

Tree Selection & Planting Guide

Texas A&M Agrilife Extension
Williamson County

Heritage Oak – Cedar Park Texas

Williamson County Master Gardener Tree Selection and Planting Guide

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This information in this book is sourced from the Texas A&M Forest Service and Texas A&M AgriLife Extension Service

**Compiled by Garry Bowman, Williamson County Master Gardener
Revised 9/11/2019**

Williamson County AgriLife Extension Service Contact Information

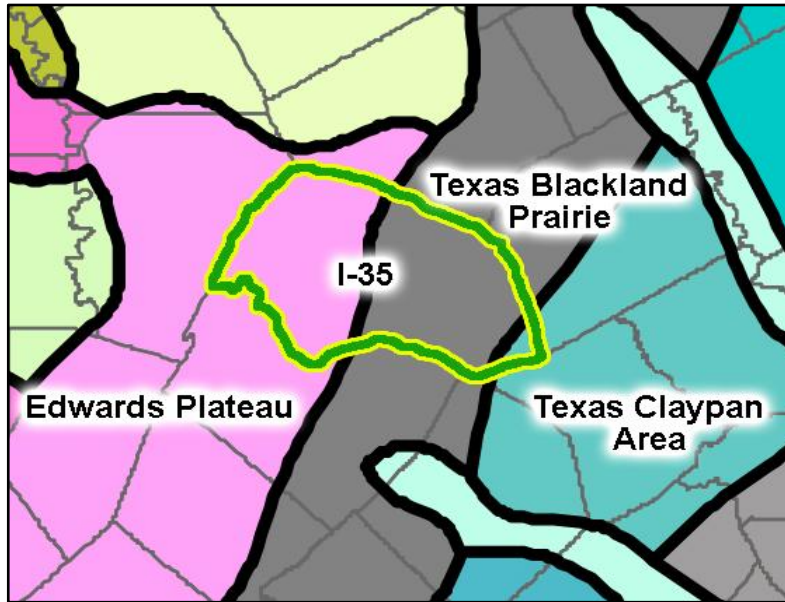
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“The members of Texas A&M AgriLife will provide equal opportunities in programs and activities, education, and employment to all persons regardless of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation or gender identity and will strive to achieve full and equal employment opportunity throughout Texas A&M AgriLife.”

Williamson County Soil, Hardiness Zone & Rainfall

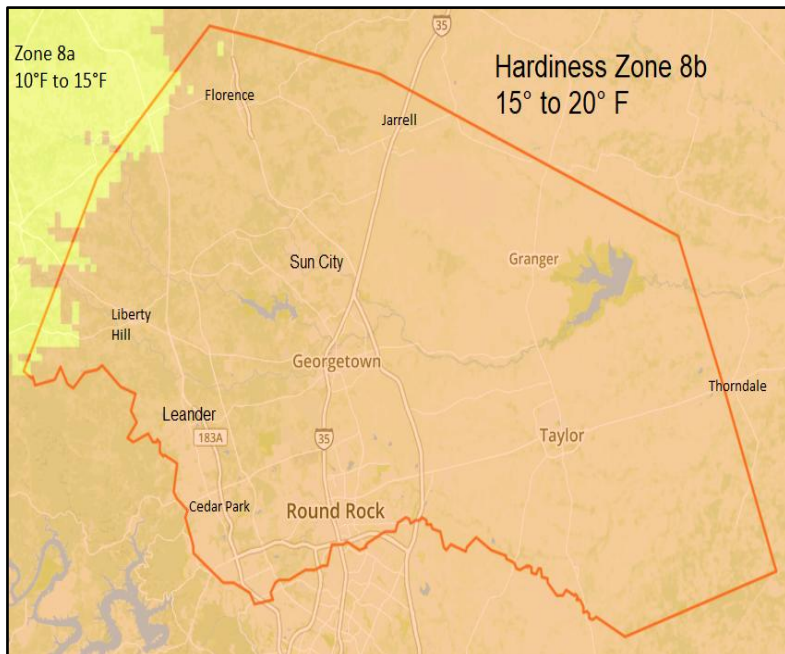


Williamson County has 3 different types of soil which can impact tree selection. Soil pH averages 7.5 – 8.2.

The **Edwards Plateau** area lies roughly west of Interstate 35. The terrain is rocky and hilly. The soil tends to be thin, stony and was formed in limestone or limestone marl. Beneath the soil is a layer of caliche often with limestone bedrock below that.

The **Texas Backland Prairie** area is roughly east of Interstate 35. The soil is deep and fertile, black heavy clay soils that formed in marine marls, ancient clayey alluvium, soft limestone and chalk. The land is relatively flat and good for farming and pastures.

The **Texas Claypan** area (aka Post Oak Savanna) is in the far southeastern corner of the county. Over most of the area, soils have well developed clayey, subsoil horizons with sandy and loamy surface textures.



Soil Tests: Contact the Extension office for information on doing soil tests.

USDA Hardiness Zone: Williamson County is in hardiness zone 8b except for a very small area on the far western edge which is 8a. The average minimum temperature for zone 8b is 15° to 20° F but occasionally can be lower.

Rainfall: On average, Williamson County, gets 35.11 inches of rain per year.

<http://www.texascounties.net/statistics/precipitation>

Native & Adapted Trees/Shrub List for Williamson County

For diversity and tree health, plant different tree species than are already in your vicinity. Having a wide variety of trees in an area can help reduce the possibility of a tree specific disease or pests getting a foothold. It normally takes about 2 years for a tree to establish itself and before a lot of upper growth is seen. There is an old saying about newly planted trees. The first year it sleeps, the second year it creeps and the third year it leaps.

Using the “Select Tree Location and Size” guide in the General Tree Planting Instructions section, select a tree size that will meet your location need. Allow for it to have room to grow vertically and horizontally both above and below ground. When selecting a tree, note its sun/shade and water requirements and if it prefers moist or well-drained soil as this can help determine placement. The following tree lists are not inclusive but reflect common landscape trees and shrubs in Williamson County.



Terms Used In the Tree Tables

Name: A tree or shrub can have several common names, but only one scientific name. Check the scientific name if in doubt.

Native to: Indicates if it is native to Edwards or Blackland soil here in Williamson County or to Texas in general. Adapted trees and shrubs are not native but have adapted well to the area.

Water: This refers to the water needs after the tree/shrub is established which is usually two seasons. Water needs are greater while the tree is getting established. See the Planting section for watering guidelines for new planted trees.

L – Low: Water deeply every 3-4 weeks for established trees if there has been no significant rainfall.

M – Medium: Water deeply every 2-3 weeks for established trees if there has been no significant rainfall.

H – High: Water deeply every 5-7 days for established trees if there has been no significant rainfall. Plants with high water needs should be placed in areas that are naturally moist and/or receive storm water runoff.

Deep Watering: The goal of watering deeply is to get the soil moist 8-12” down. Skip Richter, Agent with the Texas AgriLife Extension Service, suggests using the screwdriver test to know when to water established trees. Poke a long 8"-plus screwdriver into the soil. If you can't poke it at least 6" due to dry soil, then it's time to water.

Light: Sun = needs at least 6-8 hours of full direct sun. **P/Shade** = needs 4-6 hours of full direct sun

Leaf Type: **D** = Deciduous, **E** = Evergreen. Some trees such as the Mexican White Oak may be considered semi evergreen instead of deciduous because they lose their leaves shortly before the new leaves come out.

Height Width: These are average ranges only. Maximum height/width reflects ideal conditions.



Green Ash
Fraxinus pennsylvanica

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Baldcypress
Taxodium distichum

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Montezuma Cypress
Taxodium mucronatum

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Southern Catalpa
Catalpa bignonioides

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American Elm
Ulmus americana

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Cedar Elm
Ulmus crassifolia

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Thornless Honeylocust
Gleditsia triacanthos var. inermis

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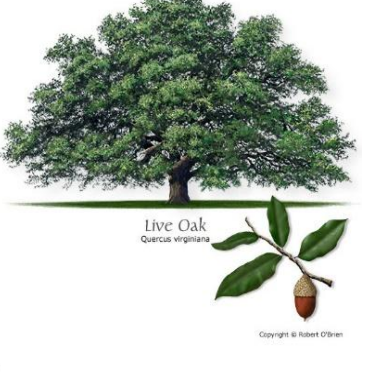
Bur Oak
Quercus macrocarpa

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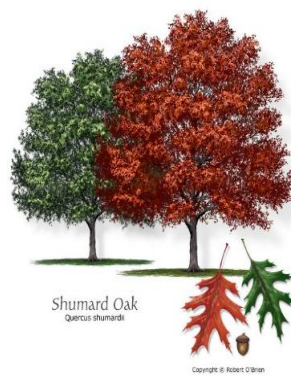
Chinquapin Oak
Quercus muhlenbergii

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Live Oak
Quercus virginiana

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Shumard Oak
Quercus shumardi

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California Fan Palm
Washingtonia filifera

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Pecan
Carya illinoensis

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Italian Stone Pine
Pinus pinea

