

Texas Agricultural  Extension Service

# Home Nut Production

# Pecans

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The pecan is the Texas State tree, being native to about 150 counties and capable of growing and producing in all Texas counties. The tree is popular for landscaping and as a source of nuts. Proper attention to cultural requirements and pest control will help to assure a long and productive life for home pecan trees.

## Soil and Site Requirements

Pecans are native to river and creek bottoms, the soils of which are deep, fertile and well-drained and have substantial water-holding capacity. Pecans require at least three feet of well-drained soil above the minimum depth of the water table to develop a strong root system. Pecans planted on shallow soils having poor internal drainage never develop into large, productive trees.

Attempts to modify shallow, poorly drained soils by digging large planting holes and filling them with topsoil, seldom work. At best, this is only a short-term solution. Often the topsoil-filled hole will retain excess water causing the tree to grow poorly or die.

The planting site should have good surface and internal drainage, receive full sun and be at least 30 feet from a building, other trees or a power line.

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## Purchasing Trees

Nursery trees are available as either container grown, bare root or large tree transplants. Purchase trees from a reliable nursery source. Avoid "bargain" trees from outlets not equipped to provide good protection from excessive heat, drying and freezing. Purchase trees as soon as they are available at a local nursery or order them at least six months ahead of planting from a reputable mail order nursery.

### Bare Root

These trees are the most common pecan nursery trees in Texas. They can be difficult to transplant and need careful handling to prevent transplanting death or slow growth. Protect their roots from freezing and drying. Tree size is important; avoid trees smaller than 4 feet tall, and more than 8 feet tall.

### Container Grown

These trees are usually smaller, can be planted anytime and are better bets to live and grow well. Container trees are growing in popularity but are less available.

### Large Tree Transplanting

A significant number of large mechanically dug pecan trees have become available in Texas in the last 10 years as commercial orchards thin out trees to correct crowding problems. The purchaser feels that these trees will provide "instant landscaping"; however, this is seldom the case. They require excellent

soil, very frequent irrigation and seldom shorten the development time over bare root trees. Large transplanted trees are also expensive.

## Varieties and Seedlings

Pecans do not come true from seed, and every native or seedling pecan tree is distinctly different from the seed parent. Over the years, more than 1,000 pecan seedlings have been named and grafted as varieties. Only a very few of these have become established as outstanding varieties.

### Seedlings

These ungrafted trees make good landscape trees because they characteristically have strong, fast growth and a natural central leader without training.

Nut quality is variable but at least acceptable. Seedlings are usually better in structure and appearance than improved variety trees. Seedling trees rarely bear nuts as early in the trees' life as improved varieties.

### Improved Varieties

If nut production and kernel quality are the major objectives, plant grafted varieties. They differ greatly in nut quality, size and attractiveness as shade trees, so the grower needs to select the specific variety for his unique needs.

Over the years, varieties have been identified which performed well in various areas of Texas. These are listed in Figure 1. The most recommended varieties are listed first.

### Pollination

Commercial pecan growers must pay special attention to cross pollination; however, unless landscape

