

Crop Profile for Peaches in Arkansas

Prepared: February, 2003

General Production Information

- **State Rank:** 13th
- **Percentage of U.S. Production:** >1%
- **Total acres grown:** 2800 acres
- **Cash Value:** \$3,336,000

Production Regions: Arkansas has peach production throughout the state. The largest concentrations are in central Arkansas (Johnson, Franklin, Pope and Faulkner Counties); southwest Arkansas (Howard and Clark Counties); northern Arkansas (Boone, Benton and Washington Counties); and Crowley's Ridge in eastern Arkansas (Cross and St. Francis Counties).

Production Methods: Most peach plantings in Arkansas are small orchards of 20 acres or less and only a few orchards have more than 100 acres. Site selection is an important factor in successful peach production and optimal production is obtained on light, sandy soils with at least 36 inches of soil depth. Orchards are typically located on elevated locations to minimize the effects of low temperature events such as spring frosts and active frost protection measures (wind machines, overhead sprinkler irrigation, etc.) are recommended. Supplemental irrigation is also recommended. In sites where peach replanting has occurred there is risk of peach tree short life (PTSL) complex. To minimize the risks associated with PTSL orchard should not be replanted to peaches for 4 to 5 years. Alternatively, the use of nematode tolerant rootstocks (Guardian, Nemaguard, Lovell or Halford), minimizing the amount of pruning that occurs between early October and early February and the use of herbicides to manage weed pressure are common practices to avoid PTSL. Peach trees are planted in the late fall or early spring. A partial crop is harvested in the third year after planting and full production is expected by the fifth season. Hand thinning of excess crop is a major expense to peach producers in Arkansas but it is essential for production of large fruit for optimal direct marketing. Orchard floor management usually begins with a fall preemergence herbicide application combined with a postemergence application for winter annual weed control. In spring another preemergence herbicide application is made with follow-up applications of postemergence materials to control escaped weeds. Mechanical weed control is not recommended due potential injury to root systems and implication to increased occurrence of PTSL. Typically a vegetation-free strip is maintained in the tree row and a non-competitive grass alley is left between rows. Orchards are pruned in the winter or early spring and some summer pruning may be done to maintain a good light environment within the tree canopy.

Commodity Destination(s):

Fresh Market 100%

Cultural Practices

Worker Activities

Approximately 85% of the peach acres are pre-pruned by mechanical equipment during the dormant season. Fifteen percent of the peach acres are pruned by hand as a follow-up to the mechanical pruning.

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 throughout the growing season.

Insecticides and fungicides are applied from early spring up to harvest primarily with orchard blast sprayers.

Crop thinning by hand is performed on approximately 15% of the peach acres during April through May. Virtually the entire peach crop is hand-harvested.

Insect Pests

Peachtree borer *Synanthedon exitiosa* (Say)

The peachtree borer is native to North America and is one of the most serious pests of peach. The adult of the peachtree borer is a clear-winged moth. The female moth is dark steel blue, with a broad, orange band around the abdomen. The male moth is light steel blue, with several yellow stripes around the abdomen and a triangular tuft at the abdominal tip. Both wings are clear with dark borders. Moths are active during the day. Mating pairs are a common sight in infested orchards. Females normally mate and begin to lay eggs within a few hours after emerging. Larvae are yellowish-white to cream-colored caterpillars with brown heads, and are about 1 to 1-1/4 inches (25-30 mm) long when fully grown. Only the larval stage of the peachtree borer causes injury. Larvae burrow in and feed on the cambium and inner bark of trees, usually at the base of the trunk from three inches below to 10 inches above the ground line. Several larvae may develop in one tree. Young trees are particularly susceptible to borers; often they are completely girdled and die. Older trees lose vigor and productivity. Heavily infested trees may exhibit partial dieback, yellowing of foliage and stunted growth.

Monitoring: Look for masses of gum, frass and wood particles exuding from the base of the tree. These are often the first evidence of infestation. Pheromone traps are available for precise monitoring of this insect. This helps insure appropriate timing for borer control treatments. Moths emerge from May through August with peak emergence typically occurring in late July or August. Pheromone traps are available for monitoring this insect.

Control: Peachtree borer moths can be controlled with timely insecticide applications. At bud swell or immediately after harvest apply trunk sprays with a handgun to prevent larval entry into the trees. Young peach trees should be protected before planting by dipping the roots and crowns in an insecticide. Lorsban is the material of choice but Asana, Phaser, and Thiodan can also be used.

Lesser Peachtree Borer *Synanthedon pictipes* (Grote and Robinson)

The lesser peachtree borer, *Synanthedon pictipes* (Grote and Robinson), like its relative the peachtree borer, is a native insect pest of peach. Lesser peachtree borer adults are metallic, blue-black, clear-winged moths, that somewhat resemble dark wasps. They have a wing-spread of about 3/4 to 1-1/4 inches. Males and females are similar in appearance; both sexes resemble male peachtree borer moths but have a more pointed abdominal tip than the peachtree borer. Yellow

crosswise bands are usually present on the 2nd and 4th abdominal segments, although the second band may be indistinct. The wings are clear except for dark borders. Larvae are creamy-white caterpillars with dark-brown heads. They are about 1 inch long when fully grown. Larval feeding habits and appearance are almost identical to those of the peachtree borer larvae, but lesser borers are usually found in wounds on scaffold limbs. Damage to trees is caused by the larval stage. Larvae burrow, feed and develop in the inner bark and cambium of the upper trunk and large branches. Masses of gum mixed with frass and wood borings normally exude from infested areas. Infestations are most common under loose bark in crotches and around wounds or cankers. "Bleeding" dark, dead or swollen areas on the trunk or limbs may indicate infestation. Larval feeding is thought to reduce tree vigor, weaken the scaffold limbs and may promote attack by shothole borers or provide entry sites for *Cytospora* canker. In heavily infested trees, large scaffold limbs may be completely girdled by borers and die. Damage is frequently worse in older orchards. Uncontrolled infestations may make trees unsalvageable. There is an emergence period in April to mid-May and a second emergence period that extends from June to September. Females mate and begin to lay small, reddish-brown eggs along the trunk and limbs. Eggs are usually laid singly in cracks in the bark, frequently in the crotch and around wounds or injuries from *Cytospora* canker, previous borer infestation, mechanical injury, sun scald, winter injury or poor pruning. Eggs hatch in one to three weeks, depending upon temperature. The young larvae immediately bore into the bark.

