

Crop Profile for Pecans in Arkansas

Prepared: February 2003

General Production Information

- **State Rank:** 13th
- **Percentage of U.S. Production:** <1%
- **Total acres grown:** NA
- **Cash Value:** \$970,000

Production Regions:

Commercial pecan production in Arkansas is primarily located on alluvial soils near most major rivers in central, eastern, and southern Arkansas. Significant production areas are found along the Arkansas, Mississippi, Red, and St. Francis rivers.

Production Methods:

Pecans are produced from native (seedling trees) or from orchards of improved (clonally-propagated) varieties. Most pecans produced in Arkansas come from native groves that have been improved and are managed with few inputs. Improvement of native groves generally involves removal of competing trees and shrubs; thinning of pecan trees to retain trees with highest production, best nut quality and highest disease resistance; establishment of permanent ground cover under trees (cool season grasses and legumes) and fertilization.

Native pecan acreage is often grazed by cattle and this presents challenges for the use of pesticides. Most acreage of native pecans is harvested mechanically although significant production is hand harvested by small growers.

Improved pecan varieties are grown in orchards with management to control diseases, insect pests, and weeds. Drip irrigation is used in some planted orchards. Improved pecan orchards are harvested mechanically. Yield is higher and more consistent for improved varieties and nut quality is higher. However, production inputs and management intensity are also higher for improved varieties as compared to native varieties.

Commodity Destination(s):

Pecans are sold in-shell through local retail outlets and to pecan processors who sell shelled pecans through various market channels. The distribution of Arkansas pecan production between these methods of marketing is unknown.

Cultural Practices

Worker Activities

Occasional pruning (approximately 10% of pecan acres) of pecan trees is performed in the dormant season.

Preemergent herbicide applications are applied in early spring, primarily with tractor mounted spray equipment. Postemergence herbicide applications are made in early summer and occasionally after harvest primarily with tractor mounted sprayers although backpack sprayers are occasionally used. Row middles are mowed during the growing season.

Insecticides and fungicides are applied from early spring up to harvest primarily with orchard blast sprayers. A small percentage of the pecan acreage is treated with fungicides and insecticides via aerial application.

Harvest is primarily by hand pick-up although mechanical tree shakers (followed by hand harvesting) are utilized by a majority of growers.

Insect Pests

Pecan Nut Casebearer

Acrobasis nuxvorella

This gray moth is nocturnal and the most damaging insect pests of pecan in Arkansas. Eggs are laid on the tip end of the nutlets. Females will lay 50-150 eggs during their 5-8 day life span. The eggs are white when laid, but turn pink to red prior to hatching. These eggs will hatch in 4-5 days. The green caterpillars grow up to 13mm in length and feed in the developing nuts. Silk webbing with conspicuous dark colored frass eliminated by the larvae is usually seen holding the infested nuts together at their base. Even one larvae is capable of destroying all the nuts in a cluster. Warm spring temperatures influence Casebearer development. Cool, rainy weather can delay moth activity and egg laying. The period of egg laying can vary as much as two weeks from year to year. The second-generation larvae also attack the nuts but the damage is less severe. Later generations feed on the foliage or in the green shuck, causing very little damage. These insects have from one to four generations per year. By carefully monitoring egg hatch and with good control of the first and second generation, the third and fourth generations will be controlled. The first generation is the most damaging.

Control: Scout for eggs and larvae when the tips of the nuts turn brown after pollination, inspecting 200 nut clusters. Insecticide control should be applied 2-3 days after the first eggs hatch or when you find 1-3% nut cluster damage. The following compounds are registered for pecan nut casebearer control: Ammo, Asana, Endosulfan, Imidan, Lorsban, Malathion, Neemix, Phaser, Sevin and Thiodan.

Hickory Shuckworm

Cydia caryana or *Laspeyresia caryana*

These are brown-headed, dirty white caterpillars. They can be up to 13mm long as mature larva. They feed internally in the immature nuts and cause them to drop. After shell hardening they feed inside the green shucks which prevents proper kernel development.

This insect is most active at night, and overwinters as a larva in the shucks of nuts. It begins attacking nuts in early-June and continues until harvest. In newly dropped nuts, you can often detect a chalky, white deposit at the larval entry point. This deposit is the scales of the female moth, placed to protect and seal the egg to the shuck. The larva will create a paper thin "window" in the shuck prior to pupation, which protects the pupa and provides an easily torn exit hole. Shuckworms have 3-4 generations per year. Emergence of the shuckworm varies from year to year and orchard to orchard depending on the temperature. The adult moths are dark-gray with a one-half inch wingspan.