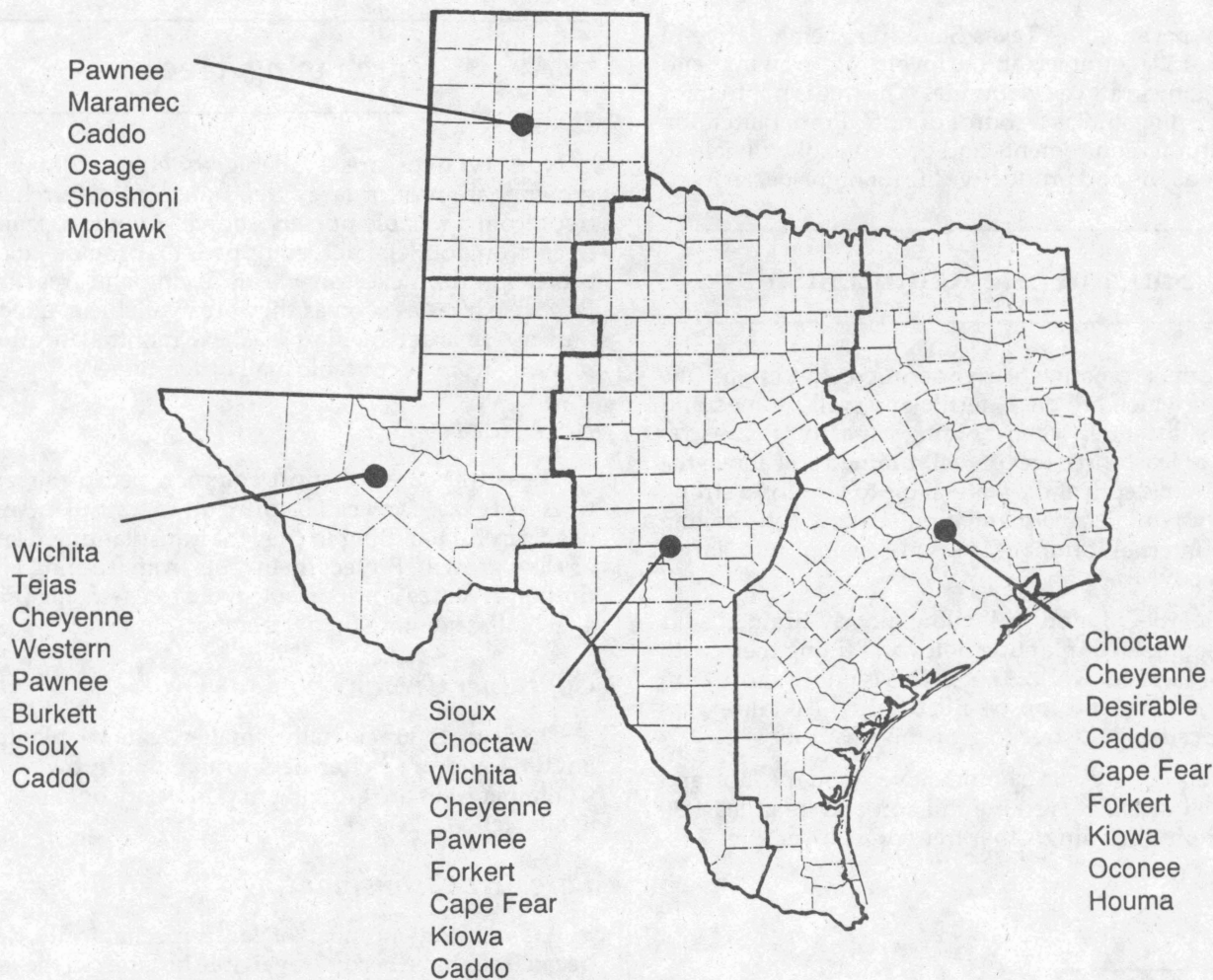


Figure 1. Pecan varieties recommended for home planting in Texas.

trees are very isolated, neighborhood trees can supply the needed pollen. Pecan varieties do only a fair job of self-pollination because some varieties shed pollen early (before female flowers are receptive) while others shed late (after female flowers are receptive). Fortunately, there are good early and late pollen shedding varieties available to insure effective cross-pollination. Pecans are wind pollinated and can cross-pollinate with trees up to 1/4 mile away.

Ideally they should be within 300 feet of another variety or a native tree. If inadequate pollination is probable, plant at least 1 early and 1 late pollen shedding variety in your landscape.

### *Early Pollen Shedding Varieties*

**Desirable** is an outstanding variety for the humid areas of east and south Texas and also produces well in central Texas. The tree grows fast but requires at least 8 to 10 years to bear 15 pounds of pecans. It has weak "V" limb angles which require training and its foliage is light green rather than a more attractive dark color. Scab resistance is moderate and can be controlled with fungicide sprays. **Desirable** is not an exceptionally heavy bearer, but as an older tree it is the most regular producer of crops of high quality pecans. Nuts/lb - 39; percent kernel - 54.

**Western** can grow and bear nuts with less management than any other in the far west. The tree is strong, easy to train and productive, coming into production in 7 to 8 years. **Western** is highly susceptible to scab disease and should be grown only in West Texas. Nuts/lb - 52; percent kernel - 59.

**Pawnee** is a new extremely early ripening variety recommended especially for the Texas panhandle. It is a medium-size pecan with good kernel quality. Additional years of evaluation are needed before recommending it for all of Texas. It appears to have a natural resistance to aphids which are a leading pecan pest. Nuts/lb - 50; percent kernel - 58.

**Caddo** is an excellent yard tree in all of Texas because of strong limbs, scab resistance, early ripening and attractive foliage. Its nuts are very small but have high quality kernels. The trees begin to bear in 5 to 6 years and tend to bear well annually. Nuts/lb - 63; percent kernel - 57.

**Cheyenne** is a very productive smaller tree which begins to bear a very high quality nut in only 5 to 7 years. **Cheyenne** is particularly susceptible to aphids. It can be grown in all but the northern panhandle area of Texas. Nuts/lb - 51; percent kernel - 57.

**Cape Fear** is a good yard tree for east and south Texas because of its strong, easy to train limbs, high yield and scab resistance. The trees begin to bear in 5 to 7 years; however, the kernels are only fair quality and the foliage is highly susceptible to fungal leaf scorch. Nuts/lb - 47; percent kernel - 54.

**Oconee** is a 1989 USDA release that has good potential for East Texas and the Gulf Coast. It has very good disease resistance and large nuts of about 56 percent kernel. It is suggested for trial only.

**Houma** is a 1989 release that has good potential for East Texas and the Gulf Coast. It has excellent disease resistance and medium size high quality nuts with nearly 55 percent kernel. It is suggested for trial only.

### *Late Pollen Shedding Varieties*

**Sioux** is an outstanding yard tree because of its strong, easy to train limb structure and extremely high quality small nut. It has moderate scab susceptibility and will require fungicide sprays during periods of high humidity. Nuts/lb - 62; percent kernel - 59.