Monitoring: Look for masses of gum, frass and wood particles exuding from scaffold limbs of the tree are often the first evidence of infestation. Pheromone traps are available for precise monitoring of this insect. This helps insure appropriate timing for borer control treatments. Lesser peachtree borer infestations are more common in poorly managed orchards of low vigor or where scaffold limbs break due to high winds or excessive cropping. Proper orchard management can reduce problems with this insect.

Control: Adult populations can be suppressed with well-timed insecticide sprays. Moths may be active from April through September. Moths emerge from April through mid May (1st brood) and June through September (2nd brood). Pheromone traps are a valuable tool that should be used to monitor adult activity. Lorsban is the material of choice but Ambush, Asana, PennCap-M, Phaser, Pounce and Thiodan can also be used.

**Mites: European red mite *Panonychus ulmi* (Koch)
and Twospotted spider mite *Tetranychus urticae* (Koch)**

The European red mite *Panonychus ulmi* (Koch) and the Twospotted spider mite *Tetranychus urticae* (Koch) are the principal mite pests of peach. Adults are minute, eight-legged and appear to have only one body segment. They vary in color and are frequently oval and spiny. Newly hatched young have only six legs but are similar to adults in general appearance. Each species can complete a generation in 10-14 days. Mites pierce leaf cells with their mouthparts and ingest the cell contents, including the chlorophyll. This results in mottled, off-color foliage which may later appear gray or bronzed.

European red mite females can be easily distinguished from other mites. Female red mites are elliptical, brownish-red, about 1/65-inch long and have four rows of conspicuous, white, spine-bearing tubercles on their backs. The spines and tubercles are clearly visible with a 10x-hand lens. Males are smaller, about 1/90-inch long, lighter in color, with less conspicuous spines. The European red mite overwinters as a fertilized egg. Summer eggs are bright red. Winter and summer eggs are laid on leaves and overwintering eggs are laid in groups on the undersides of twigs or branches. Overwintering eggs normally hatch shortly before peaches bloom.

Twospotted spider mite females may range in color from orange to green to yellow. The feeding stage is usually yellowish-green with two dark spots on each side of the body. Female adult mites are about 1/60-inch long. Males are smaller, about 1/80-inch long, with a narrower body and a

pointed abdomen. Extensive webbing may be evident when twospotted spider mites are present. The Twospotted spider mite overwinters as an adult female under loose bark or in ground debris on the orchard floor. They become active in early spring and lay round, straw-colored eggs on weeds and other ground vegetation or on the lower, inner leaves of trees. Severely injured leaves often fall prematurely. Peaches can tolerate relatively heavy mite infestations, but extensive defoliation early in the season can cause a reduction in fruit size and quality. High summer infestations can also cause reduced shoot growth and fruit yields the following year and become an itchy nuisance to pickers.

Monitoring: Starting in May, orchards should be monitored each week to detect increasing mite populations and early damage. Mite populations can be estimated in the field by counting the number of leaves with mites present out of 100 leaves checked. A 10x-hand lens is needed to see the mites on leaves. Generally, a sample consisting of 10 leaves from 10 trees (100 leaves) per orchard is considered adequate.

Cultural control: It was suggested for many years that good weed control or clean cultivation in early season should be used to reduce levels of Twospotted spider mites. Generally, it is now considered favorable to have Twospotted spider mites on ground plants in early season. These serve as a food source for several species of predaceous mites and allow predator population to build up in the orchard.

Control: Mites have also become resistant to some insecticides. Oil sprays for scale insects usually aid in control of the European red mite by killing the overwintering eggs. Oil sprays do not kill Twospotted spider mites, which overwinters on the ground. One or two miticide applications, seven to ten days apart, are frequently needed to reduce summer mite populations. Apollo and Vendex are registered for mite control in peach.

Plant bugs *Lygus* spp. and **Stink bugs** *Acrosternum hilare* (Say), *Euschistus* spp., or *Thyanta* spp.

Some hemipterous insects known to attack peach include: *Lygus* spp. primarily, the tarnished plant bug, *L. lineolaris* (Palisot de Beauvois); the green stink bug, *Acrosternum hilare* (Say); *Euschistus* spp., primarily the brown stink bug, *E. servus* (Say); and *Thyanta* spp. stink bugs. Sucking bug pests of peach vary greatly in color, size and shape. Nevertheless, they have certain characters in common. The front half of the forewing is leathery; the back half-membranous. Their mouthparts are the piercing-sucking type.

Tarnished plant bugs are small, oval, fragile-looking insects, green to dark-brown in color, flecked with white, yellow, reddish-brown and black markings and a yellow "V"-shaped marking on the triangular portion of its back. Nymphs are pale-yellow to green. Adults are about 1/5-1/4 inch (5-6mm) long.

Stinkbugs are broadly shield-shaped, flattened, with a narrow head and rather short legs. The green stinkbug is bright green, sometimes with a visible yellowish-orange to reddish border. It is about 1/2-inch long. Many *Thyanta* spp. stinkbugs are also green, frequently with red shoulders, but are usually only about 3/8-inch long. *Euschistus* spp. stinkbugs are light grayish-brown to brown, marked with dark brown to black speckles. The brown stinkbug, *E. servus*, has slightly pointed shoulders. They are about 3/8-1/2 inch long.

Sucking bugs inject a toxic substance into the plant when feeding to break down plant tissues. Their feeding is very destructive to fruiting bodies and other tender plant parts. Earliest injury to peaches is caused by the tarnished plant bug, which are active by pink. They feed on swelling fruit and leaf buds, causing the buds to dry up. When fruit buds are damaged, blossoms may never open, or may be deformed. Most severe catfacing damage is done in the period from shuck off until the pit hardens (1/2-3/4 inch in diameter). Cells are destroyed and fruit development inhibited at the feeding site, while surrounding tissues continue to grow and expand causing

scarring called "catfacing". As peaches increase in size, feeding by plant bugs or stinkbugs causes less scarring and distortion of the fruit. Clear beads or strings of gum may exude from the feeding site and shallow, dry, corky, sunken areas may develop. Peaches on the edges of orchards bordering woodlands, fencerows, or fields are usually the first and most severely damaged.