Control: Activity should be monitored with use of two black-light traps per orchard. Check the light traps three times a week looking for adult moths. In the absence of black-light traps, start scouting for activity in July using pheromone traps. The following compounds are registered for

hickory shuckworm control: Ammo, Asana, Imidan, Lorsban, Neemix and Sevin.

Pecan Phylloxeras:

Pecan Stem Phylloxera *Phylloxera devastatrix* Pergande

Pecan Leaf Phylloxera *Phylloxera russelae* Pergande

Pecan Phylloxera *Phylloxera notabilis* Pergande

There are several species of phylloxera that attack pecan, leaf phylloxera, stem phylloxera and pecan phylloxera. These are very tiny greenish-yellow aphid-like insects contained in galls, abnormal swellings, on the leaves or stems. Stem infestations can weaken the shoots that will cause shoot death. Leaf infestations are not severe or damaging to a mature tree but can contribute to premature defoliation. Pecan stem phylloxera is the most important type of phylloxera that can infest pecan. Stem phylloxera produces galls where the nut clusters would normally develop. Phylloxera overwinter in the egg stage in protected places on the tree. There are several generations per year as long as there is new growth on the tree.

Control: Inspect pecan trees for phylloxera 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 to early-March. Insecticides may be applied after eggs hatch in the spring but before nymphs are protected inside the galls. This is usually after budbreak when leaves are 1-2 inches long. The following compounds are registered for control of pecan leaf phylloxera: Asana, Endosulfan, Lorsban, Malathion, Neemix, Phaser, Provado, Sevin, Temik and Thiodan.

Pecan Leaf Scorch Mite

Eotetranychus hicoriae McGregor

These mites are about 0.2mm in size. They are long and pale green in color. They feed primarily along the midribs and veins on the underside of the leaves. This feeding causes a scorch appearance on the foliage. Infestations usually begin in the lower portions of the tree and move upward. In some instances, almost complete defoliation will occur. Damage occurs in June through September and appears as dark brown blotches on the leaflets. These mites overwinter in bark crevices on the tree limbs. Their life cycle is usually 11-15 days.

Control: The following compounds are registered for control of pecan leaf scorch mite: Lorsban, Pyramite, Savey and Vendex.

Pecan Weevil

Curculio caryae Horn

Adults are a brownish-gray in color and about 13 mm in size. They attack pecans and hickory prior to shell hardening causing the nuts to drop. Nuts in the water stage, if fed on by this weevil, will drop prematurely. Damaged nuts usually have a pinhole puncture surrounded by a dark moist stain. After the water stage, but during the jell stage, females chew a hole through the shell and deposit eggs inside the nut. Larvae hatch and feed in the nut for several weeks destroying the kernels. Mature larva have a brown head, are creamy white and legless. They leave the nut to drop down and pupate in the soil. A complete life cycle requires 2-3 years.

Control: The following compounds are registered for control of pecan weevil: Ammo, Asana, Imidan, Neemix and Sevin.

Nut Curculio

Conotrachelus nicoriae (Schoof)

The dark gray to reddish-brown adults are 5mm long. They have a slightly curved snout that is approximately one third their body length. The larvae are small, legless creamy white grubs and are found inside the nut. Adults attack the immature nut with their snouts. Females make shallow crescent shaped punctures with their snout then deposit an egg. Eggs hatch within 4-5 days. These adult punctures are very visible and cause sap bleeding that resembles a tobacco stain. This feeding will cause premature nut drop. Adults overwinter in the ground trash and other protected places. This is an occasional minor pest. There is one generation per year.

Control: This pest is usually controlled by pecan nut casebearer sprays. There is no registered control compound labeled for this pest.