**Wichita** is the most productive pecan grown in Texas and is ideally adapted to Central and West Texas. Although it has serious scab problems in the humid areas and freeze problems in the far north, the tree is very vigorous, productive and begins to bear in only 5 to 7 years. **Wichita** develops "V" limb angles that split and require careful training. It tends to be a poor bearing, unattractive tree if it is not well managed.

**Choctaw** is a good yard tree because of its beautiful foliage, scab resistance and high yields of large, high quality pecans. Unfortunately, **Choctaw** requires the very best soil and management; otherwise, it will fail. Nuts/lb - 38; percent kernel - 59.

**Tejas** is a good yard tree for West Texas. The tree is extremely vigorous and large, producing small leaves and good quality pecans. It is highly susceptible to scab disease and should be grown only in the drier areas of the state. Nuts/lb - 59; percent kernel - 53.

**Kiowa** is a newer variety that has good limb structure, attractive foliage and large nuts. It begins to bear at about 6 years of age and bears good crops, but nut quality has been inconsistent. Nuts/lb 39; percent kernel - 57.

**Forkert** is an old Mississippi variety that is little known, but rapidly gaining popularity in Texas because of its excellent nut quality. Nuts/lb - 42; percent kernel - 63.

**Maramec** is a fair quality, large pecan which has produced strong trees and consistent production in Oklahoma. It is recommended as a yard tree for North Texas. Nuts/lb - 42; percent kernels - 58.

**Mohawk** is a fair yard tree for North Texas. It matures early - ahead of fall frosts - and has strong limb structure and beautiful foliage. It bears heavily, but like other varieties with very large nuts, the nuts are poorly filled as the tree ages. Nuts/lb - 33; percent kernel - 59.



**Shoshoni** is an early ripening variety for the panhandle and North Texas. The tree is very productive and begins to bear in only 5 to 6 years. It begins alternate bearing at an early age which limits its usefulness as a yard tree except in the colder north, where later maturing varieties are vulnerable to fall freeze injury before the nuts mature. Nuts/lb - 43; percent kernel - 54.

**Burkett** is an old variety that is common across Texas, but is recommended only as a yard tree in West Texas. Do not plant Burkett in the rest of Texas because of disease and insect problems. Nuts/lb - 42; percent kernel - 59.

## Spacing

Pecans develop into large trees with massive root systems, and should be planted at least 35 feet apart. Trees planted too close develop poor health, unattractive shapes and as crowding occurs, nut production and quality is poor. Moisture and air cannot reach roots under concrete, so plant trees at least 15 feet from driveways or foundations.

## Planting

Bareroot pecan trees can be planted from December through mid-March in most of Texas. It is important that roots remain slightly moist, but not wet, at all times between nursery digging and planting. If you are not ready to plant at the time of purchase, "heel them in" placing the roots in a trench or hole and covering them with moist soil.

Trim off all broken roots immediately before planting.

Container grown trees can be planted anytime of the year, but fall or winter planting is best, to give time for the trees to adjust to their new environment before hot weather. Don't confuse trees that have the roots packaged in a plastic sleeve filled with potting soil, with container grown trees. Trees packed in plastic sleeves should be handled as bare root trees.

Because container trees are grown in soilless media, at least 1 inch of this medium should be washed off the root ball with a garden hose prior to planting. This places the exterior roots in direct contact with the planting soil in which they must live, thereby aiding in adaptation to the new en-

vironment. Also 1/2 to 1 inch of soil should be placed over the top of the root ball after planting to seal off the artificial medium and prevent it from drying too rapidly.

Dig the planting hole only as large as the root system (Figure 2). Extra deep or large holes back-filled with soil allow the tree to settle. Settling or planting too deep can cause root damage that results in poor growth or death of the tree. To avoid settling, rest the base of the taproot firmly against the bottom of the hole. If the hole is at least 2 feet deep and the taproot is longer, cut the taproot off to fit the hole.

Plant trees at the same depth at which they grew in the nursery.

The soil line on bare root trees can be determined by the color of the bark. The trunk is gray and the root is dark brown. If the hole is too deep and the tree settles after planting, lift the tree to the original soil line before growth begins.

Firmly pack the soil around the roots in 2- or 3-inch layers as the hole is filled to eliminate air pockets. Fill the hole with topsoil from the planting site. Do not fill the hole with sand or potting soil, especially in poorly drained clay soil because the light soil in the hole will