Monitoring: Begin checking weekly for tarnished plant bug by pink. Set out white sticky rectangles from the lowest scaffold limb of peach trees along the orchard perimeter nearest woods or fencerows. At petal fall, set out yellow pyramid traps baited with *Euschistus* spp. aggregation pheromone (rubber septum each charged with 50ul methyl 2,4-decadienate) also along orchard perimeter and check weekly for brown stinkbugs. Growers can also jar green and brown stinkbugs from trees on to a ground sheet.

Cultural control: Cultural practices can provide some suppression of sucking bugs. Elimination of broadleaf winter annual weeds and legumes, in and around orchards reduces bug dispersal into orchards. Legumes such as clover and vetch should be avoided as cover crops because they are the natural habitats which these plant bugs and stink bugs reproduce. Good weed control improves the performances of catfacing sprays.

Control: Sprays during pink are sometimes applied where *Lygus* bugs are a major problem. Sprays of Asana, Ambush, Guthion, Imidan, Pounce and Sevin are registered for plant bugs on peach. Prevention of serious catfacing injury depends largely upon well-timed, early-season insecticide applications. Applications of Guthion, Phaser, Imidan, Lannate or Thiodan can be applied from shuck split thereafter at 10-day intervals typically to provide good control.

Oriental fruit moth *Grapholita molesta* (Busck)

The oriental fruit moth, *Grapholita molesta* (Busck), is an imported insect, introduced into North America from Japan about 1913. The insect attacks practically all orchard fruits but is of particular importance as a pest of peach. Moths are dark grey and about 1/4-inch long. They have a wingspread of about 1/2-inch. Larvae are pinkish-white, brown-headed caterpillars, about 1/2-inch long when fully grown, with a black anal comb on the top of their last body segment. They have three pairs of true legs and fleshy prolegs on abdominal segments three, four, five and six. There are at least five generations per growing season in Arkansas. Larvae overwinter in crevices on the trees and in packing crates.

Damage is caused by the larval stage. In the spring, larvae burrow into succulent, rapidly growing terminals. The larva enters a tender twig at a leaf axil near the tip and feeds down the central core of the shoot for two to six inches, resulting in the death of the terminal. The dark, wilted terminals are said to be "flagged". A larva attacks only one terminal or fruit to complete its development. When terminals are killed, lateral shoots develop below the dead area and heavily infested trees may appear stunted and bushy. Larvae of later generations may feed on terminals or developing peaches. Fruit feeding increases as the season progresses and terminal twigs harden. Larvae attacking fruit frequently enter near the stem, leaving little or no external signs of entry. They also may enter where two peaches are in close contact or from the side of an individual fruit. Tiny, dark spots exuding gum may indicate larval entries. Even superficial fruit feeding will provide entry sites for the brown rot fungus. Once inside the fruit, larvae feed to the pit, in a fashion similar to the plum curculio. The presence of distinct legs on oriental fruit moth caterpillars distinguishes them from legless plum curculio larvae. Also, fruit moth larvae exit the peach through holes in the side, from which considerable gum and dark frass may exude. Infested fruits break down rapidly and are usually unfit for consumption. Early and even some mid-season cultivars frequently escape fruit damage by this pest. After harvest is complete, fruit moth larvae may again develop in the terminals if acceptable succulent growth is available.

Monitoring: Timing management decisions for spraying or using mating disruption requires pheromone trap monitoring. At pink, set out three pheromone traps in each orchard. Check twice weekly for first catch of moths. On the day first moths are caught, begin accumulating daily

degree-days (DD base 45° F). Add daily DD values together until it totals 400 DD. That date is when hatch begins and insecticide applications should be applied. Coverage is required from 400 to 700 DD (from April to May) to prevent infestation by this moth larva. The 2nd generation OFM hatches between 1300 to 1700 DD (June), 3rd generation occurs from 2300 -2700 DD (July) and overlaps with later generations until late September.

Cultural control: Good orchard sanitation is also important in reducing oriental fruit moth populations. Prompt removal and destruction of dropped and cull fruits from the orchard and packing shed destroys any larvae infesting these fruit. Also, all fruit should be removed at harvest.

Control: First-brood fruit moths are normally controlled by applications of Imidan or Guthion for plum curculio control. Adequate suppression of the first brood (adults developing from overwintering larvae) may give control for the entire season if orchards are not reinfested from untreated orchards nearby. The summer generations from late-May to mid-August can be controlled by placement in trees of 100 mating disruption dispensers per acre just before second flight begins in late-May. You should spray fruit to protect against hatch whenever you catch 5 or more moths per pheromone trap since the last insecticide application. Ambush, Asana, Guthion, Imidan, Lannate, Pounce and Sevin are registered for this pest.

Plum curculio, *Conotrachelus nenuphar* (Herbst)

The plum curculio, *Conotrachelus nenuphar* (Herbst), is a Native American insect found east of the Rocky Mountains in the United States and Canada. It is a major pest of peaches. Adult plum curculio are small brownish-black snout beetles, about 1/4 inch long, mottled with lighter gray or brown markings. Their snouts are slightly curved and about 1/4 the length of the body. Their backs are roughened and bear two prominent humps and two smaller humps. Larvae are slightly curved, yellowish-white, legless, brown-headed grubs, about 3/8-inch long when fully grown. Both the adult and larval stages of the plum curculio damage fruit. Adult damage on peaches is an 1/8 inch area of shiny fuzz that when teased away will expose a feeding scar and possibly an oval white egg or brown larval tunnel into the flesh. Feeding damage by adults may appear obscure in April, but as the fruit enlarges the old damaged site will enlarge and appear similar to catfacing caused by stinkbugs. These feeding and oviposition sites cause conspicuous scarring of the fruit and may provide entry for the brown rot fungus. The larvae tunnel and feed in developing fruit, usually boring to the pit.