Yellow Aphids Complex:
Black-Margined Aphid *Monellia caryella*
Yellow Pecan Aphid *Monelliopsis pecanis*

Both the yellow pecan aphid and black-margined aphid are similar in appearance and cause similar types of damage. These aphids are very small (1.5mm) and green-yellow in color. Yellow pecan aphids have red eyes and long setae that tend to stand out from the body at 45 to nearly 90-degree angles giving them a pincushion look. The black margined-aphid has much shorter setae that are less than a 45-degree angle with the body. Both species have multiple generations per year. They both feed on the under surface of the leaves. The yellow hickory aphids feed on the network of small veins located throughout the leaf while the black-margined aphids feed on the underside of leaves on the major leaflet veins. They secrete honeydew which promotes black sooty mold growth. Both the honeydew and mold coating the leaf surface will interfere with photosynthesis efficiency. Fire ants have been known to protect these aphids from their natural enemies.

Control: The following compounds are registered for control of yellow pecan aphids: Admire, Ammo, Asana, Ammo, Lannate, Lorsban, Malathion, Provado, Pyramite and Temik.

Black Pecan Aphid
Melanocallis caryaefoliae

These aphids are dark-green to black-green in color. They are very small, about 1.2mm in length. They feed on top and bottom surfaces of the leaflets causing bright yellow areas that later turn brown and die. These aphids can be serious pests of pecan. They cause premature leaf drop and contribute to defoliation of the tree.

Control: The following compounds are registered for control of black pecan aphid: Admire, Ammo, Asana, Endosulfan, Imidan, Lannate, Lorsban, Malathion, Phaser, Provado, Temik and Thiodan.

Stink Bugs and other True Bugs:
Southern Green Stinkbug *Nezara viridula*, *Leptoglossus* spp., *Euchistus* spp. and others

These are green and brown, shield-shaped bugs which are 13-38mm in length. They have piercing-sucking mouthparts and a triangular shape between the base of the wings. Adults feed on immature nuts causing the interior to darken and premature drop from the tree. Feeding after shell hardening causes brown to black pithy bitter spots on the kernels which will reduce nut quality.

Control: Imidan is registered for control of stinkbugs in pecan.

Insecticides Labeled for Pecan

Aldicarb

- Formulation: Temik 15G CP
- Target pests: black pecan aphid, yellow pecan aphid and pecan leaf phylloxera
- Average rate of most common formulation:
 - Temek 15G CP (33-67 lb./A)
- Preharvest interval: one application at bud break and before nut set
- Restricted entry interval: 48 hours

Azadrachtin

- Formulations: Neemix
- Target pests: pecan weevil, pecan nut casebearer, pecan leaf phylloxera, Hickory shuckworm
- Average rate of most common formulations:
 - Neemix (0.5-1 oz/A)
- Preharvest interval: one application at bud break and before nut set
- Restricted entry interval: 4 hours

Carbaryl

- Formulations: Sevin 80S
- Target pests: pecan nut casebearer, pecan leaf phylloxera, hickory shuckworm, and Pecan weevil
- Average rate of most common formulations and frequency of application:
 - Sevin 80S (2.5-6.25 lb./A)
- Preharvest interval: 14 days
- Restricted entry interval: 12 hours

Chlorpyrifos

- Formulation: Lorsban 4E, Lorsban 50W
- Target pests: pecan nut casebearer, black pecan aphid, pecan leaf phylloxera, Pecan leaf scorch mite, hickory shuckworm, yellow pecan aphid.
- Average rate of most common formulation and frequency of application:
 - Lorsban 4EC (1-4 pt./A)
 - Lorsban 50W (1-2 lbs/100 gal)
- Preharvest interval: 28 days
- Restricted entry interval: 24 hour

Cypermethrin

- Formulations: Ammo 2.5 EC
- Target pests: black pecan aphid, pecan nut casebearer, hickory shuckworm, Pecan Weevil, yellow pecan aphid
- Average rate of most common formulation and frequency of application:
 - Ammo 2.5 EC (3-5 fl oz/A)
- Preharvest interval: 21 days
- Restricted entry interval: 12 hours

Endosulfan

- Formulations: Thiodan 3EC or 50WP, Phaser 3EC or 50WBS, Endosulfan 3EC
- Target pests: pecan nut casebearer, black pecan aphid, and pecan leaf phylloxera
- Average rate of most common formulations:

- Thiodan 50WP or Phaser 50WSB (1-1.5lbs/100 gal)
- Thiodan 3EC or Phaser 3EC (2/3-1 qt/100gal)
- Endosulfan 3EC (2/3-1 qt/100gal)
- Preharvest interval: Do not apply after shuck split
- Restricted entry interval: 24 hours