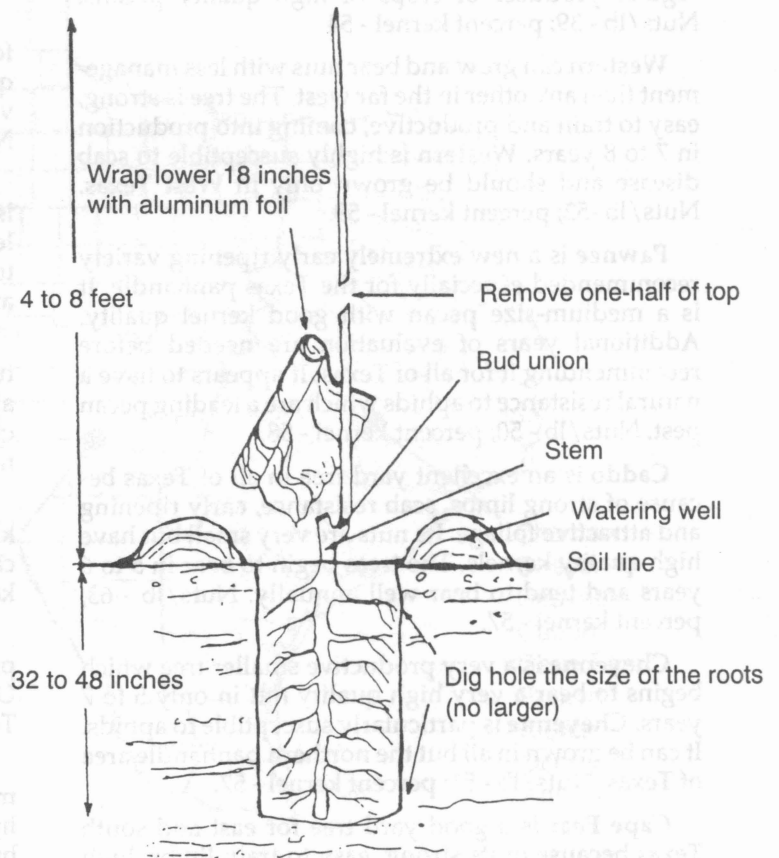


Figure 2. How to properly plant a pecan tree.



become water-logged during rainy periods. Water saturation of the soil can result in major root damage and often tree death.

Thoroughly water trees with at least 5 gallons of water immediately after planting. A 3-to 5-foot diameter watering ring of soil around the tree will help hold the water as it soaks into the ground.

Cut bareroot trees back by one half at planting (Figure 2). Trees not cut back are at much greater risk of death or poor growth. Container-grown trees do not need to be cut back as much, but if the trees are placed in a low maintenance landscape, cutting back improves the rate of survival.

## Training Young Trees

Grafted pecan trees need to be trained to develop one single central trunk with strong, wide angle branches (Figure 3). Untrained, grafted trees usually develop several trunks which have narrow branching angles with trapped bark between "V" limbs. These narrow forks are weak and prone to split under high winds, water, ice or a heavy crop.

Young trees must grow rapidly for training to be successful, therefore, delay training weak trees until rapid growth is stimulated. Ungrafted native or seedling trees usually form one central leader naturally, with little or no training.

Tree training steps are simplest to understand if each objective is considered separately.

### Remove Extra Leaders

Remove all but one central leader on the tree. Young grafted pecan trees frequently have 2 to 5 leaders developing from one point on the trunk, therefore all but one vertical trunk will need to be removed. When removing the multiple leader, use a collar cut (no stub, but not so close as to remove the visible collar at the base of each branch) at the point where the leader meets the trunk.

### Heading Back the Central Leader

Cut off 1/2 of the central leader (Figure 3) before growth begins in April. This cutback will result in several very vigorous shoots developing just below the cut. Each spring for the first few years, select and leave the strongest of these vigorous erect shoots to become the new central leader and remove the other shoots arising within 6 to 8 inches of the cutback. This central leader will grow rapidly once the others are removed.

### Trashy Trunk

Small limbs on the lower trunk are beneficial for food production and rapid root development. Permanent branches are developed beginning six feet above the ground. Keep the side shoots on the lower trunk short by pinching out their growing point. Do this 2 or 3 times a year, as needed, to maintain the