The plum curculio overwinters as an adult in ground litter or other protected places in and around orchards and in nearby woods or fencerows. They become active when mean temperatures reach 50-60°F for several days (three to four) or when the maximum temperature reaches 70°F for two or more days. This is normally shortly before or about the time peaches bloom. Adults fly to the trees, feed on succulent buds, foliage, blooms or newly formed fruit, mate, and females begin laying eggs after the shuck splits. Most eggs are deposited just before, during or just after shuck fall. The egg hatches in two to twelve days, the average is about five days. The larva feeds in the fruit for eight to twenty-two days. The full-grown larva tunnels out of the peach, enters the soil and constructs a small earthen cell, usually one to three inches below the surface. After 12 to 16 days in the soil, the larva transforms into a whitish pupa then to an adult. First generation adults begin emerging in early-June. The complete life cycle, from egg to emerged adult, may require five to eight weeks depending upon climatic conditions. In the Southeast, there are usually two generations and possibly a partial third generation each year. Second generation adults normally appear in mid-July to August. Adults feed on fruit until cool weather, when they seek overwintering sites.

Monitoring: At pink stage for each orchard tie a gray pyramid trap to the trunk of each of four peach trees along the orchard perimeter adjacent to plum curculio overwintering sites (woodlots or fence rows). Once maximum daily temperatures reach 70°F for two consecutive days in March, begin accumulating daily degree-days (DD). After accumulating 50 to 100 DD (about shuck split),

growers often detect the first feeding damage on fruit and may see egg laying begin. Check pyramid traps twice weekly for plum curculio adults. Also inspect 100 fruit along the orchard perimeter for feeding damage. An insecticide application is recommended if the traps exceed 0.05 adults per trap per day or if new damage exceeds 1%. Jarring trees over a ground sheet or beating tray can also monitor adult emergence.

Cultural control: Destroy the nearby plum thickets, abandoned peach trees and other alternate host plants as a way to reduce the possibility of spring movement of adults into orchard. Keep the orchard mowed so adults will not overwinter in the orchard floor.

Control: Control programs should be aimed at the overwintering adults to prevent feeding damage and laying of first generation eggs. Migration of adults into the orchard continues from 50 to 500 DD so this is the period when fruit should be protected by insecticide sprays (most of April). Guthion, Imidan, Phaser, Sevin, or Thiodan are recommended compounds for Plum curculio. Sprays for curculio control are normally initiated about shuck split. The initial application may be followed by two or possible three sprays at around 10 day intervals. The later two sprays also control oriental fruit moth. If the egg-laying adults are not effectively controlled, additional applications may be necessary to prevent damage by first and second-generation adults and larvae from early June through harvest. In infested orchards, special attention should be given to checking for adults and fruit damage until harvest.

San Jose scale *Quadraspidiotus perniciosus* (Comstock)

San Jose scale, *Quadraspidiotus perniciosus* (Comstock), is a pest of peach. Adult females of the San Jose scale are yellow, circular, sac-like, legless insects. They secrete and live beneath a round, gray-brown, waxy scale covering made up of concentric rings surrounding a raised nipple near the center, about 1/16-inch in diameter. Adult males are tiny, golden-brown, two-winged insects, about 1/25 inch long. They mature under elongate, oval scale coverings, about 1/24 inch long with the raised nipple located near one end. Crawlers are yellow, somewhat oval, about 1/100 inch long, and resemble tiny larval mites. Scale insects suck sap from foliage, twigs, branches and fruit. An initial sign of infestation may be a few red spots on the fruit. On heavily infested trees, much of the bark surface of branches or the trunk may be covered with a gray coating of overlapping round scales. Some crawlers move to and settle on fruit causing red spots. If heavy infestations are not controlled, damaged limbs may crack and die. Scale infested terminal twigs normally die first. In severe cases, entire trees may die.

Monitoring: By 1 April, set out two San Jose scale pheromone traps in the tops of scale-infested trees. Check traps twice weekly and note date that males are captured. Accumulate degree-days (base 51°) after that date. In early May or at 350DD, wrap actively infested branches with double-sided sticky tape. Check tapes twice weekly for crawlers and continue replacing tapes until crawlers no longer appear on tape.

Cultural control: Pruning out scale-infested limbs will reduce scale infestations. Careful pruning can also open the canopy and allow better spray coverage.

Control: Insecticidal controls are normally suggested when scale spotting was present on fruit the previous year or when scales are found on wood. The most common and effective control is dormant or delayed dormant Superior oil sprays plus Lorsban 4E to kill overwintering adult scale. Complete coverage with dilute sprays is critical since the spray must coat the scales to kill them. Scale populations are further reduced by applying Diazinon during the crawler emergence period in May as determined by pheromone traps, degree-days and crawlers on sticky tape traps. Crawlers emerge for 2 to 3 weeks after 450 DD accumulate. These sprays also should be applied with sufficient volume to wet woody portions of the trees. Control measures may have to be repeated for several years to adequately reduce heavy infestations.

Green June Beetle, *Cotinus nitida* (Linnaeus)

The green June beetle is a pest of ripe peach in Arkansas during harvest. The adult beetle causes direct damage to the fruit. They are large bodied metallic green-brown beetles. Adults emerge from the soil after a soaking rain in late June or July. Adults are first noticed flying low to the ground over pastures and then around adjacent trees. They are maturing sexually at this time and mating. After mating the females dig into the pasture to lay eggs in the soil usually in pastures where livestock have grazed or where green manure is used as fertilizer. Larva feed on fungi and decomposed organic matter at the soil surface. The larvae spend their entire life in the soil, form soil cells the following May where they pupate and then emerge from the soil as adults. The newly emerged females emit a sex pheromone that attracts males to mate. After mating and egg laying, the adults are attracted to and feed on various types of sweet sap, ripening, and damaged fruit, such as peaches. They have an aggregation pheromone that calls other beetles to feed and congregate on the fruit in large numbers. They are messy feeders, staining and tainting the fruit and those below the feeding sites. Flying beetles are noisy and startle the harvesters.

Monitoring: Look for the beetles flying in pastures or around trees in late June through July. They will be looking for food about a week after emerging from the soil and mating.