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Sycamore
Platanus occidentalis

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Mexican Sycamore
Platanus mexicana

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Common & Scientific Name	Native to...	Water	Light	Leaf Type	Height Width	Notes
Large Trees 40' and Taller (Maximum height reflects ideal conditions)						
Ash, Green <i>Fraxinus pennsylvanica</i>	Blk Land	M	Sun	D	50 - 80' H 30 - 50' W	Prefers moist, fertile soils but tolerates others. Susceptible to emerald ash borer. May need pruning to shape or raise canopy.
Bald Cypress <i>Taxodium distichum</i>	Edwards	M	Sun P/Shade	D	50 - 75' H	Feathery leaves turn copper-colored before falling. Tolerates many soil/moisture conditions. May grow knees in wet/moist soil.
Montezuma Cypress <i>Taxodium mucronatum</i>	Texas	H	P/Shade	D	36 - 72' H	South Texas relative of Bald Cypress more adapted to dry conditions. Leaves deciduous planted north of San Antonio.
Catalpa, Southern <i>Catalpa bignonioides</i>	Texas	L	P/Shade	D	50 - 75' H	Tough tree for open areas. Host tree for catalpa worms which are prized fish bait. Large heart shaped leaves 6-12" long.
Elm, American <i>Ulmus americana</i>	Blk Land Edwards	H	Sun P/Shade	D	60 - 80' H	Fast-growing, vase-shaped shade tree that tolerates a wide range of conditions. Susceptible to Dutch Elm disease.
Elm, Cedar <i>Ulmus crassifolia</i>	Blk Land Edwards	L	Sun P/Shade	D	50 - 70' H 40 - 60' W	Drought-tolerant, adapts to a many soil conditions. Scaly bark/corky ridges on branches. Moderate resistance to Dutch Elm disease.
Honeylocust, Thornless <i>Gleditsia triacanthos</i> var. <i>inermis</i>	Texas	M	Sun	D	50 - 90' H	Shademaster is an excellent thornless, seedless nursery variety. May shed limbs to survive drought. Reliable fall color. Surface roots can become a mowing problem. Minimal leaf litter.
Oak, Bur <i>Quercus macrocarpa</i>	Blk Land Edwards	M	Sun	D	50 - 80' H 50 - 70' W	Drought-tolerant native, with large acorns up to 1.5" wide. Attractive rough deep texture ridged bark on trunk and limbs. Resists Oak Wilt.
Oak, Chinkapin <i>Quercus muehlenbergii</i>	Blk Land Edwards	L	Sun	D	50- 70+' H 30 - 40' W	Attractive, relatively fast growing, resistant to diseases/pests. Good fall color. Does best in well-drained soil, but adapts to others.
Oak, Live <i>Quercus virginiana</i>	Blk Land Edwards	L	Sun	E	40 - 60+' H 50+' W	Attractive wide-spreading tree. Susceptible to Oak Wilt. May require pruning. Can send up dense shoots from underground rhizomes.
Oak, Shumard <i>Quercus shumardii</i>	Texas	M	Sun P/Shade	D	50 - 90' H	Prefers well-drained soils. If planting from seed, seed source may determine success. Susceptible to Oak Wilt.
Palm, California Fan <i>Washingtonia filifera</i>	Adapted	M	Sun	E	40 - 60' H 20 - 30' W	Available from California/Florida nurseries. Drought tolerant when established but benefits with regular watering. Prefers moist soil and good drainage.
Pecan <i>Carya illinoensis</i>	Blk Land Edwards	H	Sun	D	80- 95+' H	State tree of Texas. Large landscape and commercial nut tree. Slow growing, needs deep soil to develop properly.
Pine, Italian Stone <i>Pinus pinea</i>	Adapted	L	Sun	E	30 - 50' H 20 - 40' W	Broad umbrella like canopy when mature. Pine nuts are edible. Slow growing so consider buying a large one.
Sycamore <i>Platanus occidentalis</i>	Blk Land Edwards	H	Sun P/Shade	D	60 - 90' H	Provide plenty of room and a moist site. Mexican Sycamore (<i>P. mexicana</i>) is more drought-tolerant.
Sycamore, Mexican <i>Platanus mexicana</i>	Edwards	H	Sun P/Shade	D	30 - 60' H 20 - 40' W	Resists bacterial leaf scorch and drought conditions. Prune to shape. Prefers moist deep soil. Fast-growing.



Texas Ash
Fraxinus texensis

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Escarpment Black Cherry
Prunus serotina

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Arizona Cypress
Cupressus arizonica

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Lacebark Elm
Ulmus parvifolia

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Eve's Necklace
Sapotea affinis

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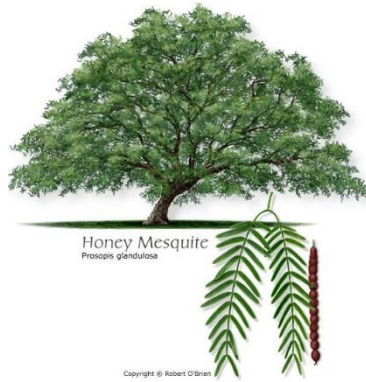
Goldenrain Tree
Viburnum parvifolium

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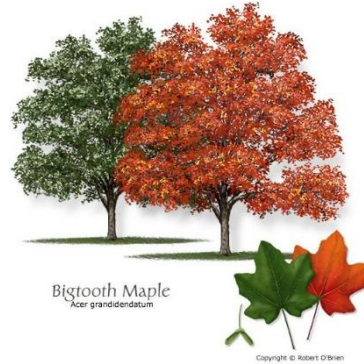
American Holly
Ilex opaca

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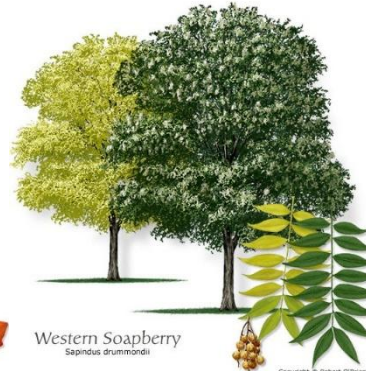
Honey Mesquite
Prosopis glandulosa

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Bigtooth Maple
Acer grandidentatum

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Western Soapberry
Sapindus drummondii

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Lacey Oak
Quercus laceyi

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Mexican Oak
Quercus polymorpha

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Texas Red Oak
Quercus buckleyi

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Texas Sabal Palm
Sabal texana

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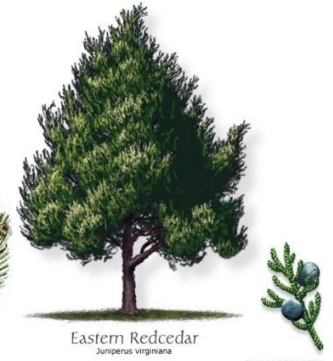
Mexican Pinyon
Pinus cembroides

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Pinyon Pine
Pinus edulis

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Eastern Redcedar
Juniperus virginiana