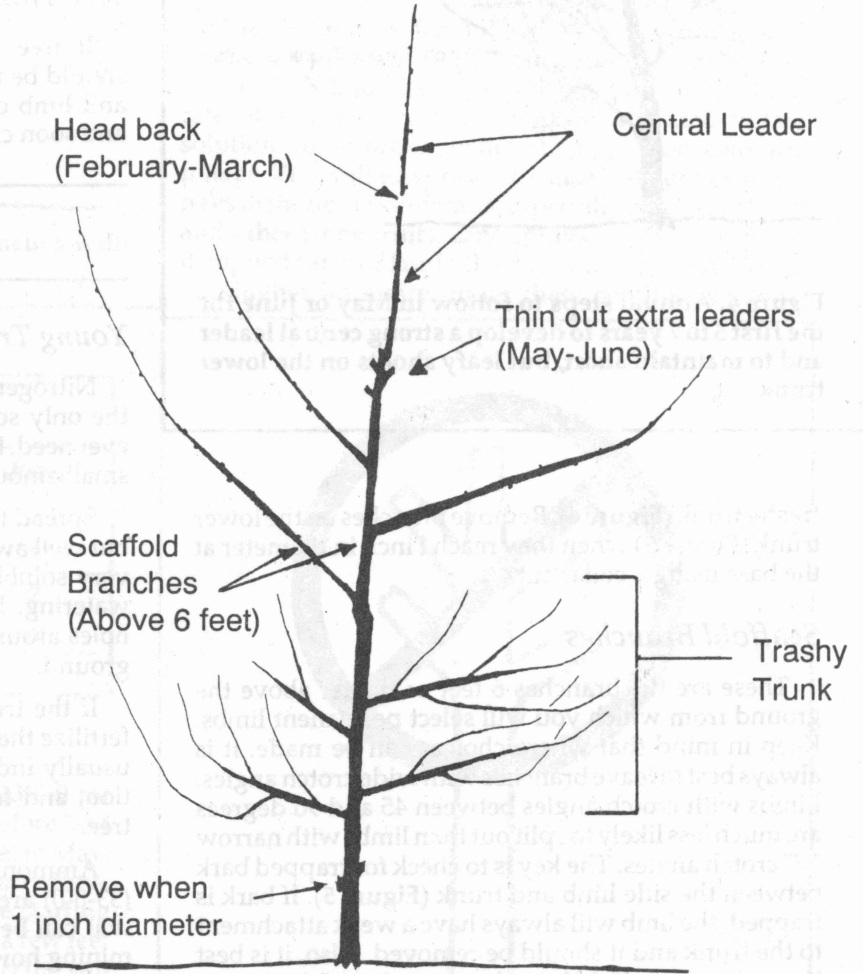


Figure 3. Annual steps for the first 5 to 7 years in training a central leader pecan tree.

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## Pruning Mature Trees

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Large pecan trees seldom need major pruning. Late winter when the trees are dormant is the normal time to remove dead wood, low hanging limbs, or branches that are in the way, endangering structures or power lines. However, pruning can be done anytime it is necessary.

### *Tree Topping*

The all-too-common practice of severely topping (Figure 6) pecans and other trees is not recommended. Severe topping of a healthy tree ruins its looks and can allow insect and disease entry that may kill the tree. Also the new limbs developed after topping usually have narrow branching angles and are easily split out.

### *Tree Thinning*

If tree crowding occurs with age, whole trees should be removed. Pruning will not correct for root and limb crowding. Pruned trees will grow rapidly and soon crowd again.

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## Fertilization

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### *Young Tree – Nitrogen*

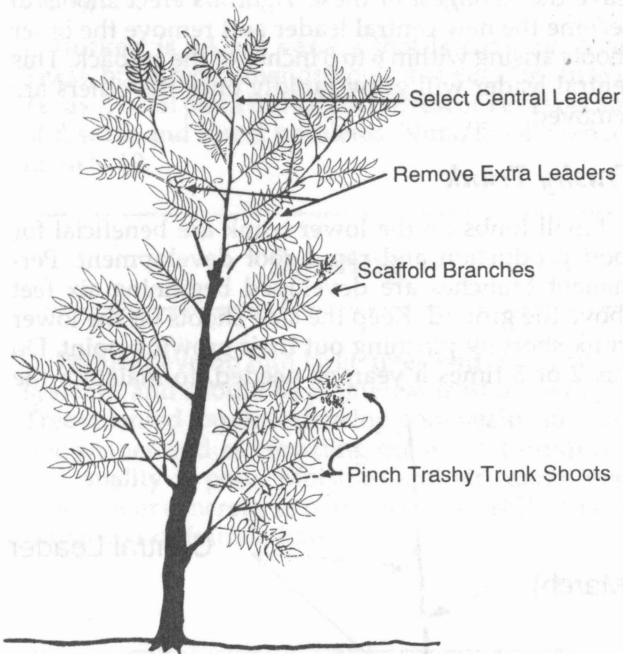
Nitrogen is necessary for rapid tree growth and is the only soil-applied nutrient that most pecan trees ever need. It is important to apply nitrogen in frequent small amounts during the first few years.

Spread fertilizer on the soil surface, under the tree, but well away from the trunk. Nitrogen fertilizers are very soluble and are readily moved into the soil by watering. It is inefficient and unnecessary to make holes around the tree and pour the fertilizer into the ground.

If the trees are not making rapid growth, do not fertilize the first year. Poor growth by a first year tree usually indicates problems other than lack of nutrition, and fertilizer may hinder rather than help the tree.

Ammonium sulfate (21-0-0) and ammonium nitrate (33-0-0) are common, economical nitrogen fertilizers that can be used. Table 1 gives guidelines for determining how much fertilizer to apply and when.

Freeze damage is very common on young pecan trees fertilized after the month of June, so do not fertilize after this date.