Chemical Control: Spraying the orchard when beetles are present will give some immediate knockdown of this insect but may also cause the beetle to spread out in the orchard. One or more sprays may be necessary to prevent economic damage. The following chemical is labeled for control of green June beetle: Sevin.

Insecticides Labeled for Peaches

Azinphos-methyl

Formulations: Guthion 50WP, Guthion 35WP

Target pests: Oriental Fruit Moth, Plum Curculio, Plant bugs, Scale, and Green June beetle

Average rate of most common formulation:

-- Guthion 50WP (1.75-2 lbs/A)

-- Guthion 35WP (1 lb/100 gal)

Preharvest interval: 14 days

Restricted entry interval: 48 hours

Carbaryl

Formulations: Sevin 80S, Sevin 4F, and Sevin 4EC

Target pests: Oriental Fruit Moth, Plum Curculio, Plant bugs, Scale crawlers, Green June beetle

Average rate of most common formulations:

-- Sevin 50WP (4-8 lb/100 gal)

-- Sevin 80S (1.25 lb/100 gal)

-- Sevin 4F (1 qt/100 gal)

-- Sevin 4EC (1qt/100 gal)

Preharvest interval: 3 days

Restricted entry interval: 12 hours

Chlorphrifos

Formulations: Lorsban 4EC

Target pests: Scale, mites, and borers

Average rate of most common formulation:

-- Lorsban 4EC (3-6 pts/100gals for borers) or (3-6 pts/100gals plus oil for scale)

Preharvest interval: 14 days or postharvest

Restricted entry interval: 24 hours

Clofentezine

Formulations: Apollo 0.42SC

Target pests: mites

Average rate of most common formulation:

-- Apollo 0.42SC (2-8oz/A)

Preharvest interval: 30 days

Restricted entry interval: 12 hours

Diazinon

Formulations: Diazinon 50WP

Target pests: scale crawlers

Average rate of most common formulation:

-- Diazinon 50WP (1 lb/100 gal)

Preharvest interval: 21 days

Restricted entry interval: 24 hours

Dormant oil

Formulations: Superior oil

Target pests: scale

Average rate of most common formulation:

-- Superior oil (1-3 gals/100 gal for scale) or (0.5 gal/100 gals plus Lorsban for borers and scale)

Preharvest interval: postharvest, after leaf fall only

Restricted entry interval: 12 hours

Endosulfan

Formulations: Phaser 50WP, Phaser 3 EC, Thiodan 50 WP. Thiodan 3EC

Target pests: Peachtree borer and lesser peachtree borer

Average rate of most common formulations:

-- Phaser 3 EC (6pt/100gal) for borers

-- Phaser 50WP (2 lbs/A) for plant bugs, Oriental Fruit moth, plum curculio, scale

-- Thiodan 3EC (6 pts/100gal) for borers

-- Thiodan 50 WP (2 lb./A) for plant bugs, Oriental Fruit moth, plum curculio, scale

Preharvest interval: 30 days

Restricted entry interval: 24 hours

Esfenvalertae

Formulations: Asana XL 0.66EC

Target pests: scale, oriental fruit moth, plum curculio, plant bugs

Average rate of most common formulation:

-- Asana XL 0.66 EC (2-5.8 fl oz /100 gal)

Preharvest interval: 14 days

Restricted entry interval: 12 hours

Fenbutatin-oxide

Formulations: Vendex 50 WP, Vendex 4L

Target pests: mites

Average rate of most common formulation:

-- Vendex 50 WP (1-1.5 lbs/A)

-- Vendex 4L (4-8 fl oz/100 gal)

Preharvest interval: 14 days

Restricted entry interval: 48 hours

Methomyl

Formulations: Lannate LV

Target pests: Stink bugs, Oriental Fruit moth

Average rate of most common formulation:

-- Lannate LV (3-6 pt/A)

Preharvest interval: 4 days

Restricted entry interval: 4 days

Permethrin

Formulations: Pounce 3.2 EC, Pounce 25WP, Ambush 25 WP, Ambush 2 EC

Target pests: Mites, Lesser peachtree borer, Plum curculio, Oriental fruit moth, Plant bugs

Average rate of most common formulations:

-- Pounce 25 WP (1.6-3.2 oz/100 gal)

-- Pounce 3.2 EC (1-2 fl oz/100 gal)

-- Ambush 2 EC (1.6-6.4 fl oz/100 gal)

-- Ambush 25 WP (1.6-6.4 oz/100 gal)

Preharvest interval: 7 days

Restricted entry interval: 12 hours

Phosmet

Formulations: Imidan 70WP

Target pests: Oriental Fruit Moth, Plum Curculio, Plant bugs, Scale, and Green June beetle

Average rate of most common formulation:

-- Imidan 70 WP (2.25-3 lbs/A)

Preharvest interval: 14 days

Restricted entry interval: 24 hours

Pyridaben

Formulations: Pyramite 60WP

Target pests: mites

Average rate of most common formulation:

--Pyramite 60WP (4.4oz/A)

Preharvest interval: 7 days

Restricted entry interval: 12 hours

Summer oil

Formulations: Saf-T-Side

Target pests: scale

Average rate of most common formulation:

-- Saf-T-side (1-1 ½ gals/100 gal)

Preharvest interval: 14 days or postharvest

Restricted entry interval: 4 hours

Insecticides Used on Peaches

Crop	Class	Insecticide	Trade Name	% Ac Trt. as reported by growers in 1991	% Ac. Trt. In 2002	Avg. # Applic.
Peach	Insecticide	Azinphos-methyl	Guthion 50WP or 35WP	47	70	2
Peach	Insecticide	Carbaryl	Sevin 80S or 4F or 4EC	35	70	2
Peach	Insecticide	Chlorpyrifos	Lorsban 4EC	8.0	50	1
Peach	Insecticide	Diazinon	Diazinon 50WP	3.1	4	
Peach	Insecticide	Dormant oil	Superior oil	9.0	50	1
Peach	Insecticide	Endosulfan	Phaser 50WP or 3EC, Thiodan 50WP or 3EC	1.2	50	2
Peach	Insecticide	Esfenvalerate	Asana XL 0.66EC	13	35	1

Peach	Insecticide	Fenbutatin-oxide	Vendex 50WP or 4L	0.6	1	1
Peach	Insecticide	Permethrin	Ambush 25WP or 2EC, Pounce 3.2 EC or 25WP	31	35	2
Peach	Insecticide	Phosmet	Imidan 70WP	31	65	1
Peach	Insecticide	Malathion	Malathion	0.7	4	1
Peach	Insecticide	Methyl parathion	Penncap M	3.7	5	1

Diseases

Bacterial Spot *Xanthomonas compestris* pv. *Pruni*

Bacterial spot occurs on the leaves, twigs and fruit of peach. Leaf infection may be so severe as to completely defoliate the tree. Cankers on the twigs may cause dying back and serve as a source for later infections.

