

Establishment  
&  
Maintenance  
Of  
  
Landscape  
Pecan Trees  
  
In  
Southwest Arkansas

By

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## PECAN VARIETIES SELECTION

There are more than 500 varieties of pecans that have been tried in different parts of the world. Therefore, variety selection is one of the most important decisions a pecan grower can make.

Long range performance of an orchard, and the type of management required, is very dependent upon the varieties planted in the beginning. Regular production, disease resistance, tree strength, and nut quality are extremely important in selection of a variety for a specific area.

When selecting a variety, the following factors should be considered:

- Regular production capacity
- Disease and insect resistance
- Age tree produces
- Tree strength and branching characteristics
- Nut size
- Kernel quality
- Kernel percentage
- Date of ripening
- Pollination type
- Chilling requirements

Most trees which bear early and heavy are slow growing. Because of this, these trees can be planted closer together.

Dominant growing varieties grow more rapidly, become crowded sooner, and require thinning at an early age. They begin bearing later in life, make vigorous growth and obtain larger sizes.

## POLLINATION

Pecan trees have dichogamous flowering since male and female flowers on a tree mature at different times. If male flowers give off pollen before female flowers are receptive, the tree is protandrous (male first) and is classified as Type I. If female flowers are receptive before male pollen is shed from catkins, the tree is protogynous (female first) and is classified as Type II.

When a tree has complete separation of male and female blooms, it must be cross pollinated by another tree.

Some pecan varieties have incomplete dichogamy and pollen is given off a short time during stigma receptive period. In this case, the tree may be self pollinated. Self pollination is undesirable and will reduce nut quality.

In order to insure quality pollination, every orchard should consist of at least 20% of one type of varieties for adequate nut production, with the exception of natives. They are 50% protandrous (Type I) and 50% protogynous (Type II).

## PECAN VARIETIES POLLINATION TYPES

	Type I		Type II
Protandrous			Protogynous
Pollen first			Nutlets first
Nutlets last			Pollen late
	Varieties		Varieties
Western			Wichita
Desirable			Choctaw
Cheyenne - Scab			Shawnee
Caddo			Tejas
Pawnee			Kiowa
Cape Fear			Apache - (not recommended)
Cherokee - (not recommended)			Brooks
Barton			Burkett
GraCross			Candy
Brake			Chickasaw - (not recommended)
Clark			Comanche - (not recommended)
Moore			Curtis
No. 60			Elliot
Onliwon			Evers
Peruque			GraBohls
Riverside			GraKing
San Saba Improved			GraPark
Starking			GraTex
Success			Grazona
Oconee			Hays
Houma - (Looks good - not sure)			Ideal
Creek (15-17 years)			Mahan
			Mohawk
			Odom
			Schley
			Shoshoni - (losing popularity)
			Stuart
			Texhan
			Willmann
			Sumner
			Melrose - Bitter taste
			Moreland

## TEN BEST VARIETIES FOR ARKANSAS

Type I			Type II		
Protandrous			Protogynous		
Pollen First			Nutlets First		
Nutlets Late			Pollen Late		

  

Variety	Average nut/lb	Percent kernel	Variety	Average nut/lb	Percent kernel
Desirable	45	55	Choctaw	36	58
Caddo	64	56	Sumner	51	55
Cape Fear	45	53	Candy	72	46
Oconee	46	59	Elliot	71	52
Creek	44	52	Moreland	58	55

## PECAN SOILS

There are two types of soil that are good for pecan production. Alluvial and Upland.

Alluvial soil is commonly found in river or stream basins and beds deposited by centuries of overflows over the flood plains of these waters. It is deep, fertile, well-drained and has a good water storing capacity. It also has a permanent static water table four feet or more below the surface.

Upland soil does not have all the characteristics alluvial soil has for maximum pecan production. Instead, it should have a topsoil that is sandy loam with a depth of 4-7 feet or more. This topsoil should allow fast and easy movement of water. Another key to good upland soil is the proper makeup of the subsoil. It is absolutely necessary to have a permeable, sandy clay subsoil that will allow both water and air penetration.

This desired subsoil will be reddish in color, indicating oxidation, blue, slate, and yellow clay subsoils are usually impervious to water and air and, therefore, will not allow root penetration.