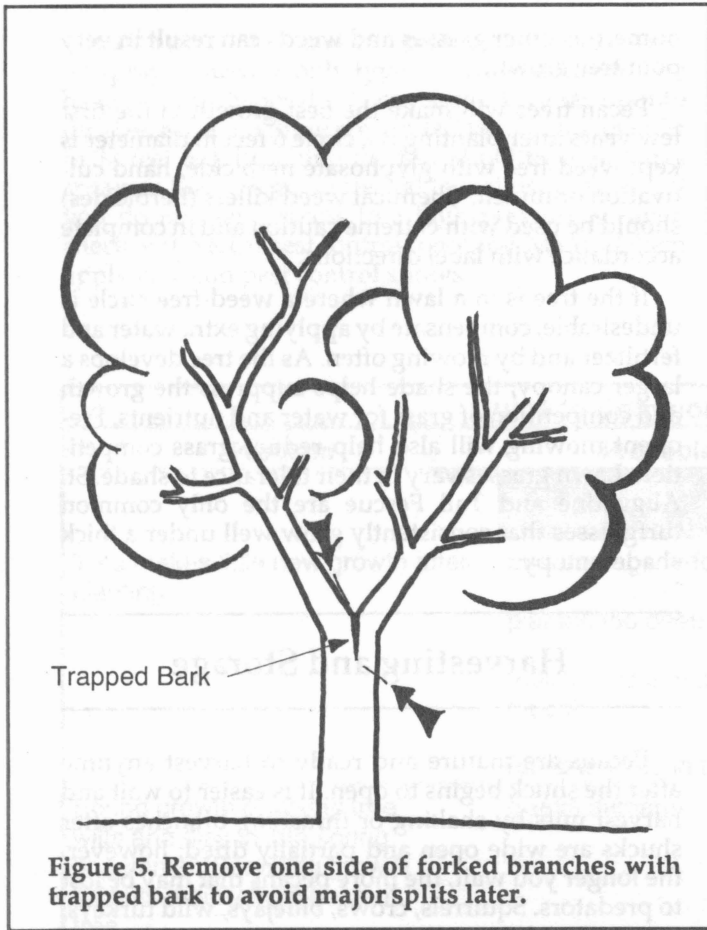


**Figure 4. Annual steps to follow in May or June for the first 5 to 7 years to develop a strong central leader and to maintain short, but leafy shoots on the lower trunk.**

trashy trunk (Figure 4). Remove branches on the lower trunk (Figure 3) when they reach 1 inch in diameter at the base using a collar cut.

### *Scaffold Branches*

These are the branches 6 feet or higher above the ground from which you will select permanent limbs. Keep in mind that where choices can be made, it is always best to leave branches with wide crotch angles. Limbs with crotch angles between 45 and 90 degrees are much less likely to split out than limbs with narrow "V" crotch angles. The key is to check for trapped bark between the side limb and trunk (Figure 5). If bark is trapped, the limb will always have a weak attachment to the trunk and it should be removed. Also, it is best if permanent scaffold branches are at least 2 feet apart. If the tree has too many branches, prune as needed to thin out crowded limbs.



**Figure 5. Remove one side of forked branches with trapped bark to avoid major splits later.**

## Zinc

Frequent zinc sprays are essential for rapid tree growth. Trees deficient in zinc usually have small, weak leaves, highly branched (rosetted) twigs at shoot tips and, in severe cases, dieback of twigs and branches. During at least the **first 7 years**, trees grow best if foliar sprays of zinc are applied at least every 2 weeks throughout the growing season of April through early August. If the trees are not growing, reduce the spray frequency.

Spray **mature trees** with zinc at least three times between bud break in late March or early April and early June. Zinc is needed primarily by young expanding leaflets; and leaflet expansion on mature trees usually stops by mid-June. Two of several choices of zinc materials to spray are:

**Zinc Nitrate** is formulated as a liquid. Use 2 to 4 teaspoons per gallon or 1 to 2 quarts per 100 gallons of water.

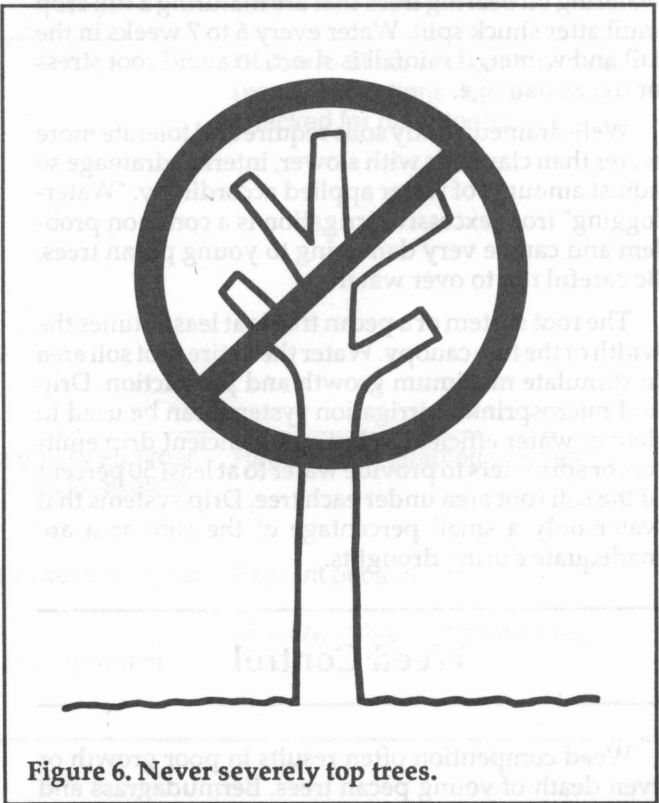
**Zinc Sulfate** is formulated as a powder. Use 2 teaspoons per gallon or 2 pounds per 100 gallons of water. UAN liquid fertilizer (32-0-0) can be added at a rate of 1 quart per 100 gallons of the zinc sulfate solution to improve penetration of zinc into the foliage. Zinc sulfate spray can cause leaf burn on other trees in the home landscape, especially peaches, plums and other stone fruits. Zinc sprays are most effective if applied early or late in the day with little or no wind. The higher humidity under these conditions allows

	April	May	June
Year 1			1
Year 2	1	1	1
Year 3-4	2	2	2
Year 5-7	4	4	4

\*1 cup equals - approximately 1/2 pound.