Leaf symptoms- The first sign of bacterial spot on the leaves appears as a small circular or irregular area a little lighter in color than the surrounding leaf tissue. As the disease develops, the spots enlarge, become angular in outline and darken into a brown color. Central areas of the infected spots may fall out, giving the leaves a shot-hole appearance. Badly infected leaves may turn yellow and drop off. Complete defoliation may occur. Heavy defoliation early in the summer may reduce fruit size and weaken the tree.

Twig symptoms- Spring cankers may form on twigs of the previous season's growth. Cankers will first appear as small water-soaked blisters about the time the first leaves appear. They may grow to 2-3 inches in length. Later in the spring, the epidermis over the lesions ruptures and the bacteria are exposed for dissemination by the wind, rain and insects. Summer cankers develop on current season twig growth in mid to late summer or early fall. As they develop they are slightly sunken, circular to elliptical in shape with water-soaked margins. Overwintering cankers are the primary sources of spring infections of this disease.

Fruit symptoms- Bacterial spot will appear on the fruit as small circular spots on the surface. As the disease develops, the spots become brownish and depressed and the margins may appear water-soaked. Following spot development, the fruit continues to enlarge, cracking and pitting ensues around the infected areas. The cracking may vary from slight to deep, and it may be limited in area or cover 25-50 percent of the fruit. A warm moderate spring with frequent rains accompanied by fairly high winds and heavy dews favor severe infection. Heavy, driving rains are particularly effective in spreading the bacteria through the trees and fruit present. Hot dry weather will usually slow down or stop the disease from spreading.

Cultural control: Use of resistant varieties is the primary method for controlling bacterial spot. Balanced fertilization programs should be followed. Excess nitrogen may aggravate the problem.

Control: Copper hydroxide, copper oxychloride, basic copper sulfate plus Ziram 76DF, Ferbam 76 Granuflo are the recommended choices during the dormant period before bud swell. Recommended sprays from delayed dormant through shuck split are dry copper hydroxide or liquid copper hydroxide plus Ziram 76DF. Mycoshield can be applied 7-10 days after shuck split if necessary. The period from petal fall through second cover is often critical in controlling bacterial spot.

Brown Rot *Monilinia fructicola*

Brown rot is a serious disease of peach in Arkansas. Brown rot reduced yields by killing blossoms and twigs and by rotting the fruit on the tree and after harvest. Brown rot overwinters in mummies on the tree, ground and in cankers. At the time fruit buds are opening, small, cup-shaped mushrooms called apothecia arise from mummies on the ground. These structures only develop under certain weather conditions. When the apothecia becomes wet their spores are ejected into the air and carried to blossoms where they infect the peaches. Relative humidity of 85% or higher and warm weather (75°F -80° F) is necessary for conidia production. Germination can occur at lower temperatures, which accounts for early spring blight infections. Twig cankers may develop from blighted blossoms or from infected fruit.

Blossom symptoms- This fungus may attack any part of the peach flower. It can grow rapidly and cover the entire flower with a mass of gray conidia if the proper humidity conditions exist. The young fruit may be invaded through the flower and the fungus passed down into the twig to form a canker.

Twig symptoms- Cankers on twigs are usually brown, elliptical and usually sunken. During rainy conditions the canker will appear gummy and gray spore tufts appear on the surface of the bark. This infection may completely encircle the twig, killing that portion above the point of infection.

Fruit symptoms- Fruit symptoms first appear as a small circular brown spot. One or several spots may appear on a fruit. If the fruit is mature, the rot develops rapidly. The outline remains smooth, circular and will be light brown in color. The rotted area will become covered with gray colored tufts that break through the skin of the peach, eventually rotting the entire fruit. The fruit may fall from the tree or remain attached. These mummified fruit are the prime sources of infection for the following year. Hail injury greatly increases the fruit susceptibility to brown rot.

Cultural control: Sanitation measures include maintaining plant-free ground under trees, the removal of mummified fruit from the trees, elimination of wild plum and peach thickets, and elimination of abandoned peach orchards (if possible) that serve as sources of infection. Proper pruning keeps the tree open to allow for more air movement and quicker drying of the foliage.

Control: Thorough spray coverage with effective fungicides is essential to achieve acceptable brown rot control. A good pre-harvest fungicide program is essential. DMI fungicides, Elite, Indar and Orbit, are very important for pre-harvest brown rot control. Limiting the number of times the DMIs are used is the most practical way to slow resistance development. Use MBCs, such as Topsin-M, at pre-harvest only in blocks where sensitive strains of the fungus have been confirmed. Captan, Elite, Indar, Orbit and Abound are all registered for brown rot control.

Peach leaf curl *Taphrina deformans*

Incidence of peach leaf curl is related to failure to obtain good coverage and timing in the dormant season fungicide application. This fungal disease is most likely to occur when weather conditions during bud emergence are wet and cool. Leaves infected with this airborne fungus are severely deformed and often display a variety of colors ranging from light green and yellow to shades of red and purple. As the fungus completes its life cycle, the curled leaves turn brown, shrivel, and drop from the tree. Fruit can also be infected resulting in premature drop or deformation. Premature defoliation reduces fruit yield, quality and tree vigor. On young trees, this can cause a significant amount of tree stress if left uncontrolled. The fungus overwinters on bud scales and bark crevices beneath these areas. In the spring the spores infect young leaves while still in the bud. Spores of the fungus are produced on the surface of infected leaves. Rain splash and wind carry the spores to the susceptible tissue. Leaf curl is more severe when extended cool and rainy weather occurs from bud break until the young shoots and leaves develop. Older leaves become resistant to infection.