### Pecan Soil Drainage Test

Dig a hole 32 inches deep and 8 inches wide. Fill the hole with water (about 7 gallons). Wait 24 hours and check to see if water is drained from the hole. If all is drained, fill again and check in one hour. If all 32 inches are drained in one hour, this means there is more than 32 inches of soil available for pecan production, and the permanent static water table is below 32 inches.

## TEMPERATURE

Pecan trees require a mean temperature of 80 degrees F for the three hottest months (June to August) and 45 to 55 degrees for the three coldest months (December to February).

## PLANTING AND ESTABLISHING PECAN TREES

Order bare rooted trees from a reputable nursery in early fall (September preferably).

Pick up trees from nursery and plant immediately or heel in soil. Trees should be four to 8 feet tall when picked up.

Plant bare rooted trees - December to March.

Plant container-grown trees - December to June.

### Planting Technique

Dig the hole only as large as the root system. If the hole is too deep, trees will settle, causing poor growth or tree death. The taproot should set firmly on the bottom of the hole. If the hole is not as deep as the length of the taproot, cut the taproot off so that it is supported by the bottom of the hole or adjust the hole to the root. Pack the soil around the roots tightly. Use the same soil that came out of the hole. Packing soil in two or 3 inch layers is ideal. Plant tree at same depth it grew in the nursery row or container. This is insured by setting the taproot on bottom of the hole. The soil line can be determined by color - trunk bark is gray and root is dark brown.

Apply 5 gallons of water to tree immediately after planting and a minimum of 5 gallons every week from April to September.

Wrap the lower 18 inches of the trunk with aluminum foil to prevent shoot growth, freeze damage - sun scald and pest damage. You can also use low-priced white latex paint and water. A one-to-three ratio of paint to water is adequate.

Apply **2** pound of Ammonium sulfate or Ammonium Nitrate to trees which are rapidly growing in June the first year. If the trees are not making rapid growth, do not fertilize the first year.

### Weed Control

All native grasses, such as Johnson Grass, nutgrass, bermudagrass and other weeds are major problems around young non-bearing pecan trees. Young trees go through transplant shock and will not compete with weeds even when they are healthy. Chemical weed control is superior to cultivation because it does not cut roots. Roundup, Poast, Fusilade and Gramoxone are labeled for use on non-bearing pecans. Treat a six to 10-foot diameter ring around each tree in April, June and September.

## CENTRAL LEADER TRAINING

Native or seedling trees are juvenile and form central leaders naturally, without training. Budded/grafted trees are adult and grow from the ground as they grow in the top of the tree with frequent branching. Slow-growing young pecan trees are almost impossible to train. A pecan tree will not respond to training unless it is healthy and growing rapidly. Training and pruning of slow growing pecan trees can make them weak and do more harm than good.

### First-Year Training

Cut the tree trunk back one half its height at planting. Three months later, in May or June, select one shoot at the top of the tree to be the central leader. This shoot should be the strongest and most rapidly growing. Remove the other shoots within six inches of the cut-back point. This encourages maximum growth of the selected central leader shoot. Allow side shoots on the lower part of the trunk to develop the traditional trashy trunk. If other shoots at the cut-back point are not removed in May, they can be cut the following February, but the central leader will grow less and fewer laterals will form.

### Second-Year Training

Cut the central leader back one-third during January or February of the dormant season. Do not remove any of the trashy trunk shoots on the lower trunk unless they are 1 inch in diameter or larger. If they are more than 18 inches long, tip prune by removing only the terminal bud cluster.

In May or June, after growth is well under way, select and leave the strongest shoot in the top of the tree at the cut-back point. This selected shoot will become the central leader. Remove, entirely, all other shoots developing within 12 inches of the cut-back point. The central leader shoot should make much more growth the second year than it did the first year.

If side shoots of the trashy trunk become excessively vigorous during the growing season, pinch prune the terminal growing point to stop growth. Do not cut the side shoots of the trashy trunk back one-third because this encourages even greater side shoot growth, which further reduces growth of the central leader.

### Third-and Fourth-Year Training

Cut the central leader back one-third in January or February. Tip prune side shoots. Remove the lower side shoots which are 1 inch in diameter or larger at the trunk leaving a short collar.