### Mature trees - Nitrogen

Apply one pound (2 cups) of 21-0-0 or 33-0-0 for each inch of trunk diameter in late March before bud break. If the tree produces a very heavy nut set in May, make a second application in late May or early June. Apply the fertilizer broadcast on the surface starting 3- to 5-feet from the trunk and extending out a few feet past the tree canopy. Water the fertilizer into the soil promptly. Avoid scattering fertilizer on sidewalks or paved driveways since some materials can cause unsightly, although seldom permanent spotting.



**Figure 6. Never severely top trees.**



longer wetting and more zinc absorption. Zinc sprays pose a minimal hazard to man and animals, yet care should be taken not to contact the spray directly. Zinc sprays are not a threat to stain sidewalks, houses, cars, etc.

These zinc materials can be mixed and sprayed in combination with most chemicals labeled for insect and disease control. Consult Texas Agricultural Extension Service publication L-1140 *Homeowner's Fruit and Nut Spray Schedule* for recommended combinations.

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## Irrigation

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Irrigation is essential for survival and rapid growth of young trees and for consistent production of quality nuts on bearing trees. Each irrigation should be sufficient to thoroughly soak the soil. Water regularly from mid-March through September. Ideally, water at least weekly, especially in mid-summer. Apply at least 1 inch of water each irrigation. The water needs of trees will vary from near 1 inch per week in the spring to over 2 inches per week in mid-summer. If lawn grasses are under the trees competing for water, apply additional water to compensate.

Water young, vigorously growing trees less frequently (every 2 weeks) in late August and September to begin winter hardening. Do not reduce late summer watering on bearing trees that are maturing a full crop until after shuck split. Water every 6 to 7 weeks in the fall and winter, if rainfall is short, to avoid root stress or freeze damage.

Well-drained, sandy soils require and tolerate more water than clay soils with slower, internal drainage so adjust amounts of water applied accordingly. "Waterlogging" from excessive irrigation is a common problem and can be very damaging to young pecan trees. Be careful not to over water.

The root system of a pecan tree is at least 2 times the width of the tree canopy. Water the entire root soil area to stimulate maximum growth and production. Drip and microsprinkler irrigation systems can be used to deliver water efficiently, but use sufficient drip emitters or sprinklers to provide water to at least 50 percent of the soil root area under each tree. Drip systems that water only a small percentage of the root area are inadequate during droughts.

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## Weed Control

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Weed competition often results in poor growth or even death of young pecan trees. Bermudagrass and Johnsongrass are especially severe competitors, but

numerous other grasses and weeds can result in very poor tree growth.

Pecan trees will make the best growth in the first few years after planting if a circle 6 feet in diameter is kept weed-free with glyphosate herbicide, hand cultivation or mulch. Chemical weed killers (herbicides) should be used with extreme caution and in complete accordance with label directions.

If the tree is in a lawn where a weed-free circle is undesirable, compensate by applying extra water and fertilizer and by mowing often. As the tree develops a larger canopy, the shade helps suppress the growth and competition of grass for water and nutrients. Frequent mowing will also help reduce grass competition. Lawn grasses vary in their tolerance to shade. St. Augustine and Tall Fescue are the only common turfgrasses that consistently grow well under a thick shade canopy.

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## Harvesting and Storage

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Pecans are mature and ready to harvest anytime after the shuck begins to open. It is easier to wait and harvest nuts by shaking or thrashing branches after shucks are wide open and partially dried; however, the longer you wait, the more pecans that may be lost to predators. Squirrels, crows, bluejays, wild turkeys, raccoons and deer all can cause serious yield reduction.

Nuts harvested early in the season have a high moisture content and need to be dried before storage. Dry them in the shell in thin layers on elevated screens or hang them in small mesh bags in a well-ventilated area at room temperature out of direct sunlight. Within 2 weeks the nut meats should be dry enough to snap when bent which is an indication they are ready for storage or immediate use.

To retain nut meat quality, store pecans in the freezer. Pecans retain good quality for up to 6 months in the refrigerator, but the freezer insures much better quality when storing shelled pecans. Pecans readily absorb odors from almost any material including other fruits and vegetables, so be careful to protect them from possible contaminating odors.

## *Insects and Diseases*

Pecans are damaged by several insect and disease pests and control measures are usually necessary to mature a good crop. Control measures are detailed in Texas Agricultural Extension publication L-1140 *Homeowner's Fruit and Nut Spray Schedule*. A copy may be obtained from your county Extension office.