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Common & Scientific Name	Native to...	Water	Light	Leaf Type	Height Width	Notes
Medium Trees 20' - 40' but can be higher (Maximum height reflects ideal conditions)						
Ash, Texas <i>Fraxinus texensis</i>	Blk Land Edwards	L	P/Shade	D	30' - 45' H	Brilliant fall color. Very drought-tolerant with low water requirements. Prefers loamy, well-drained soils, but works on dry sites as well.
Black Cherry, Escarpment <i>Prunus serotina v. eximia</i>	Edwards	L-M	Sun P/shade	D	35 - 50' H 25 - 35' W	Attractive tree with spring flowers, showy fall color, interesting bark. Not for heavy, clay soils. Cherries edible if pitted, but not other parts.
Cypress, Arizona <i>Cupressus arizonica</i>	Texas	L	Sun	E	40 - 50' H 15 - 25' W	Often grown for Christmas trees or screening. Foliage is pale soft-textured, gray-green to blue-green. Well-suited to limestone soils.
Elm, Lacebark <i>Ulmus parvifolia</i>	Texas	L	Sun	D	30 - 40' H	Hardy tree with oval crown. Attractive mottled bark. Resists Dutch Elm disease. Also known as Chinese Elm. Avoid Siberian Elm.
Eve's Necklace <i>Sophora affinis</i>	Blk Land Edwards	L	Sun P/Shade	D	15 - 30' H	Light-green leaflets and fragrant, pink, wisteria-like blooms. Thin, scaly, reddish brown bark on older wood. Requires well-drained site.
Goldenraintree <i>Koelreuteria paniculata</i>	Adapted	L	Sun	D	30 - 40' H 25 - 35' W	Fast-growing flowering ornamental with fruit shaped like three-sided lanterns. May be invasive in rural areas. Needs well drained soil.
Holly, American <i>Ilex opaca</i>	Texas	M	Sun P/Shade	E	25 - 50' H	Use as a hedge, ornamental or shade tree. Plant away from walkways. Male/female required for berries. Berries are poisonous.
Honey Mesquite <i>Prosopis glandulosa</i>	Edwards	L	Sun	D	25 - 30' H	Very drought-tolerant native. Prune for strong branch/trunk structure. Has thorns, plant away from walkways. Considered an invasive.
Maple, Bigtooth <i>Acer grandidentatum</i>	Edwards	M	Sun P/Shade	D	30 - 50' H	Large shrub/small tree. Prefers moist well-drained soil. Ok in shady sites. Leaves turn bright red/gold in the fall. Bark dark brown/scaly.
Soapberry, Western <i>Sapindus drummondii</i>	Adapted	L	Sun P/Shade	D	10 - 50' H	Bright yellow fall color, amber berries in fall/winter. Distinctive gray, sculpted bark in the dormant season. Nuts used for soap substitute.
Oak, Lacey <i>Quercus glaucooides</i>	Edwards	L	P/Shade	D	15 - 50' H	Large shrub or medium tree. Some have multiple trunks. Leaves are peach-colored in spring/fall, dark-blue or grayish-green in summer.
Oak, Mexican White <i>Quercus polymorpha</i>	Texas	M	Sun P/Shade	D	40 - 55' H 30 - 50' W	AKA 'Monterrey Oak". Relatively fast-growing tree almost evergreen in this area. More resistant to Oak Wilt and other oak disease, pests.
Oak, Texas Red <i>Quercus buckleyi</i>	Blk Land Edwards	L	Sun P/Shade	D	30 - 50' H 20 - 45' W	Leaves turn deep shades of red in fall. Oak Wilt disease spread can often be linked to the movement of infected red oak firewood.
Palm, Texas Sabal <i>Sabal texana</i>	Texas	L	Sun P/Shade	E	30 - 50' H 15 - 18' W	Only palm tree native to Texas. Cold-tolerant. Can be hard to find nursery stock. Trunk up to 3 ft. diameter. Fan-shaped leaves.
Pine, Mexican Pinyon <i>Pinus cembroides</i>	Blk Land Edwards	L	Sun	E	15 - 30' H	Bushy evergreen, compact, rounded crown, blue-green needles. Good specimen tree or living Christmas tree. Needs good drainage.
Pine, Pinyon <i>Pinus edulis</i>	Texas	L	Sun	E	15 - 30' H	Seeds are edible. Curved green needles, twisting trunk. Requires good drainage; used as a living Christmas tree. Slow grower.
Red Cedar, Eastern <i>Juniperus virginiana</i>	Blk Land Edwards	L	Sun P/Shade	E	30 - 40' H	Pyramidal evergreen, aromatic, often used as windbreak. Foliage may vary in green shades. Females produce berries.



American Smoketree
Cotinus obovatus

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Anacacho Orchid Tree
Baobab conchata

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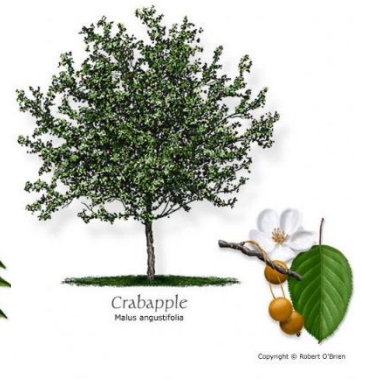
Bluewood
Condalia hookeri

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Mexican Buckeye
Ungnadia speciosa

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Crabapple
Malus angustifolia

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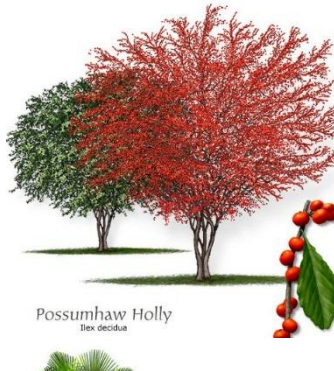


Crapemyrtle
Lagerstroemia indica

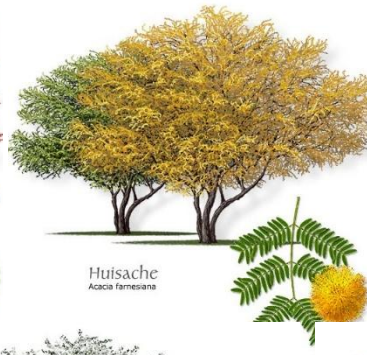
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Goldenball Leadtree
Leucaena retusa



Possumhaw Holly
Ilex decidua



Huisache
Acacia farnesiana



Jerusalem Thorn
Parkinsonia aculeata



Carolina Laurelcherry
Prunus caroliniana

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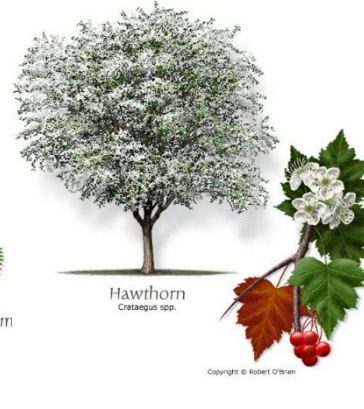
Texas Mountain Laurel
Sophora secundiflora

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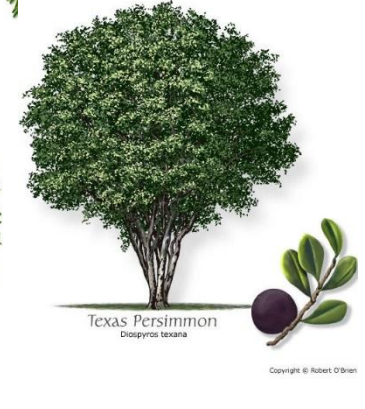
Windmill Palm
Trachycarpus fortunei

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Hawthorn
Crataegus spp.

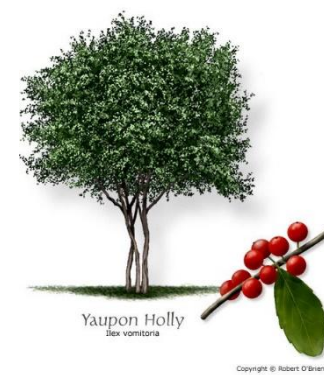
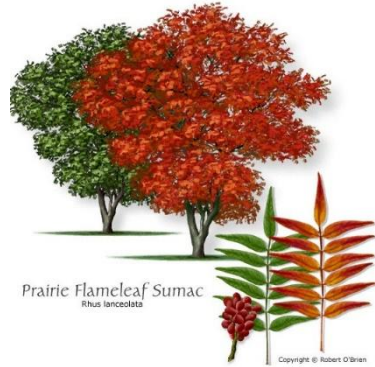
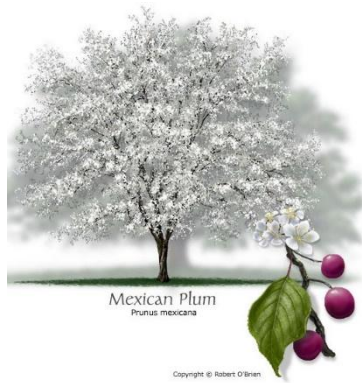
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Texas Persimmon
Diospyros texana

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Common & Scientific Name	Native to...	Water	Light	Leaf Type	Height Width	Notes
Small Trees--Large Shrubs (Maximum height reflects ideal conditions)						
American Smoketree <i>Cotinus obovatus</i>	Edwards	L	Sun P/Shade	D	15 - 20' H	Good for fall leaf color. May be hard to find in the nursery. Gnarled limbs and dark, flaking bark. Name comes from smoke-like fruit clusters with hairy stalks.
Anacacho Orchid tree <i>Bauhinia congesta</i>	Texas	L	Sun P/Shade	D	6 - 12' H	Delicate-looking native with showy flowers. Good understory tree. Prune to shape if needed. Protect from winter winds. Flowers attract butterflies/bees.
Bluewood <i>Condalia hookeri</i>	Edwards	L	P/Shade	E	12'+ H	Good tree for wildlife. Thorny, thicket-forming shrub or small tree with thin crown. Berries color range from green to red to black.
Buckeye, Mexican <i>Ungnadia speciosa</i>	Edwards	L	Sun P/Shade	D	10 - 25' H	Good specimen tree. Also used as an understory shrub but needs 1/2 day of sun. Not a true buckeye, but so named due to similar appearance of seeds.
Crabapple, Blanco <i>Malus angustifolia</i>	Edwards	M	Sun	D	12 - 20' H	Hill country native. White/pink fragrant blooms. Fall color mix of reds, oranges, yellows and purples. Protect from deer. Apples can be made into preserves.
Crapemyrtle, Common <i>Lagerstroemia indica</i>	Edwards	L-M	Sun	D	12 - 20' H	Many sizes and colors available, but 'National Arboretum' cultivars are excellent choices. Prefers moist soil.
Goldenball Leadtree <i>Leucaena retusa</i>	Edwards	L	Sun P/Shade	D	12 - 15' H	Can be invasive by spreading from seed into the surrounding landscape. Small, understory tree with 1" round globe-like fragrant blooms.
Holly, Possumhaw <i>Ilex decidua</i>	Blk Land Edwards	M	Sun P/Shade	D	12 - 20' H 12' W	Striking native plant. Choose female plants with red berries. Similar to Yaupon Holly but loses leaves in winter. Tolerates poor drainage. Prune to shape.
Huisache <i>Acacia farnesiana</i>	Texas	L	Sun	D	15 - 20'+ H	Tough native tree with sweet-smelling spring flowers. Drought tolerant, prune to shape if needed.
Jerusalem Thorn <i>Parkinsonia aculeata</i>	Blk Land Edwards	M	Sun	D	12 - 20'+ H	Provides sparse shade, but suited to hot, dry locations. Used as an ornamental and hedge plant. Fragrant flowers. Difficult to control in moist soils.
Laurelcherry, Carolina <i>Prunus caroliniana</i>	Blk Land	M	Sun P/Shade	E	15' - 25' H	Showy, attractive, fast growing, evergreen screening tree or hedge. Needs well-drained soil. Plant contains hydrocyanic acid and should not be eaten.
Mountain-Laurel, Texas <i>Sophora secundiflora</i>	Edwards	L	Sun P/Shade	E	12 - 20' H	Excellent drought-tolerant specimen. Outstanding purple flowers with grape bubble gum fragrance. Seeds are toxic.
Palm, Windmill <i>Trachycarpus fortunei</i>	Adapted	L	Sun P/Shade	E	20 - 25' H 7 - 10' W	A small palm for use in small spaces, or close to the shore. Can be heavy feeders.
Hawthorn <i>Crataegus</i> ssp.	Texas	M	P/Shade	D	20 - 25' H 7 - 10' W	Texas native. Small fragrant flowers turn to bright red berries which are eaten by wildlife. Fall leaf color is red. Some varieties are thornless.
Persimmon, Texas <i>Diospyros texana</i>	Edwards	L	Sun P/Shade	D	12 - 20' H 8 - 12' W	Drought-tolerant, multi trunked, attractive exfoliating bark. Don't plant female trees near walkways as fruit can be messy. May require pruning to shape.