In May or June, as rapid growth begins, select the final central leader shoot at the top of the tree at the cut-back point. Remove entirely all the other shoots at the top 12 inches of the tree. This allows only one central leader.

## WATER MANAGEMENT

Young trees - non-bearing

5 gallons per week from April to September.

Mature trees -

2 inches of water per week from April to September.

Mature trees also need water at five critical periods:

-Initial Spring growth - Late March to early April

-Nut sizing - May

-Water stage - August

-Kernel filling - Late August - Early September

-Shuck split - Late September

Sprinkle around trees canopy to drip line and then 10% more. Pecan trees like an abundance of water, but do not like wet feet, (standing in water).

## **FERTILIZATION RECOMMENDATIONS FOR PECAN TREES IN ARKANSAS**

- Young non-bearing trees
- first year - no fertilizer (**2** pound in June if rapid occurs)
  - Second year - apply **2** pound of Ammonium Nitrate or Ammonium Sulfate in April - **2** pound in May and **2** pound in June
  - S** third and 4<sup>th</sup> year - one pound first of April, May and June
  - S** fifth year - two pounds first of April, May and June

Bearing Named Varieties and Natives - always follow leaf analysis recommendations

Apply one pound of Ammonium Nitrate per inch of tree trunk diameter or 1 **2** pound of Ammonium Sulfate per inch of tree trunk diameter

Split application: 50% mid-March, 50 % before June

Two applications are better than one, three applications are better than two

Broadcast around trees canopy to dripline and 10 % more.

Available carriers of nitrogen

Ammonium Nitrate 33.5 %

Ammonium Sulfate 20.5 %

## ZINC RECOMMENDATIONS

Young non-bearing trees - apply foliage application every two weeks from April to mid August

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Named varieties	first spray	green tip
	second spray	one week after green tip
	third spray	three weeks after green tip
	fourth spray	Casebearer
	fifth spray	eight weeks after green tip

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Natives	two sprays - first spray - one week after green tip
	second spray - Casebearer (usually in May)

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Mix **2** ounce of Zinc Nitrate or Sulfate per gallon of water.

## PECAN LEAF ANALYSIS - ACCEPTABLE RANGE ELEMENTS

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	Concentration on dry weight basis
Nitrogen (N)	2.50-4.00 percent
Phosphorus (P)	0.15-0.30 percent
Potassium (K)	0.75-1.25 percent
Calcium (Ca)	0.70-3.00 percent
Magnesium (Mg)	0.30-0.60 percent
Sulfur (S)	0.20-2.50 percent
Iron (Fe)	50-300 ppm
Manganese (Mn)	40-300 ppm
Zinc (Zn)	80-500 ppm
Boron (B)	20-45 ppm
Copper (Cu)	10-30 ppm

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### Collecting leaf samples

This is the first step in determining an effective ongoing fertilization program. The accuracy and effectiveness of this diagnostic procedure depends on proper collection and handling of the leaflet samples.

1. Collect samples in July. Leaves have usually reached full size by this time.
2. Collect 50 leaflets for each sample. The two middle leaflets from the middle leaf (one on each side) are best to use of current season growth. (Figure 1).
3. Collect leaflets that can be easily reached from the ground, and from all sides of the tree.
4. Try to leave the leaflet stem (petiole) intact and attached to the leaflet. This is best accomplished by downward or backward pull.
5. Collect leaflets from typical shoot growth. Water sprouts and poorly developed shoots should not be sampled.
6. Do not use galvanized or other metal containers for collections or leaf preparation.
7. Do not use rubber gloves or other rubber materials during collection or preparation.
8. Wash the leaflets with pure clean water while they are still fresh and unwilted.
9. Let the leaflets dry completely in a shaded or protected area out of direct sunlight. Avoid heat exposure.
10. Place the dried leaves in a sample bag or paper sack and submit with a completed information sheet to your County Extension Office.

## **MOST HARMFUL INSECTS OF PECANS IN ARKANSAS**

Pecan Nut Casebearer - This gray moth is active at night time only and is the most damaging pecan insect pest in Arkansas. Eggs are laid on the tip end of the nutlets. Females lay 50-150 eggs during their five to eight day life span. Eggs are white when laid, but will turn pink or red prior to hatching. Eggs hatch in four to five days. Insecticides should be applied two to three days after the first eggs hatch.