Monitoring: Once the leaves are present, inspect leaves throughout the orchard for curling.

Chemical Control: This disease can be adequately controlled with application of a single fungicide either in the late-fall or early spring, prior to bud swell and bud scale opening. It can be adequately controlled with a single fungicide application before bud swell, using Ferbam, Ziram, or copper containing products.

Phomopsis *Phomopsis* spp.

Commonly known as a pocket rot because it produces a rot where the flesh can easily separate from the surrounding healthy tissue to create a conical pocket. The inoculum for this fungus develops in twig cankers. This infection is currently found in the Crowley's Ridge region of eastern Arkansas and the Clarksville area.

Cultural control: Good orchard management practices, scouting and proper pruning to eliminate cankers will help manage this fungus.

Chemical Control: Treatment from brown rot sprays will give partial control of this organism. Topsin-M plus Captan or Abound beginning 6 weeks before harvest is the current recommendation.

Rhizopus fruit rot *Rhizopus* spp.

Rhizopus rot is a soft fungal rot of harvested or over-ripe stone fruit. This rot is very similar to brown rot. The difference being that the skin will slip with Rhizopus rot and not slip with brown rot. Fungal growth and fruit decay are greatly retarded in cold storage but will advance rapidly at warm temperatures. The early appearance of the fungal mycelium will appear as a fluffy white mass that turns dark gray to black as the fungus begins to sporulate. Rotted fruit on the orchard floor allow for inoculum build up as harvest progresses.

Monitoring: Be aware of conditions (insects, hail, birds) that injure fruit in the pre-harvest period and during the harvest operation. Check for Rhizopus rot buildup while monitoring for brown rot. Rhizopus rot is more likely to be a problem where fruits are allowed to fully ripen on the tree. Check for presence of Rhizopus in field bins or crates, the hydrocooler, and the packinghouse.

Cultural Control: Since the fungus attacks fruit mainly after harvest, storage at 39°F will almost completely stop its growth. To minimize the incidence of Rhizopus rot, handle fruit carefully to avoid wounds, keep storage containers and warehouses clean, and keep hydrocooling water clean.

Chemical Control: Pre-harvest fungicide options are not particularly effective against Rhizopus rot. Fungicide sprays applied near harvest for other fungal diseases or post-harvest dips will give some control.

Peach Scab *Cladosporium carpophilum*

Peach scab or freckles is a common disease in Arkansas. The severity of peach scab, like brown rot, is dependent upon weather conditions and the fungicidal control applied by the grower. Twigs, leaves and fruit are infected, but the symptoms on the fruit are the most noticeable and problematic. Fruit infections begin as small greenish circular spots that later enlarge to form olive-green patches, typically found at the stem end. These lesions may coalesce and crack or misshapen or stunt fruit. The cracking may also make the fruit more susceptible to brown rot or attractive to insect attack. The fungus overwinters in the orchard as mycelium on infected twigs. Beginning at shuck split spores are produced and are carried by rain splash and wind. Fruit is most vulnerable to infection during this period. Infections are favored by humid weather. Primary

infection occurs approximately within the month following bloom, although symptoms do not usually become visible until 5 to 7 weeks after infection. Fungicide application during the postbloom period is critical to prevent peach scab. Lack of fungicide treatment will result in severe cracking of the fruit skin, which also can allow for infection by secondary fungi. Mild infections can be mostly cosmetic, but if no fungicides are applied, scab can be severe.

Monitoring: Examination of susceptible trees for scab aids the grower in identifying areas of future disease concern, and also allows for assessment of the effectiveness of the current spray program.

Cultural Control: Proper and regular tree pruning facilitates air movement, reduces length of wet periods, and improves spray penetration into trees.

Chemical Control: Fungicide sprays, applied at 10 to 14 day intervals, should be made beginning at petal fall and continuing until 40 days before harvest. Resistance management strategies should be considered when planning season-long spray schedules to control peach scab. The following compounds are registered for Peach scab control: Abound, Bravo, Captan, Captec or Sulfur are all registered for control of this disease.

Fungicides Labeled for Peaches

Azoxystrobin

Formulations: Abound 2.08F

Target pests: Peach leaf curl, Scab, brown rot

Average rate of most common formulations: -Do not apply to peaches between shuck-split stage and harvest.

--Abound 2.08F (11-15.4 fl oz/A)

Preharvest interval: 0 days

Restricted entry interval: 4 hours

Captan

Formulations: Captan 50 W, Captec 4L

Target pests: Scab, Blossom blight

Average rate of most common formulations:

--Captan 50W (4-6 lb./A)

--Captec 4L (2-3 qt./A)

Preharvest interval: 0 days

Restricted entry interval: 96 hours

Chlorothalonil

Formulations: Bravo Weather Stik, Bravo Ultrex WDG, Bravo 500, Equus 720

Target pests: Peach scab and blossom blight

Average rate of most common formulations: Do not apply to peach between shuck-split stage and harvest

-- Bravo Weather Stik (3-4 pt./A)

-- Bravo Ultrex WDG (2.8-4 lbs/A)

-- Bravo 500 (4-6 pt./A)

-- Equus 720 (3-4 pt./A)

Preharvest interval: Do not apply after shuck split

Restricted entry interval: N/A

Copper

Formulations: Tenn-Cop

Target pests: Bacterial Spot

Average rate of most common formulations:

--Dry copper hydroxide (1.5 lbs/A)

--Liquid copper hydroxide (3.3 pt./A)

Preharvest interval: 6 hours

Restricted entry interval: 21 days

Copper Hydroxide

Formulations: Blue Shield 50WP, Kocide 50WP, Champ

Target pests: Bacterial Spot and Peach leaf curl

Average rate of most common formulation:

-- Blue Shield 50WP (4-6 lb./A), Kocide 50WP (4-6 lbs/A), dormant

Preharvest interval: 21 days

Restricted entry interval: 24 hours

Dicloran

Formulations: Botran

Target pests: Rhizopus rot, Botrytis rot

Average rate of most common formulation:

-- Botran 75W (1.33-5.33 lbs/A)

Preharvest interval: 10 days

Restricted entry interval: 12 hours

Fenbuconazole

Formulations: Indar 75W

Target pests: Brown rot

Average rate of most common formulation: preharvest

--Indar 75W (2 oz/A)

Preharvest interval: 0 days

Restricted entry interval: 12 hours

Ferbam

Formulations: Ferbam 76 Granuflo

Target pests: Peach leaf curl and Bacterial Spot

Average rate of most common formulations:

--Ferbam 76 Granuflo (3 lbs/A)

Preharvest interval: 21 days

Restricted entry interval: 48 hours.