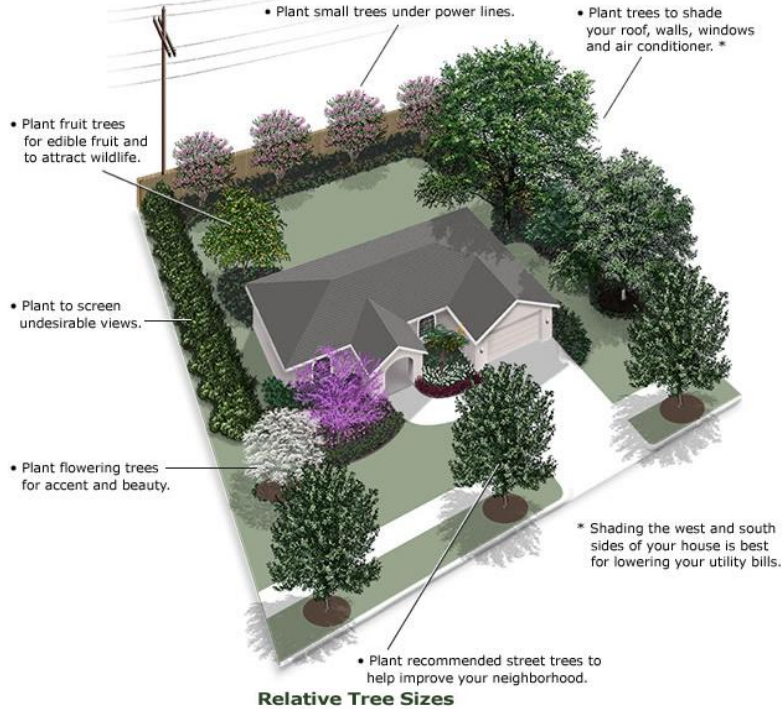


Common & Scientific Name	Native to...	Water	Light	Leaf Type	Height Width	Notes
Small Trees--Large Shrubs Continued (Maximum height reflects ideal conditions)						
Plum, Mexican <i>Prunus mexicana</i>	Blk Land Edwards	L	Sun P/Shade	D	15 - 20' H 15 - 20' W	Good fall color, yellow to red to purple. Prefers well-drained soils. Good understory tree. Can be pruned to shape. Fruit edible. Plant away from walkways to avoid mess.
Redbud, Mexican <i>Cercis canadensis</i> var. <i>mexicana</i>	Edwards	L	Sun P/Shade	D	10 - 15' H 10 - 15' W	Early spring bloomer. Mexican variety has small wavy leaves. Good for dry locations. Needs well-drained site. Prune to shape.
Redbud, Texas <i>Cercis canadensis</i> var. <i>texensis</i>	Edwards	L	Sun P/Shade	D	15 - 25' H 10 - 15' W	Early spring bloomer. Texas variety has leaves that are larger and less wavy. Prune to shape. Needs well-drained site.
Rusty Blackhaw <i>Viburnum rufidulum</i>	Blk Land Edwards	M	Sun P/Shade	D	10 - 25' H 10 - 15' W	Excellent specimen tree. Good understory tree w/showy flowers. Prune to shape after blooming. Yellow, orange, and red fall color. Prefers deep soil with good drainage.
Sumac, Prairie Flameleaf <i>Rhus lanceolata</i>	Blk Land Edwards	L	Sun P/Shade	D	10 - 20' H 12 - 20' W	Root sprouts and suckers require regular maintenance to keep tree shape. Give lots of space as thicket-forming suckers can go out 20'. Except for suckers, no pruning necessary.
Texas Madrone <i>Arbutus xalapensis</i>	Edwards	M	Sun P/Shade	E	20 - 30' H	Drought-tolerant with striking flowers, bark, and red or orange berries. Multi-trunked exfoliating outer bark reveals polished, red, inner bark.
Texas Pistache <i>Pistacia texana</i>	Edwards	L	Sun P/Shade	E	10 - 25' H	Fruits are a preferred wildlife food. Can be single or multi-trunked, with irregular form. Usually evergreen. Needs good drainage.
Vitex Chaste Tree <i>Vitex agnus-castus</i>	Adapted	L	Sun P/Shade	D	10 - 15' H 10 - 15' W	Aka Texas Lilac. Designated A&M Texas Superstar. Multi-trunk with large spikes of purple blooms from May to frost. Sap is a skin irritant. Can be invasive in limestone outcroppings and dry creek beds.
Walnut, Texas <i>Juglans microcarpa</i>	Edwards	M	P/Shade	D	15 - 25' H	A small version of the black walnut. Nuts are mostly shell. Works well as a highway planting or in a park setting. Used as an ornamental and as a small shade tree.
Willow, Desert <i>Chilopsis linearis</i>	Edwards	L	Sun P/Shade	D	15 - 25' H 10 - 20' W	Open, airy tree creates light shade for planting underneath it. Trumpet-shaped, 3" long flowers. Needs well-drained soil. Prune for shape and remove suckers if needed.
Yaupon Holly <i>Ilex vomitoria</i>	Edwards	L	Sun P/Shade	E	20 - 25' H	Landscape plant with shiny green leaves and red berries. Native Americans used the plant to make a tea containing caffeine. Prune into a shrub, hedge or tree.

General Tree Planting Instructions

1. Select the Tree Location and Size:

Landscaping Around Your House



Relative Tree Sizes

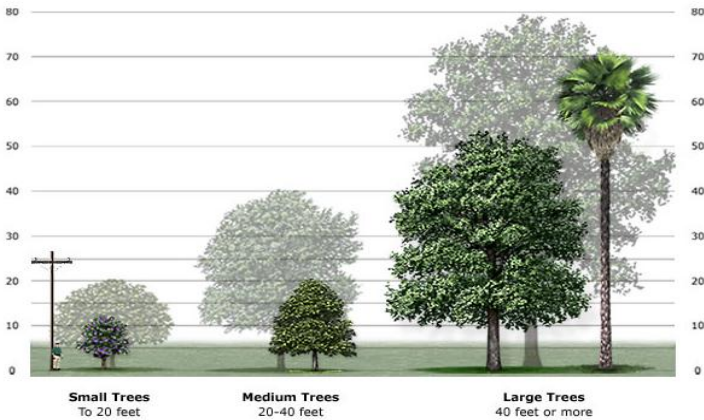
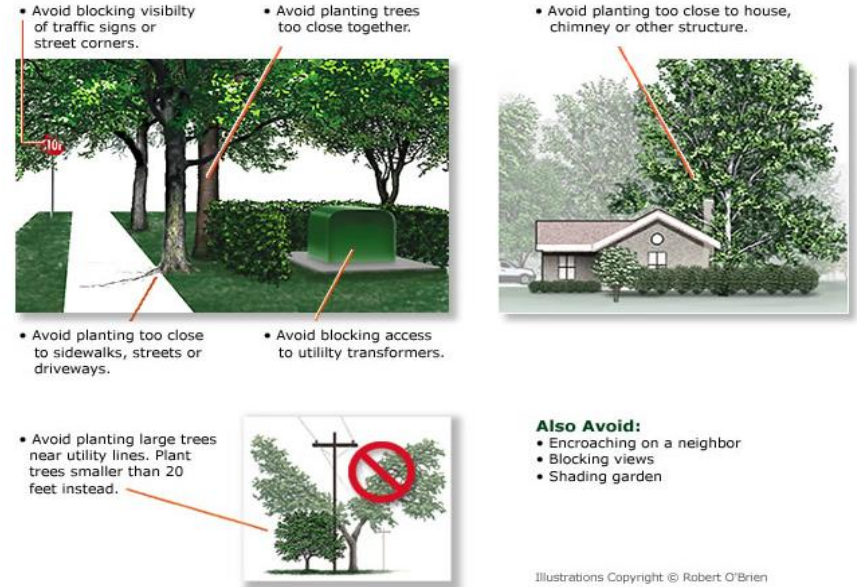


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Avoiding Problems With Your Tree



- Also Avoid:**
- Encroaching on a neighbor
 - Blocking views
 - Shading garden

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Planning for Your Available Space

Plan your planting to ensure enough growing space is available for your tree at its mature height and spread. View the tree description page for your chosen tree to determine its size at maturity.