The Casebearer may have one to four generations. By carefully monitoring egg hatch and control of the first generation; the second, third or fourth generation will be controlled.

Warm spring temperatures influence Casebearer development. Cool, rainy weather can delay moth activity and egg laying. Thus, the period of egg laying can vary as much as two weeks from year to year.

Control - Mother's Day is usually a designated time to start scouting for Casebearer eggs.

Insecticides - Check with County Extension Office and refer to MP-144.

Hickory Shuckworm - Active mostly at night, over winters as a larva in the shucks of nuts. It begins attacking nuts in early June and continues until harvest. Shuckworms produce three to four generations per year.

Control - Emergence of the Shuckworm varies from year to year and orchard to orchard. Spraying should be timed to Shuckworm activity. Activity should be monitored with blacklight traps. In the absence of a light trap, start scouting for activity in July.

Insecticides - Check with County Extension Office and refer to MP-144.

Phylloxera - Leaf phylloxera forms galls on leaves. Nut Phylloxera forms galls on shoots and nuts.

Control - Survey trees in May. Mark the trees that have galls on them for treatment the following year. Dormant oil may be applied to trees before budbreak in late February and early March. Insecticides must be applied after eggs hatch in spring but before nymphs are protected inside galls. Treat after budbreak when leaves are one to two inches long.

Insecticides - Check with County Extension Office and refer to Mp-144.

Pecan Leaf Scorch Mite - This mite causes scorch appearances on foliage. Damage occurs in June, July, August and September, appearing as dark brown blotches on leaflets.

Mites usually feed on the underside of leaves, but will feed on the upper leaf surface. In some instances, almost complete defoliation will occur. They over-winter in bark crevices on tree limbs. Life cycle usually is 11-15 days.

Control - Thresholds levels not known.

Insecticides - Check with County Extension Office and refer to MP-144.

Pecan Weevils The Pecan Weevil attacks pecans and hickory prior to shell hardening. Adults will feed on pecans usually causing immature pecan to fall from the tree.

Nuts in water stage, if fed on by weevil, will drop prematurely. After water stage during jel stage, female chews a hole through the shell and deposits her eggs inside the nut.

After eggs hatch and grub matures, it will chew a hole about 1/8-inch in diameter in the shell and emerge in late September until late December.

Control - Control should be aimed at the adult in August. Usually after the first rain occurs, adults will emerge from the soil. Emergence can be determined by shaking lower limbs of tree or setting weevil traps in orchard.

Insecticides - Check with County Extension Office and refer to MP-144.

Hickory Nut Curculio - This insect causes nuts to abort from the trees. Aborted nuts usually will have a circular puncture in the middle. A brownish liquid seeps through the puncture, leaving a syrup-like deposit on the side of the nut. Heavy activity occurs about June 15, and two spray applications are necessary for control.

Control

-First spray June 20.

-Second spray two weeks later.

Insecticides - Check with County Extension Office and refer to MP-144.

Yellow Aphids - There are two species of yellow aphids - Black Margined and Yellow Pecan Aphids. They feed on the underside of leaves and generate honeydew while feeding. Aphids can be seen on pecan foliage from budbreak to the first freeze, but are usually most abundant and most destructive during August and September. Yellow aphids secrete honeydew, which in turn promotes the growth of sooty mold. The sooty mold (black substance) inhibits photosynthesis.

Control - If aphids population gets to twenty-five or more per compound leaf, a chemical control may be needed.

Insecticide - Check with your County Extension Office and refer to MP-144.

Black Pecan Aphids - This aphid is more destructive than the yellow aphids. It feeds on the underside of leaves and injects a toxin that causes the leaf tissue between major veins to turn bright yellow. The black pecan aphid also reduces nut fill and lowers production the following year.

Control - It is very active in August and September. Treat when aphids average three or more per compound leaf.

Insecticide - Check with your County Extension Office and refer to MP-144.

Stink-Bugs/Leaf-Footed Bugs - There are three primary types of these bugs - Leaf-Footed bugs, Brown Stink-bugs, and Green Stink-bugs.