Esfenvalerate

- Formulations: Asana XL
- Target pests: pecan nut casebearer, black pecan aphid, pecan leaf phylloxera, yellow pecan aphid, hickory shuckworm, pecan weevil
- Average rate of most common formulations:
 - Asana XL (4.8-14.5 fl oz/A)
- Preharvest interval: 21 days
- Restricted entry interval: 12 hours

Fenbutatin-oxide

- Formulations: Vendex 50 WP
- Target pests: pecan leaf scorch mite
- Average rate of most common formulation:
 - Vendex 50 WP (1.5-2 lbs./A)
- Preharvest interval: 1 day
- Restricted entry interval: 48 hours

Hexythiazox

- Formulations: Savey 50DF
- Target pests: pecan leaf scorch mite
- Average rate of most common formulations:
 - Savey 50DF (3-6 oz/A)
- Preharvest interval: 28 days
- Restricted entry interval: 12 hours

Imidacloprid

- Formulations: Admire 2F, Provado 1.6 F
- Target pests: black pecan aphid, pecan leaf phylloxera, and yellow pecan aphid
- Average rate of most common formulations:
 - Admire 2F (16-32 fl oz/A)
 - Provado 1.6F (3.5-14 fl oz/A)
- Preharvest interval: apply between May 15 and July 15 for Admire usage.
- Restricted entry interval: 12 hours

Malathion

- Formulations: Malathion 5E and Malathion 8EC
- Target pests: pecan nut casebearer, black pecan aphid, pecan leaf phylloxera, yellow pecan aphid
- Average rate of most common formulations:
 - Malathion 5E (1.5-2 pt./A)
 - Malathion 8EC (2.5-12.5 pt./A)
- Preharvest interval: 0 days
- Restricted entry interval: 12 hours

Methomyl

- Formulations: Lannate SP or LV

- Target pests: black pecan aphid and yellow pecan aphid
- Average rate of most common formulations:
 - Lannate SP (0.5-1 lb./A)
 - Lannate LV (1.5-3 pt./A)
- Preharvest interval: 30 days
- Restricted entry interval: 48 hours

Phosmet

- Formulations: Imidan 70W
- Target pests: stink bugs, hickory shuckworm, pecan weevil, pecan nut casebearer, black pecan aphid
- Average rate of most common formulations:
 - Imidan 70W (2-3 1/8 lb./A)
- Preharvest interval: 14 days
- Restricted entry interval: 24 hours

Pyridaben

- Formulations: Pyramite
- Target pests: pecan leaf scorch mite and yellow pecan aphid
- Average rate of most common formulations:
 - Pyramite (13.2 oz/A)
- Preharvest interval: 7 days
- Restricted entry interval: 12 hours

Insecticides Used on Pecans

Crop	Class	Insecticide	Trade Name	% Acres Treated as Reported by growers in 1991	% Acres Treated In 2002	Average # Applications
Pecan	Insecticide	Carbaryl	Sevin 80S	7	15	1
Pecan	Insecticide	Chlorpyrifos	Lorsban 4E, or 50W	22	25	2
Pecan	Insecticide	Cypermethrin	Ammo 2.5 EC, Cymbush	5	3	1
Pecan	Insecticide	Endosulfan	Phaser 3EC or 50WBS, Thiodan 3EC or 50WP	17	20	1
Pecan	Insecticide	Esfenvalerate	Asana XL	7	12	1
Pecan	Insecticide	Fenbutatin-oxide	Vendex 50WP	Not reported	20	1
Pecan	Insecticide	Malathion	Malathion 5E or 8EC	7	10	1
Pecan	Insecticide	Phosmet	Imidan 70W	Not reported	20	1
Pecan	Insecticide	Dimethoate	Cygon	17	20	1

Weeds

Management of weeds in native pecan groves consists of mowing the permanent ground cover and/or grazing by livestock. Weed control in pecan orchards with improved varieties is more intensive and is required for attainment of maximum yield. Weeds interfere with pecan production by competing for moisture and nutrients, producing chemicals that inhibit tree growth (allelopathy), and decreasing mechanical harvesting efficiency. The most commonly used system of orchard weed control is a herbicide strip in the tree row with mowed sod row middles. Maintenance of row middles in sod improves orchard access during wet conditions and mowing reduces competition with the trees. Cultivation is generally not practiced due to concerns about erosion and reduced tree health and growth.

