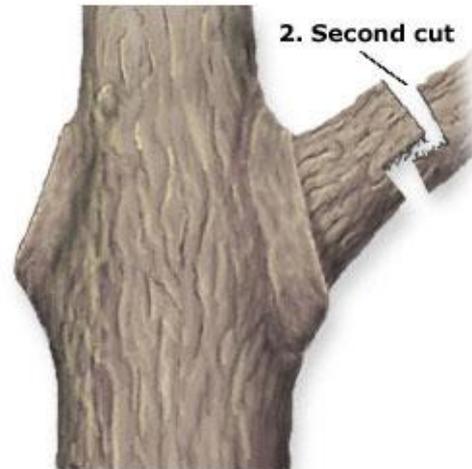
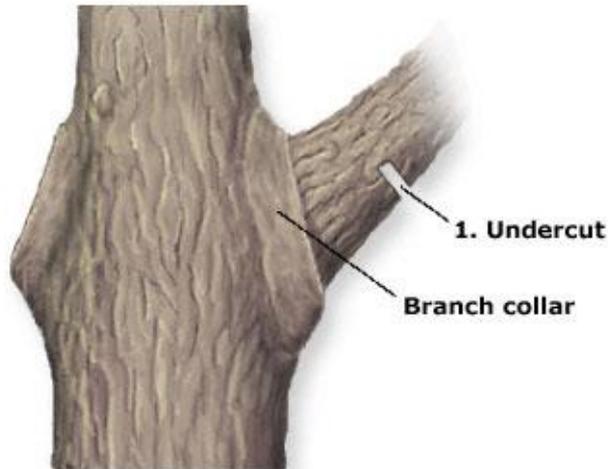
- Prune during dormant season
- Paint wounds
- Proper tree pruning technique to minimize damage and promote healing
 - Sharp blade
 - 3 step cut

Proper Pruning Technique

Pruning a Large Limb

1 Undercut 12-24" up from the branch collar. This stops the bark from tearing.

2 Make the second cut from the top all the way through the branch, 2-3" above cut #1.



3 The final cut should be just beyond the branch collar. Support the stub so it does not tear the bark.

Competing Plants

- For plants in a landscape, or managed wildscape,
 - Remove competing vegetation from the base of the tree
 - Includes turfgrass, flowers, other vegetation
 - Replace with 4" hardwood mulch 4'-6' from the base of the tree
 - Plants can tap the root flare and negatively impact the tree

Questions?

Thank You

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