Adult stink bugs and leaf footed bugs prey on pecans both before and after shell hardening. They are seen on pecan trees late in August and September. Adults over winter in bark crevices, fence rows, and debris. They puncture the shuck and nut shell, and feed on the inner material. Before shell hardening the nuts bleed and abort. After shell hardening, the nuts stay on the tree but there will be small dark spots on kernel.

Control - Stink-bugs and Leaf-Footed bugs like legumes (beans and peas, etc.) better than pecans. Plant legumes as a trap crop close to pecan trees and when the bugs invade, control them with a labeled insecticide after the shell hardening stage in September.

Insecticides - Check with your County Extension Office and refer to MP-144.

## **MOST HARMFUL DISEASES OF PECANS IN ARKANSAS**

Pecan Scab - Leaves can be infected from two weeks after budbreak until June. Nuts can be infected from May to late September. Lesions are brown and later become black. Lesions reduce photosynthetic activity and cause early leaf loss.

Shucks stick to nuts and nuts can become undersized. Nuts may stick to the tree or drop prematurely.

Environmental Influences - Frequent rains, high humidity, heavy dew, and cloudy days.

Control - Fungicide spray should begin two weeks after budbreak.

Fungicide - Check with your County Extension Office and refer to MP-154.

Shuck Decline - (Shuck Dieback, Shuck Disease, Tulip Disease, etc.) Pecan shuck decline is the collective name for a rash of problems involving the thick outer husk that surrounds a pecan shell. The condition causes the shucks to shrink, blacken and fall before the nuts can fully form. It can cause no kernel, small kernel, blacken kernel, small nuts, stick-tight (shucks stick to shell, etc.). The cause has long been attributed to a fungus, but production stress is responsible. The pecan tree under great production pressure responds by opening its shucks, the tree realizes it's in trouble and tries to drop its seed to ensure its survival. The condition is worse in prolific varieties, such as Success, Cherokee, Cape Fear and Choctaw.

Control - Provide tree with plenty of water in late August to September during kernel filling stage.

### Stem End Blight

The cause of this disease is not known, but it will kill shuck tissue and reduce nut quality. It sometimes appears in August, but more often in September and October. Some nuts on a cluster can be affected while others remain healthy.

Stem End Blight begins as a brown or black spot on the shuck near the base of the nut. This black area usually enlarges to cover the entire nut or at least a portion of it. Shortly after black area appears, the nut becomes easily dislodged from its stem. The earlier the symptoms appear in the season, the poorer the kernel will be.

Fungicides - Check with your County Extension Office and refer to MP-154.

## Vein Spot

Vein spot, a foliar disease, is caused by the fungus *Oniomania Nerviseda* Cole. The fungus overwinters in infected leaf debris on the ground. From spring through August, spores are released immediately after rain showers. The greatest spore release usually occurs from late April into early June.

Symptoms - Vein spot lesions on pecan foliage closely resemble scab and must be examined very closely in direct sunlight. Vein spot usually looks shiny or greasy while scab appears dull. On the leaflets, the lesions are always centered on midrib veins.

Control - Start fungicide applications in late April to protect the foliage throughout May.

Fungicides - Check with your County Extension Office and refer to MP-154.

## Fungal Leaf Scorch

Fungal leaf scorch is one of the major causes of premature defoliation of pecans. It can be mistaken for scorch caused by excessive amounts of Nitrogen and Potassium.

Symptoms - Like most fungal diseases, fungal leaf scorch develops most rapidly in wet conditions. It usually appears in July and August and becomes severe by September. The characteristic symptom of fungal leaf scorch is a blackened area on the leaf between healthy and dead tissue. The disease usually begins at the base of the leaflets and advances toward the midvein. The dead areas are dark brown or ash, and there are usually distinctive black zones between the green and dead portions of the leaflet. The disease gradually affects more and more healthy tissue, and the leaflets soon drop from the leaf. As more leaflets drop, eventually the entire leaf will be lost.

Control - Fungicides used to treat pecan scab also reduce the amount of fungal leaf scorch, but don't prevent it.

Fungicides - Check with your County Extension Office and refer to MP-154.