Herbicides Labeled for Pecan Preemergence Control

Diuron

- Formulations: Karmex DF
- Target weeds: grasses and broadleaf weeds
- Application: One application per year: 2-4 lb. in 25-40 or more gallons of water/acre applied in spring to weed-free soil before weeds emerge.
- Restricted entry interval: 12 hours
- Comments: Apply only to plants established three years or more. Do not apply within three months before harvest. Do not use on soils with less than 1% organic matter. Do not graze livestock in treated groves.

Isoxaben

- Formulations: Gallery 75DF, Gallery T & V
- Target weeds: broadleaf weeds
- Application: Single application of 0.66 – 1.33 lb. in a minimum of 10 gallons of water/acre applied in spring before weeds emerge and trees leaf out.
- Restricted entry interval: 12 hours
- Comments: Apply only to plants established one year or more. Rainfall/irrigation required within 21 days. For non-bearing groves only.

Napropamide

- Formulations: Devrinol 50 DF
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 8 lb. in at least 20 gallons of water/acre. Apply to the base of plants in late fall to spring on weed free soil.
- Restricted entry interval: 12 hours
- Comments: May be applied to newly planted (non-bearing) or established (bearing) plants. Do not apply to newly transplanted trees until the soil has settled and no cracks are present. Requires sufficient irrigation or rainfall to wet the soil to a depth of 4 inches within one week of application for incorporation.

Norflurazon

- Formulations: Solicam 80 DF
- Target weeds: grasses and broadleaf weeds

- Application: Single application of 2.5 lb. (sandy or light-colored soil) to 5 lb. (heavy or dark-colored soil) in at least 20 gallons of water/acre. Apply to clean soil surface from fall to early spring when crop is dormant.
- Restricted entry interval: 12 hours
- Comments: Apply only to plants established 18 months or more. Do not apply within 6 months of planting. Do not apply when nuts are on the ground. Do not graze livestock in treated areas.

Oryzalin

- Formulations: Surflan 4 AS or Oryzalin 4 AS
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 2.0 to 4.0 qt. in 20 to 40 gallons of water/acre applied to soil. Apply in the fall or early spring before weeds emerge.
- Restricted entry interval: 12 hours
- Comments: May be used in newly established (non-bearing) or established (bearing) trees. Do not apply to newly planted trees until soil has settled and no cracks are present. Do not graze or feed forage. Avoid spray contact with foliage.

Simazine

- Formulations: Princep 4L, Princep 90WDG
- Target weeds: annual broadleaf weeds
- Application: Single application of 2 to 5 lbs./treated acre(90WDG); 2 to 4 qt./treated acre(4L). Apply in the fall or early spring before weeds emerge.
- Restricted entry interval: 12 hours
- Comments: Do not apply to sandy, loamy sand, gravelly soils, or exposed subsoils. Use only on trees that are at least two years old. Do not use when nuts are on the ground. Do not graze or feed forage.

Postemergence Control

2,4-D Amine

- Formulations: Orchard Master, Formula 40, others
- Target weeds: broadleaf weeds
- Application: Apply as multiple applications (1-2) in established plantings as a directed spray to actively growing weeds. Apply 2-3 pt. per acre. Do not apply more than 2 times per season.
- Restricted entry interval: 12 hours
- Comments: Use only on trees that are at least one year old. Do not contact foliage, limbs or stems. Do not use within 60 days before harvest.

Fluaziflop

- Formulations: Fusilade DX 2EC
- Target weeds: grasses
- Application: Apply as multiple applications (2-4) in established plantings as a directed spray to actively growing weeds. Apply 12 to 24 oz. with crop oil concentrate at 1 qt. in a minimum of 25 gallons of water/acre.
- Restricted entry interval: 12 hours
- Comments: Do not apply if rainfall is expected within one hour of application. Low spray volumes (10gpa) generally improve control. Do not apply within 30 days of harvest. Do not graze livestock in treated area.

Glyphosate

- Formulations: Roundup Ultra
- Target weeds: grasses and broadleaf weeds
- Application: Apply as multiple applications (2-4) in established plantings as a directed spray or wiper application (20% solution in water) to actively growing weeds. Apply 0.5 to 2 qt. in 10-40 gallons of water/acre depending on weed species.
- Restricted entry interval: 12 hours
- Comments: Do not allow spray to contact desirable vegetation, including green shoots or foliage, as severe damage will result. Do not apply within 3 days of harvest.