Large pecan trees can be a problem to spray. Hose-on sprayers are the only type that most homeowners have at their disposal that can spray very far up into the tree, but even these are limited to trees not over 25 to 30 feet tall. Reaching the top of tall trees requires sprayers that can generate 500 to 600 psi pressure. If you do not have access to a high pressure sprayer, check with a local pest control company. Many of them apply zinc and pest control sprays.

Proper timing of spray applications is important, especially for the pecan nut casebearer and pecan weevil. Spray dates for these insects may vary each year and should be checked with the county Extension office.

<b>Guide to Common Pecan Questions</b>		
<b>Problem</b>	<b>Probable Cause(s)</b>	<b>Solution(s)</b>
	<b>The Tree</b>	
Tree makes little new growth after planting.	<ul style="list-style-type: none"> <li>root damage before planting</li> <li>planted too deep</li> <li>moisture stress (too little or too much)</li> <li>fertilizer used in the planting hole</li> </ul>	Replace tree if growth is extremely weak or cut back to a 1 foot stub during winter.
Spring growth of young tree wilts and dies in late spring or summer. Surviving growth sprouts mainly from base of tree.	<ul style="list-style-type: none"> <li>freeze damage</li> </ul>	<ul style="list-style-type: none"> <li>Prune out damaged wood.</li> <li>Improve fall hardening. Cut back on fall watering and don't fertilize late.</li> </ul>
Older tree with weak growth, small yellowish leaves and twig dieback.	<ul style="list-style-type: none"> <li>zinc deficiency</li> <li>poor soil</li> <li>crowding</li> <li>poor nitrogen</li> <li>moisture stress</li> <li>grass competition</li> <li>nematodes</li> </ul>	Follow fertilizer and general care recommendations. Have roots checked for nematodes.
Sudden tree death in the late spring or summer.	<ul style="list-style-type: none"> <li>cotton root rot (especially summer death of younger trees in alkaline soils)</li> <li>delayed response to severe winter freeze</li> <li>water-logged soil (during winter or current)</li> </ul>	<ul style="list-style-type: none"> <li>Replant with adapted species.</li> <li>Replant pecans.</li> <li>Replant with adapted species.</li> </ul>

<b>The Leaves</b>		
Trees dripping sugary substance from leaves and black material coating leaves.	yellow aphids feeding on leaves	See L-1140*.
General burn of tissue along edges and tips of leaflets.	sprinkler water on leaves	Lower sprinkler height.
	too much fertilizer	Reduce fertilizer and water more.
	moisture stress	
	hot weather	
	poor quality (salty) water	
Black spots on leaves.	disease most commonly scab	See L-1140*.
Green galls (wart-like) on leaves or small twigs.	pecan phyloxera	See L-1140*.
<b>The Bark</b>		
Green or yellowish fungal-like growth on the bark.	lichens	Not a problem, fungicide sprays for nut and foliage disease usually control lichens.
Peeling woody bark.	natural part of growth and aging process	None needed.
Deep vertical cracks.	freeze injury	Will heal depending on severity of injury.
	very fast growth	None needed.
Holes in bark.	woodpeckers make cone-shaped holes usually aligned in rows	Usually not harmful.
	borers	Treat with labeled insecticide, may indicate a weak tree from other problems.
<b>The Nut</b>		
Premature nut drop in summer.	poor pollination	Plant pollinator.
	insect damage (nut casebearer, weevil, stink bug)	See L-1140*.
	drought stress	Water more often and deeper.
Random patches of dead tissue on the shuck.	disease-usually scab	See L-1140*.
White powdery growth on the shucks.	powdery mildew	None needed, not seriously damaging.
Shuck won't open, small white worms tunneling in shucks.	hickory shuckworm	See L-1140*.



Shuck won't open, but no apparent insect problem, kernel usually shriveled.	"sticktights" from drought and heat stress in September and October	Water more often and deeper especially in August and September.
	fall freeze injury	Grow early maturing varieties.
Round, 1/8" diameter hole in the shell, kernels eaten.	pecan weevil larvae (redheads)	See L-1140*.
Kernels poorly filled.	crowded trees	Thin trees.
	old trees	Thin trees and/or avoid water and nutrient stress.
	shallow soil	Thin trees, and/or avoid water and nutrient stress.
	late summer drought stress	Water more.
	insect damage (especially hickory shuckworm)	See L-1140*.
	nuts are too large	Enjoy for shade as is or graft tree to better variety.
	poor nutrition	Follow nitrogen and zinc recommendations.
Nuts sprouting before harvest.	fall drought stress	Continue watering until harvest.
	rains during shuck opening	Harvest as early as possible.
Black spots on kernels.	stinkbug damage	See L-1140*.
Fuzzy brown or tan material on surface or kernels.	stress (drought, tree crowding, old trees, shallow soil)	Water more often and deeper.

\* L-1140, entitled "Homeowner's Fruit and Nut Spray Schedule" is available from your County Agricultural Extension Office

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The following information is for your information only. It is not intended to be used as a guide for the selection of a crop or for the determination of the amount of seed to be used. The amount of seed to be used should be determined by the farmer or grower on the basis of the soil and weather conditions. The amount of seed to be used should be determined by the farmer or grower on the basis of the soil and weather conditions.

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