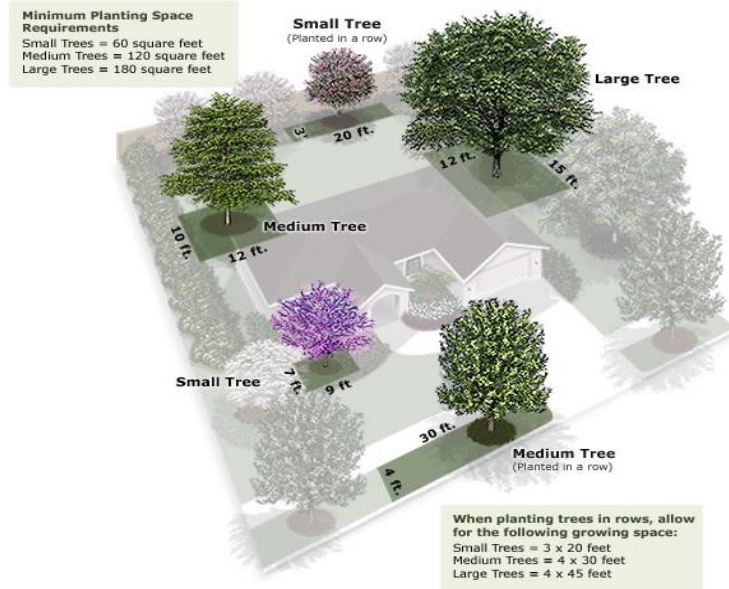


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2. Choose quality nursery stock:

A High Quality Tree Has:

- Enough sound roots to support healthy growth.
- A single, central trunk or leader
- A trunk free of mechanical wounds and wounds from incorrect pruning.
- A strong form with well-spaced, firmly attached branches.
- Leaves with good color and no obvious insect or disease damage
- Healthy form

What to look for:



A Low Quality Tree Has:

- Crushed or circling roots in a small root ball or small container.
- A trunk with wounds from mechanical impacts or incorrect pruning.
- A weak form in which multiple stems squeeze against each other or branches squeeze against the trunk.

What to avoid:



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Bare Root: Bare root trees have no soil around their roots. The maximum height is usually 6 to 8 ft. Bare root stock must be planted in early spring while dormant. Roots have to be protected from drying out before planting. Bare root is the most economical way to purchase trees/shrubs.

Balled and Burlapped (B&B): Large trees are often sold balled and burlapped and are the most expensive. The root ball is dug up and wrapped in burlap and sometimes supported with wire baskets. They can be planted anytime but care is needed in the hot summer months. Be sure to check for and avoid circling or girdling roots.

Container Grown: The trees have usually been grown in a container for 1-2 seasons and have developed a root system. Usually smaller in size and lower in price than B&B stock. The planting times are the same as for B&B stock. Be sure to check for a healthy root system and avoid circling roots. Try to avoid trees in containers for more than two seasons as it can cause circling roots. Lay the tree and container on its side, tap container sides and bottom to loosen. Slide the root ball out to inspect. Do not pull the tree straight up out of the container by the trunk. Look for plants that have good leaf color and no damage to the trunk or signs of disease.

3. Soil drainage percolation test: Some native and drought tolerant trees and shrubs will not tolerate poorly draining soil. Soil that remains saturated 1-2 days following a heavy rain is considered poorly draining. For poorly draining soils, refer to the Water section in the tree tables in this guide and choose varieties with high water needs.

To test drainage, dig a hole where the tree will go, 12" wide and 12" deep with straight sides and a flat bottom. Fill the hole with water and let it sit overnight for the most accurate result. The next day, fill to the top of the hole and measure the water level drop per hour. 1"-3" drop per hour is acceptable while 2" is ideal and will work for low and medium water need trees. If less than 1" per hour, soil is considered poorly draining.

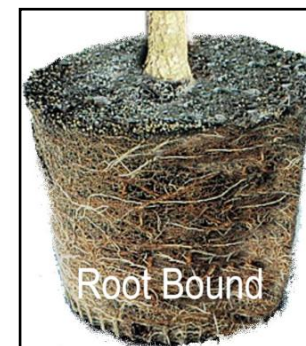
For poor draining soil, choose another location or use a raised bed, berm, or mound above the present soil line. Prepare raised beds by bringing in or scraping up topsoil into a 10 -12-inch-high mound, 6 - 8 feet across depending on tree size. Break up the soil under the raised bed.



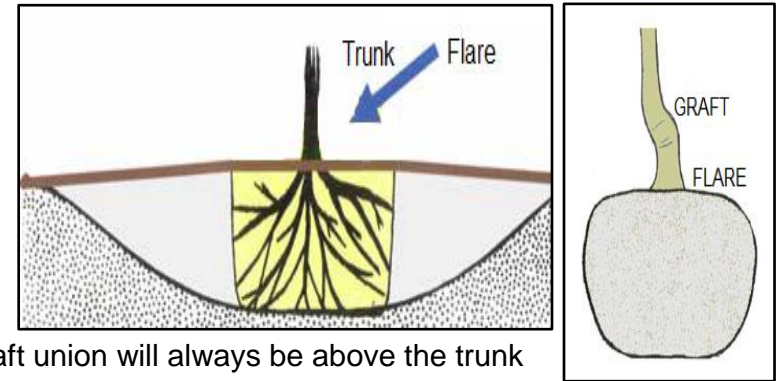
Always use the soil from that location if possible. If the soil is not from that location, mix or roto-till it and the location soil together to minimize root-soil interface issues. Do not add fertilizer or compost to the soil. The fertilizer will stop the roots from spreading beyond the bed. The compost will be quickly used up causing the soil volume to shrink and the tree to be lower to the ground. A raised bed can be framed with edging timbers or landscape blocks for a more attractive appearance.

French drain: A French drain is a trench filled with gravel or rock or containing a perforated pipe that redirects surface water and groundwater away from an area. Consult your neighbors to avoid problems if the redirected water will go their way.

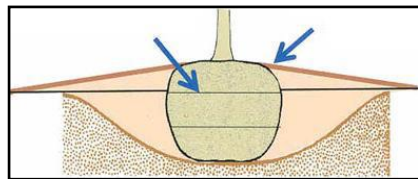
4. Checking the root ball: Always check the root ball before purchasing the tree. Circling, girdling, diving and kinked roots in the pot lead to poor health, blown-down trees and short life spans. Nurseries usually repot trees into larger containers as the trees grow. If left too long in a pot before being repotted, then the above issues can occur. First, check to see if the trunk flare is visible in the container. If not, brush away the top 1-2 inches or so of soil to see where the woody roots start. If you have to go deeper than this, the tree was planted too deep. If the top roots are growing in a circular manner, find another tree. Lay the tree on its side, tap and loosen the container to pull it away from the root ball. Do not pull the tree up from the container by its trunk. If the nursery won't let you inspect the roots, go somewhere else. Look for circling roots, root bound, or brown roots which are dead or diseased. Small flexible circling roots can be unwrapped and straightened. But if the root is not flexible, it will need to be severed so the cut end is pointing outward. Diving roots need to be cut at the point just before they turn downward so they point outward. Because of the time and effort involved over the years in planting, growing and caring for the tree, its best not to buy one with problems at the start only to have it die in 5-10 years.



5. Planting hole size and shape: The hole should be 2-3 times the diameter of the root ball and 1-2" less in depth than the root ball's height so the tree's trunk flare is above grade level when planted. Roughen the sides and bottom of hole if it looks slick or smooth. The trunk flare is a slight widening of the trunk above ground where it meets the soil and the roots begin. If it is hard to find, it will be just above where the first root emerges from the trunk. Burying or covering the trunk flare when planting can damage and even kill the tree over time. If the flare is not visible in the container grown or B&B tree, remove the excess soil on top of the root ball until it is exposed before planting the tree. If the tree has been grafted the graft union will always be above the trunk flare. The graft union can look like a swelling, crook or offset in the trunk. Plant the root ball so the trunk flare is 1-2" above ground.