Paraquat

- Formulations: Gramoxone Extra
- Target weeds: grasses and broadleaf weeds
- Application: Multiple applications (2-4) of 2.0 to 3.0 pt. in 30 to 100 gallons of water/acre. Apply as a directed spray to weeds. Do not allow spray to contact desirable vegetation, including green shoots or foliage, as severe damage will result.
- Restricted entry interval: 12 hours
- Comments: Use low pressure during application to produce a coarse spray. Add non-ionic surfactant at 1-2 pt. or crop oil at 1 gallon per 100 gallons of water for best results.
Restricted use pesticide.

Sethoxydim

- Formulations: Poast EC
- Target weeds: grasses
- Application: Multiple applications (2-3) of 1.5 to 2.5 pt. plus 2 pt. of a crop oil concentrate in 10-20 gallons of water/acre. Apply as a directed spray when grass is actively growing.
- Restricted entry interval: 12 hours
- Comments: Low spray volumes generally improve control. Do not apply within 15 days of harvest. Do not graze livestock in treated areas.

Herbicides Used on Pecans

Crop	Class	Herbicide	Trade Name(s)	% Acres Treated as Reported by growers in 1991	% Acres Treated in 2002	Average # Applications
Pecan	Herbicide	Diuron	Karmex 80WDG	Not reported	10	1
Pecan	Herbicide	Glyphosate	Roundup Ultra	6	65	1
Pecan	Herbicide	Oryzalin	Surflan 4AS, Oryzalin 4AS	Not reported	5	1
Pecan	Herbicide	Paraquat	Gramoxone Extra, BOA	2.5	10	1
Pecan	Herbicide	Simazine	Princep 4L, Princep 90WDG	Not reported	10	1

Diseases

Pecan Scab

Cladosporium caryigenum (Ell. et Lang.) Gottwald

Pecan scab is the most destructive and widespread disease of pecans and hickories. Damage can vary due to weather and cultivar. Pecan scab symptoms show up as small round, olive-green to black spots on the new leaflets, petioles and nut shuck tissue. These lesions can grow together resulting in large irregular masses of black on the leaflets and nuts causing terminal death. New tissue is more susceptible than older tissue. Old lesions tend to dry out, crack and fall out of the leaf blade making it look tattered. Old lesions, later in the season, can become covered with other fungi resulting in a white moldy look. Pecan scab overwinters on the shucks and shoots that were infected the previous season. Infections can occur as soon as green tissue appears in the spring and continue throughout the season on any growing tissue. Water and air currents can spread the spores from orchard to orchard. Spores can germinate and infect pecan tissue with 2-12 hours. Nuts attacked shortly after nut set usually abort and fall. Nut shuck infected early in the season often crack where lesions run together and serve as entry points for other fungi. Nut infection can result in crop loss from nut drop and small sizing of nuts.

Control: Preventive fungicide control is the most effective way to control pecan scab. Pecan orchards that use scab-resistant or tolerant cultivars may use a modified fungicide program unless wet conditions prevail. The following compounds are registered for pecan scab: Abound, Dodine, Enable, Orbit/Super Tin AGPAK, Syllit and Topsin-M.

Shuck Decline/Dieback *unknown causal agent*

and **Stem End Blight** *unknown causal agent*

Shuck decline is also known as dieback, tulip disease, and shuck disease. The causes of both these diseases are unknown. Both problems can appear on the same nut cluster and even on the same nut. Some nuts on a cluster can be affected while others remain healthy.

Shuck dieback is more prevalent than stem end blight. Shuck dieback is generally most severe on trees with large crops and with crowded trees. The shuck will turn black and die at or near the tip of the nut. The blackened area can spread over the entire shuck and the shuck will usually flare open. Tree stress factors can increase the incidence of shuck dieback. 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 a portion of the nut, even the entire nut. After the black area appears, the nut can easily be dislodged from the stem. The earlier either of these disease symptoms appears, the poorer the kernel quality.

Control: Fungicides are not effective in controlling shuck dieback. The following compound is labeled for control of stem end blight: Topsin-M.