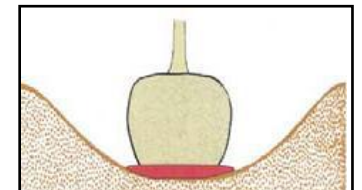


On thin soil such as in the Edwards Plateau, dig a saucer shaped hole 3-4 times the root ball width. On deeper soil such as Blackland, dig a saucer shaped hole 2-3 times the root ball width. In Edwards Plateau soil, if caliche is at the bottom of the hole, it should be busted up to allow some root penetration which can help aid the tree's stability. Ensure that the root ball is sitting on firm soil on the bottom and will not sink.



In heavy clay soil such as Blackland Prairie, a tree that does not tolerate wet feet may have to be planted shallower in depth if drainage is an issue. Make the hole a little wider and taper the backfill soil from the outer edge of the hole up to the top edge (knee) of the root ball. A raised bed or berm may also be used. Plant so the first level of primary lateral roots is below the soil surface at the top of root ball. Avoid digging the hole if the soil is wet. If the sides of the hole are smooth, glazed or shiny from digging, roughen them up with the shovel to allow for easier root penetration. Roots can penetrate crevices, fissures and roughened surfaces easier than smooth or glazed surfaces. Modifying the soil by adding expanded shale can also loosen and aerate heavy clay soils allowing them to breathe and drain better.

6. Planting the tree and back filling the hole: Hold the tree by the root ball (not the trunk) to avoid root damage and place the tree in the center of the hole. The soil in the center should be firm enough that the tree will not sink. Measure to ensure the root flare is 1-2" above the soil. A small ring of backfill soil placed around the base of the root ball at the bottom will help stabilize it.



Avoid tree root issues: Tree roots grow much more horizontally than vertically, and a root system normally extends well beyond the width of the canopy to catch rainwater. Roots responsible for nutrients and moisture are usually just 8" to 12" below the soil. Keep this in mind when deciding where to plant a tree because of where the tree roots might go. Don't plant close to septic fields, underground utilities, foundations, patios, buildings, driveways, sidewalks, walkways or other structures.

Use only the native soil that came from the hole for backfilling: Do not amend the backfill soil with compost, manure or fertilizer amendments. Research has found that amending with fertilizers can harm the tree long term. All newly planted trees experience transplant shock. Amendments that stimulate growth will increase rather than decrease shock and can affect root

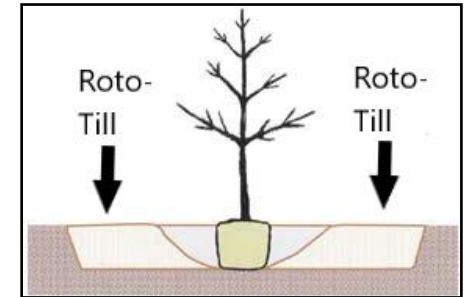


Girdling Roots

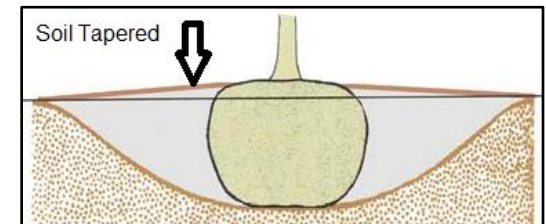
development adversely. In richly amended backfill soil, the roots tend to grow and circle in the planting hole where the nutrients are rather than growing outward into the less rich native soil. The circling or girdling roots that are formed will continue to grow in that circular pattern even after the amendments are gone. This can stunt growth and make the tree easier to be blown over in a windstorm. If the root girdling is severe enough, it can compromise a tree's health and kill the tree.

In unamended native soil, the roots grow outward, rather than circling in search of nutrients. This outward root growth stabilizes the tree as nature intended and helps ensure adequate nutrient and water for future growth. The one exception to modifying backfill soil is to add expanded shale to heavy clay soils in the Blackland Prairie area. Expanded shale does not add nutrients but will loosen and aerate heavy clay soils allowing them to breathe and drain better which aids root development.

Heavily compacted soil: If the soil is heavily compacted, it may help to dig or roto-till a ring around the planting hole, 4-5 times the width of the root ball diameter after the tree is planted. This can help roots spread into the surrounding compacted soil better. This should be done after planting is completed so the soil is not compacted again by foot traffic during the planting process.



When backfilling the planting hole, add some soil, then water and repeat. This process settles the soil better than packing and removes voids. Do not cover the top of the root ball with soil. Instead taper the soil from the edges of the planting hole to the round top edge (knee) of the root ball.



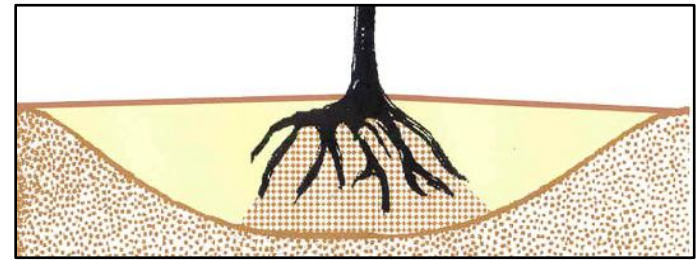
7. Planting bare root trees: If possible have the planting hole ready before the bare root tree arrives. Bare root trees should be planted as soon as possible after you receive them.

Keep them covered and moist until ready to plant. Left exposed to air and sun, roots can dehydrate and die in as little as 30 minutes and tiny feeder roots in just minutes. If the plant starts leafing out, it must be planted immediately as survivability will drop rapidly.

Heeling in: If planting will be delayed for more than a few days after receiving the bare root trees, they can be heeled in until time to plant. Dig a shallow hole (or a trench if there are several trees) in a shady location and protect from freezing. Lay the trees on their side at 90° angle with the roots in the hole or trench and cover the roots with soil. Keep soil moist, but not wet. A 3" layer of mulch over the soil will help keep the moisture in. A wheelbarrow can also be used for heeling in and moved to a shady location where protected from freezing. Put some soil in the bottom, add the trees and cover the roots with soil and mulch.



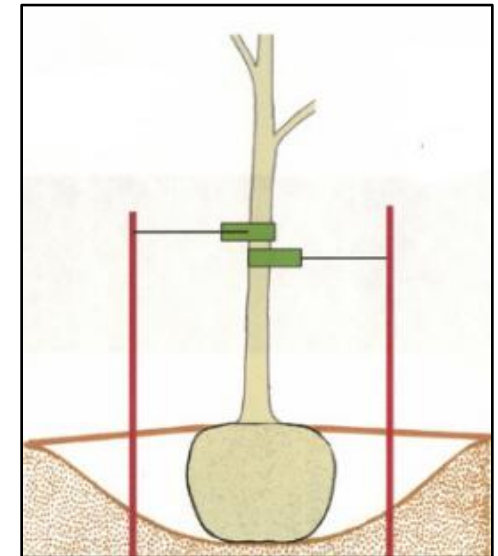
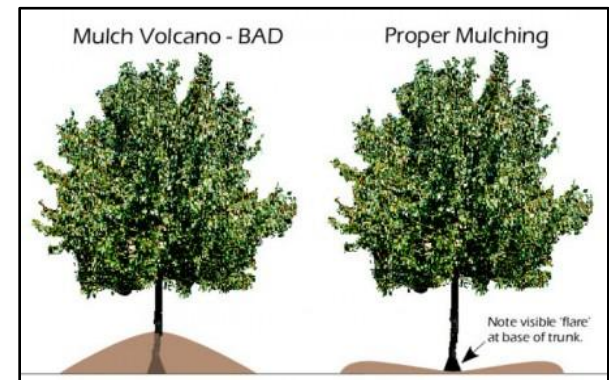
Make a soil mound for bare root trees: When ready to plant, unpack a tree and measure root spread. Dig a saucer shaped planting hole, three times the diameter of the root spread. The hole should have a mound of firmed soil in the middle on which the roots will be spread. Adjust the mound as needed so that at least two structural roots are within the top 1-2 inches of the soil surface. Spread roots on the soil mound and backfill, lightly packing soil around the roots. Pay attention to the correct planting depth of the tree. Add soil and water alternately to backfill the hole. The trunk flare should be 1-2" above grade. Taper the backfill soil from the edge of the hole up to the trunk flare. Trees over 3' high are usually staked. Mulch the disturbed soil around the tree, up to but not touching the trunk. Not sure if your bare root tree is still alive? Use your thumbnail to scratch a thin sliver of bark off on a branch. If there is a thin layer of green under the bark, the branch is alive.



8. Mulching: Spread mulch 3-4" deep over the area where the soil was disturbed. Keep mulch 2" away from the trunk. Wood chips, pine bark or needles, leaf litter and hay (without herbicides) are great mulches. Mulching keeps soil temperature steadier, boosts soil moisture retention and keeps competing weeds and grass at bay. Construct a mulch berm around the outer edge of the mulch bed to help contain water.

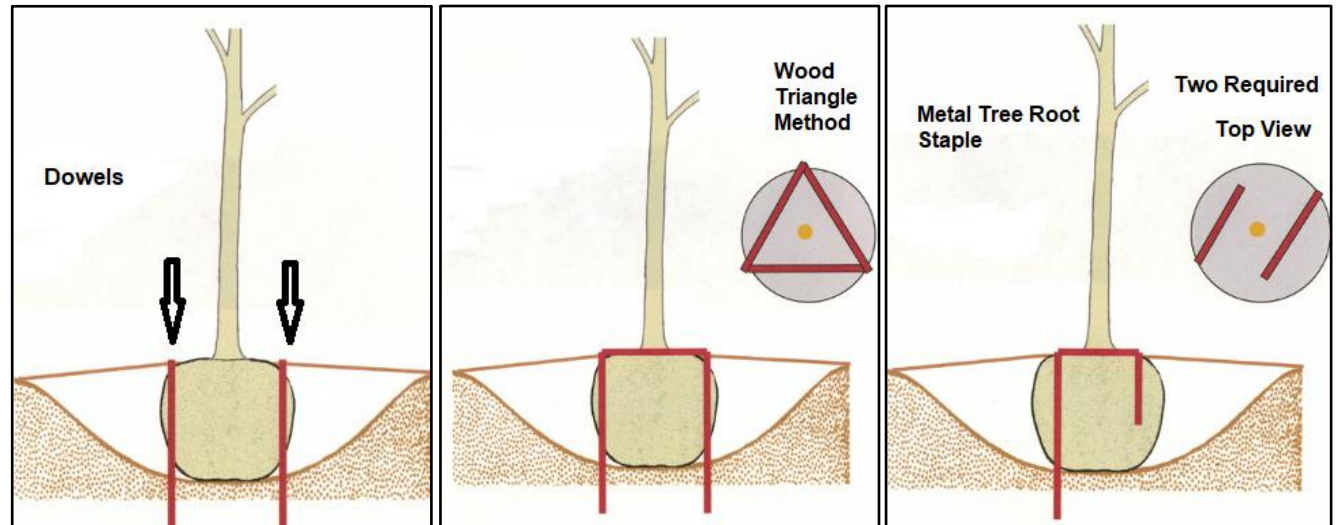
9. Staking: Bare root trees over 3' high need staking, but properly planted container and B&B trees usually do not. Stake the tree only if necessary. Improper staking can harm tree bark, retard tree root spread, affect the tree trunk taper and make tree more storm damage prone. In many home landscape settings, no staking is necessary if the tree is set on undisturbed soil (where it cannot sink and tilt), with soil firmed around the base of the root ball before backfilling. Exceptions to this are if the tree needs protection from human activities, there is high wind in the area or the tree has a floppy tall trunk that is not self-supporting.

Above ground staking: For small to average-sized trees (up to 10-12 feet in height), wooden stakes are enough. Use 2X2 stakes, 5 feet long. For larger or heavier trees, or trees in particularly windy situations, metal fence stakes may be necessary. Drive 2 stakes into the ground, at least 15-18 inches away from the trunk. Connect to the tree using wide flat straps to reduce bark damage. Do not stake rigidly. It is best if the trunk has some flexibility to move. Wind movement encourages root growth and trunk taper development. Never tie a post to the trunk as it can cause the trunk to grow at a tilt due to shading the sun on the side where the stake is.



Underground stabilization: There are 3 common underground stabilization methods. They are done prior to backfilling the planting hole.

1. Two or three wood dowels driven into the ground at the edge of the root ball.
2. A 2x2 wood triangle over the top of the root ball is screwed into 2x2 wood stakes driven into the ground at the edge of the root ball. The wood will decompose over time.
3. Two metal root staples.



The long leg of the staple goes into the ground at the edge of the root ball. The short leg of the staple goes into the root ball. The metal staple may pose a problem if the tree stump needs to be ground out in the future

10. Watering and fertilizing: Trees vary in their water requirements, so refer to the tree's water needs in this document. As a general rule unless noted otherwise, for the 1st 2 weeks after planting, water daily with 1 gallon per inch of trunk diameter. Then water weekly with 7 gallons per inch of trunk diameter for the 1st year. Trees listed in this guide with high water needs may need regular watering for the second year as well to aid in root establishment depending on rainfall and type of soil. More water may be needed in the spring and summer and during drought conditions and less needed when the tree is dormant. Fruit and nut trees may need extra water when the fruit or nut is developing. Your type of soil, the weather and the water needs of your tree will determine how much water is needed.

Deep Watering: The goal is to get the soil moist 8"-12" deep. Avoid light, frequent watering as it encourages roots to come too close to the surface. Generally, 1" of water can wet soil to 12" deep if there is no runoff. Shallow rocky soils may require less water and clay soils more water depending on soil dryness. To test soil moisture, poke a long 8" screwdriver into the soil. If you can't poke it in at least 6" because of dry soil, then it's time to water. Don't overwater. Most roots responsible for water and nutrient intake are within 8"-12" of the soil surface. Roots require that oxygen be present in the soil in order to take in the water. If the root area is saturated in water, then no oxygen is present and the roots can suffocate.

Fertilization: Refer to the fertilizer recommendations for your specific tree. Generally, the tree is never fertilized the day it is planted. The tree's biggest need at first is getting established and developing/expanding its root system and overcoming transplant shock. Water is much more important at this stage than fertilizer for the first growing season. There is usually enough potassium in our Williamson County soil for good root development and plant health. During the second growing season, a light application of nitrogen

fertilizer can be put around the drip line, but not the base of the tree. Don't allow fertilizer to touch the trunk as it can burn it. If you are unsure what your soil needs are, do a soil test as adding too much of a nutrient can be as detrimental to growth as not having enough.

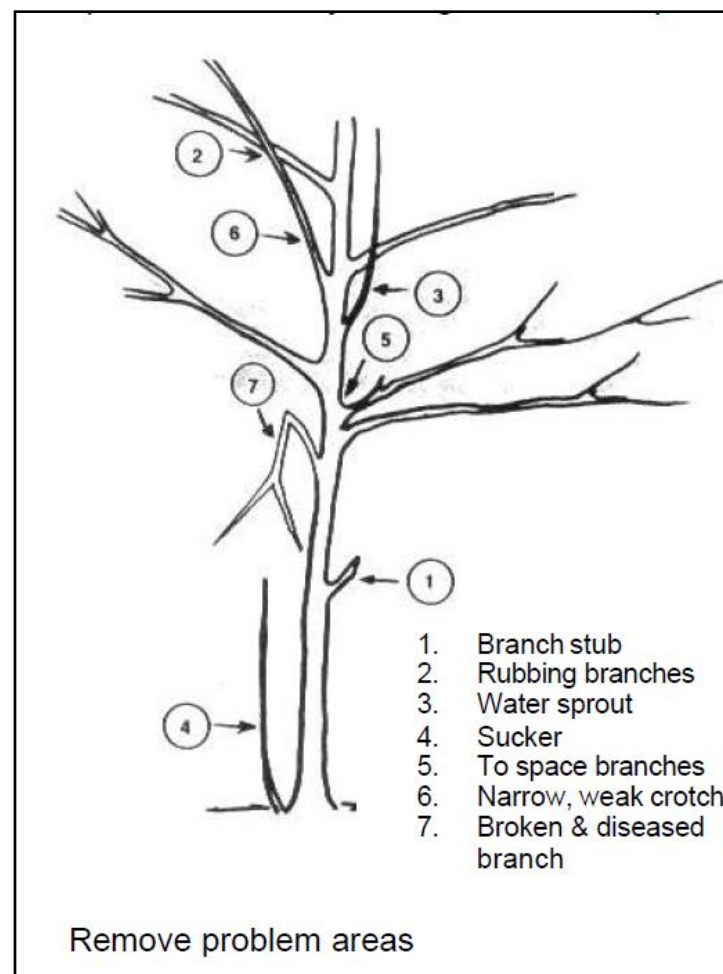
11. Pruning landscape trees and shrubs: Always have a plan in mind when pruning. Having second thoughts after a branch is already cut off is too late. The primary reason to prune landscape trees and shrubs is to remove dead, broken or rubbing branches or branches deemed hazardous due to location. The second reason for pruning is to make training or corrective cuts. These are usually done to develop a desired shape, to fill in an open area caused by storm or wind damage or to keep it in bounds to fit a given area. To properly train a plant, one should understand its natural growth habit. Avoid destroying the natural shape or growth habit when pruning. If you do, closely monitor the plant because it will in time try to revert to the more natural growth habit.

Corrective pruning cuts can be made to eliminate weak or narrow branch crotches and remove the less desirable leader where double leaders occur. After these cuts have been made, stand back and take a look at your work. Are there any other corrective pruning cuts necessary? If the amount of wood removed is considerable, further pruning may need to be delayed a year. Remove water sprouts unless needed to fill a hole or to shade a large limb until other branches develop. If the water sprouts are not needed, remove them. Make the cut as close to the trunk or limb as possible so no stubs are left and the chance of additional sprouts arising from the adventitious buds near the wound is reduced.