Vein Spot

Gnomonia nerviseda Cole

Vein spot lesions are very similar to those caused by pecan scab but tend to be linear rather than round. The lesions first appear as dark brown-black pinpoint spots centered on veins on midribs. Vein spot lesions appear shiny or greasy in sunlight. These lesions seldom increase in size beyond 0.25-inch in diameter. This fungus overwinters in infected leaf debris on the ground. In the spring spores are released into the air immediately after rain. Some pecan cultivars are more susceptible

than others are but all cultivars have some level of susceptibility to vein spot.

Control: This disease is usually controlled during pecan scab sprays. The following compounds are labeled for control of Vein spot: Dodine, Enable, Orbit/Super-Tin AGPAK, Syllit and Topsin-M.

Fungal Leaf Scorch

unknown causal agent

Fungal leaf scorch is a major cause of premature defoliation of pecans in the southeast. This infection can be mistaken for nutritional imbalances such as excessive nitrogen and potassium. The exact cause of this disorder is unknown. Fungus is believed to be the cause, since it can be isolated from the scorched tissue. The scorch tissue is brown and drying beginning at the leaf margin and expanding inward. There is a black or very dark band separating the scorched areas from the green portions. Scorched leaflets will drop prematurely.

Control: Select cultivars that are resistant to fungal leaf scorch. Fungicides can reduce but not prevent fungal leaf scorch. The following compounds are labeled for control of leaf scorch: Enable, Orbit/Super-Tin AGPAK.

Pecan Bunch Disease

Mycoplasma-like organism

Bunch disease of pecans is a disease that affects weak pecan trees and is caused by a mycoplasma-like organism. It is most often associated with pecans grown along alluvial river bottoms. Seedling pecans appear to be a source of inoculum. Affected trees display a proliferation of stem shoots on large scaffold limbs, localized on individual limbs. The shoots on the limbs are brittle and short-lived. Leaves on the infected shoots are larger than normal and flexible. This disease causes lower yields and inferior nut quality. Symptoms can occur on a healthy tree that is grafted with a diseased scion. Zinc deficiency can also cause bunching symptoms and can be confused with bunch disease. The two conditions can be distinguished on the basis of foliage symptoms. Zinc deficient leaves are smaller and very rigid with chlorosis developing between the veins.

Control: Bunch disease can be controlled by pruning, removing infected trees and planting resistant cultivars. Pruning can be effective only when a few scattered bunches are present. When pruning make the cuts several inches below the bunch symptoms to ensure that all the infected area is removed.

Fungicides Labeled for Pecan

Azoxystrobin

- Formulations: Abound F
- Target diseases: pecan scab
- Average rate of most common formulations:
--Abound F (9,2-12.3fl oz/A)
- Preharvest interval: 4 hours
- Restricted entry interval: 45 days

Dodine

- Formulations: Syllit 65W, Dodine 65W
- Target diseases: pecan scab, vein spot

- Average rate of applications:
 - Syllit 65W (2-4 lb./A) ground application
 - Dodine 65W (2-4 lb./A) ground application
- Preharvest interval: 48 hours
- Restricted entry interval: Do not apply after shuck starts to open

Fenbuconazole

- Formulations: Enable 2F
- Target diseases: vein spot, leaf scorch, pecan scab
- Average rate of most common formulations:
 - Enable 2F (8 fl oz/A)
- Preharvest interval: 12 hours
- Restricted entry interval: 28 days

Propiconazole and Triphenyltin Hydroxide

- Formulations: Orbit 45 WP/Super –Tin 80WP AGPAK
- Target diseases: leaf scorch, vein spot and pecan scab
- Average rate of most common formulations:
 - Orbit/Super-Tin AGPAK (5 acres/20oz AGPAK)
- Preharvest interval: 48 hours
- Restricted entry interval: 30 days

Thiophanate

- Formulations: Topsin-M 70WP
- Target diseases: vein spot, pecan scab and stem end blight
- Average rate of most common formulations:
 - Topsin-M 70WP (½-1 lb./A)
- Preharvest interval: 12 hours
- Restricted entry interval: Do not apply after shuck split

Fungicides Used on Pecans

Crop	Class	Fungicide	Trade Name	% Acres Treated as Reported by Growers in 1991	% Acres Treated In 2002	Average # Applications
Pecan	Fungicide	Fenbuconazole	Enable 2F	Not reported	10	1
Pecan	Fungicide	Propiconazole + triphenyltin hydroxide	Orbit 45WP/Super-Tin 80WP AGPAK	7	60	1

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