Pruning newly planted trees: The only pruning that should be done is to remove dead, broken, rubbing or overlapping branches. All other pruning should be withheld until the second year when the tree has recovered from the stress of transplanting.

When to prune: There is never a bad time to remove dead, damaged or diseased branches. Most trees benefit from pruning in mid to late winter as pruning during dormancy encourages new growth in the spring. There are exceptions with some flowering trees and shrubs as noted below, but generally avoid pruning after new growth appears in the spring. Food stored in roots and stems is used in developing that new growth. This food should be replaced by new foliage before it is removed; if not, future growth may be stunted. Limit the amount of pruning in late summer as this may stimulate new growth which won't have time to harden before winter arrives.

Pruning fruit and nut trees: Fruit and nut trees use different pruning techniques than landscape trees and shrubs. Fruit trees are commonly pruned every year to maximize fruit production and some to maintain certain shapes. Landscape trees on the other hand



should only be pruned when needed. For additional information on fruit and nut trees, see our Fruit and Nut Tree Selection and Planting Guide available at the Williamson County Extension Office.

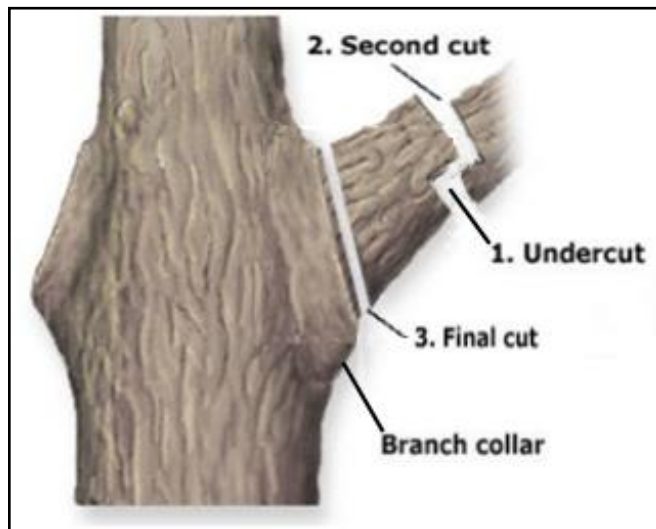
Pruning flowering trees and shrubs: Spring-flowering trees and shrubs usually bloom on last season's growth and should be pruned soon after they bloom. This allows for vigorous summertime growth and results in plenty of flower buds the following year. Pruning these plants in the fall or winter will remove flower buds and reduce spring flowering. Some trees and shrubs that bloom after June usually do so from buds which are formed on shoots that grow the same spring. These shrubs should be pruned in late winter to promote vigorous shoot and bud growth in spring.

Painting pruning cuts and wounds: It is not recommended to paint pruning wounds or cuts on any type of tree, except for oaks. University research shows that painting pruning cuts interferes with the tree's natural wound healing process and in some cases increases the chance of infection or rot.

Pruning oak trees: Avoid pruning oaks from **February 1 through June 30** due to the threat of Oak Wilt Disease. The Nitidulid Beetle which spreads the disease is most active in this area at this time. The tiny beetles are drawn to the cuts by the sweet smell of the fresh sap. The beetle can fly up to one mile and smell oak sap a ¼ mile away. Note the size of the 2 beetles in the image in relation to a dime.



The rule not to paint pruning cuts does not apply to oak trees. Always paint pruning cuts or wounds on any type of oak tree when they occur due to the danger of Oak Wilt disease in this area. Any type of latex paint will work. Special tree wound paint is not necessary. Paint the inside and outer edge of the cuts immediately after pruning including any wounds that occur on the tree.



Pruning a large limb:

First cut. Make an undercut 12" from the branch collar to prevent bark tearing when the limb drops.

Second cut. Make the second cut from the top all the way through the branch, 2" above and past the first cut.

Final cut. The final cut should be made just beyond the branch collar so a stub isn't left. Support the stub being cut off so it does not tear the bottom bark when it drops. Be sure not to cut into the branch collar as it helps protect against decay and rot. The branch collar is a slightly swollen area that forms at the base of a branch where it is attached to the tree's trunk or another branch.

Pruning small branches and twigs: Branches and leaves always grow out of a bud in the direction the bud is pointing. When pruning back to a lateral bud, choose a bud that is pointing in the direction you want the new growth to go. Be sure not to leave a stub over the bud or cut too close to it and damage it. Make a slanting 45 degree pruning cut 1/8"-1/4" away from the bud. Making slanting cuts prevents water from collecting in the cut and expedites wound healing.

When cutting back to an intersecting or lateral branch, choose a branch that forms an angle less than 45 degrees with the branch to be removed. The branch you cut back to should also have a diameter at least half that of the branch to be removed. Make a slanting cut and remove the branch about 1/8"-1/4" from where the other branch begins.

Examples: (The black line is the cut line and the arrow points to the branch angle.)

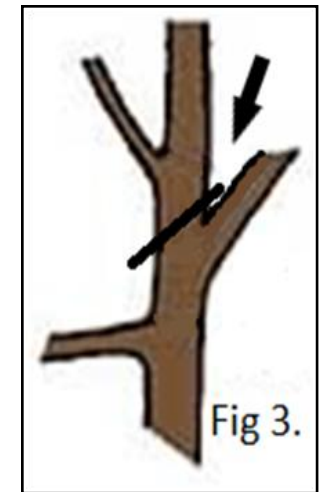
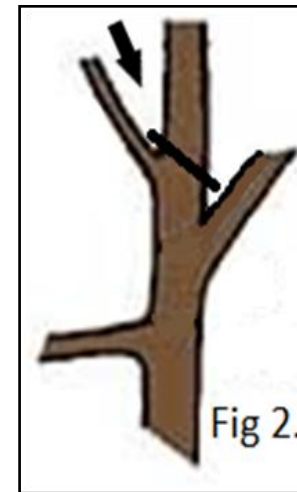
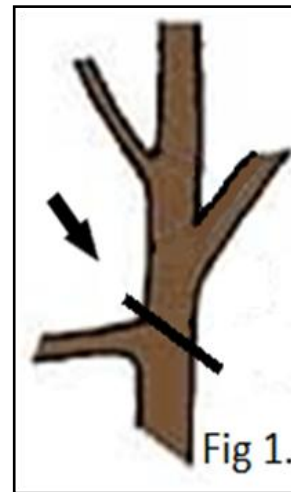
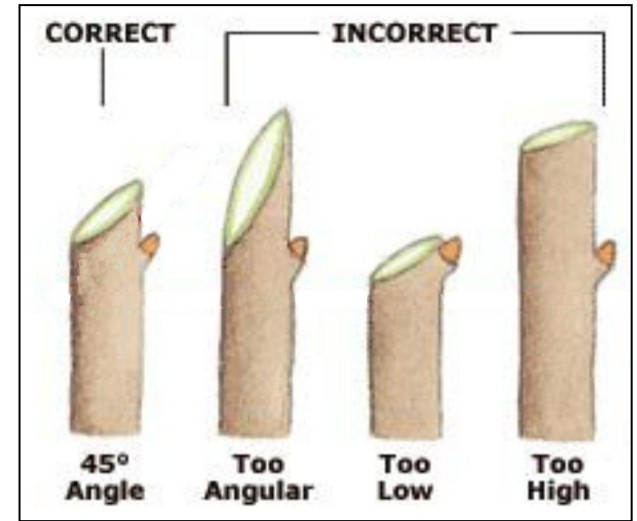
Fig 1. Making a cut here isn't recommended as the branch angle is too large. The branch that would grow out on the left would be weak and could easily break.

Fig 2. The branch angle is good, but the branch that is left is too small in comparison to the main branch. It should be at least half the diameter of the branch that is removed.

Fig 3. The branch angle is good and the branch that is left on the right is at least half the size of the branch that was removed.

Terminal and lateral buds: Terminal buds are on the ends of each limb and help control its growth outward. They also suppress the growth of the lateral buds on that limb so there is orderly leaf and branch growth. Lateral buds are further back on the limb and those will make future leaves and branches. Damaging or removing the terminal bud at the end of the limb may make the limb bushier.

Disinfecting pruning tools: Disinfecting your pruning tools is a good way to prevent the spread of disease-causing pathogens in your landscape. Cleaning and disinfecting are two different things. Cleaning involves removing soil and debris and should be done before you disinfect your tools. Soil and organic matter residues can reduce the effectiveness of your disinfectant. Before disinfecting, always clean to remove dirt, debris, or sap by wiping your tools with a damp cloth or paper towel. Household disinfectants are common in many homes and most aren't corrosive. Chlorine bleach and 70% rubbing alcohol are also found in most homes. Follow the product label instructions for disinfecting. After disinfecting, ensure tools are dry then apply a light coat of oil to the metal parts to retard corrosion.



Sources

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Native Plant Society of Texas <https://npsot.org/wp/wilco/faqs/what-plants-are-native-to-williamson-county/>

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