Iprodione

Formulations: Rovral 50WP

Target pests: Blossom blight

Average rate of most common formulation: Do not use after petal-fall on peach.

-- Rovral 50WP (2 lbs/A)

Preharvest interval: 0 days

Restricted entry interval: 12 hours

Oxytetracycline

Formulations: Mycoshield 17W

Target pests: Bacterial spot

Average rate of most common formulations:

--Mycoshield 17W (0.75 lbs/A)

Preharvest interval: 21 days

Restricted entry interval: 12 hours

Propiconazole

Formulations: Orbit 3.6E

Target pests: Brown rot

Average rate of most common formulations:

--Orbit 3.6E (4 oz/A)

Preharvest interval: 0 days

Restricted entry interval: 24 hours

Sulfur

Formulations: 95% sulfur

Target pests: Scab

Average rate of most common formulations:

-- Sulfur (9-12 lbs/A)

Preharvest interval: 0 days

Restricted entry interval: 24 hours

Tebuconazole

Formulations: Elite

Target pests: Brown rot

Average rate of most common formulations: Preharvest

-- Elite 45 DF (4 oz/A)

Preharvest interval: 0 days

Restricted entry interval: 12 hours

Thiophanate

Formulations: Topsin-M 70W, Topsin-M 70 WSB

Target pests: Blossom blight

Average rate of most common formulations: limited site fungicide

--Topsin-M 70W (1.5 lbs/A)

--Topsin-M 70 WSB (1.5 lbs/A)

Preharvest interval: 1 day

Restricted entry interval: 12 hours

Ziram

Formulations: Ziram 76DF

Target pests: Bacterial Spot and Peach leaf curl

Average rate of most common formulations:

--Ziram 76 DF (3-4 lb./A)

Preharvest interval: 14 days

Restricted entry interval: 48 hours

Fungicides Used on Peaches

Crop	Class	Fungicide	Trade Name	% Ac Trt. as reported by growers in 1991	% Ac. Trt. In 2002	Avg. # Applic.
Peach	Fungicide	Azoxystrobin	Abound 2.08F	Not reported	60	2
Peach	Fungicide	Captan	Captan 50W, Captec 4L	93	60	2
Peach	Fungicide	Chlorothalonil	Bravo Weather Stik or Ultrex WDG or 500, Equus 720	45	60	3
Peach	Fungicide	Copper hydroxide	Kocide 50WP, Blue Shield 50WP, Champ	3.2	100	1
Peach	Fungicide	Fenbuconazole	Indar 75W	Not reported	25	3
Peach	Fungicide	Ferbam	Ferbam 76 Granuflo	4.2	50	2
Peach	Fungicide	Iprodione	Rovral 50 WP	6	40	1
Peach	Fungicide	Oxytetracycline	Mycoshield 17W	1.4		
Peach	Fungicide	propiconazole	Orbit 3.6E	Not reported	95	1

Peach	Fungicide	Sulfur	Sulfur	38	95	1
Peach	Fungicide	Tebuconazole	Elite	Not reported		
Peach	Fungicide	Thiophanate	Topsin-M 70W or 70 WSB	22	100	3
Peach	Fungicide	Benomyl	Benlate	29	40	1

Nematodes

Peach tree short life (PTSL), tree survival and general productivity of orchards planted on light, sandy soils may be improved by management of resident nematode populations. Preplant assays for the presence of root knot, root lesion, or ring nematodes should be performed to determine the need for fumigation before planting. Preplant fumigation is strongly recommended for light, sandy soils where these nematodes are present. If no nematodes are detected in the assay then a 6-8 foot wide strip along the tree row is all that needs to be fumigated. Postplant treatment consists of two annual applications of a nematicide in the fall for nematode population suppression.

Nematicides and Soil Fumigants Labeled for Peaches

1,3-dichloropropene

Formulations: Telone II

Target pests: Ring, root knot, root lesion nematodes; bacterial canker

Average rate of most common formulations: -used as a preplant soil fumigant, trees can easily be killed by Telone if planting takes place too soon after application, thorough soil preparation is required and soil moisture is a critical consideration; carefully review the label before application.

-- Telone II (27-35 gal./A)

Preharvest interval: N/A

Restricted entry interval: 5 days

Metam Sodium

Formulations: Vapam, Sectagon II, Busan 1020

Target pests: Ring, root knot, root lesion nematodes

Average rate of most common formulations: -used as a preplant soil fumigant, plan for at least a four week interval between treatment and planting; carefully review the label before application.

-- Vapam (75 gal./A)

Preharvest interval: N/A

Restricted entry interval: 48 hours

Methyl Bromide and Chloropicrin

Formulations: Meth-O-Gas, Brom-O-Gas

Target pests: Ring, root knot, root lesion nematodes; bacterial canker

Average rate of most common formulations: -used as a preplant soil fumigant, tarping is generally used, subject to availability – due to be eliminated by EPA regulation.

-- Meth-O-Gas (225-350 lb./A – tarped)

Preharvest interval: N/A

Restricted entry interval: 48 hours

Fenamiphos

Formulations: Nemaicur 3E

Target pests: Ring, root knot, root lesion nematodes

Average rate of most common formulations: -used as a postplant nematicide, very expensive and not typically used.

-- Nemaicur 3E (1.25 gal./A) applied twice in fall at 2-4 week intervals

Preharvest interval: 45 days

Restricted entry interval: 48 hours

Weeds

Weed control in peach orchards is currently incorporated in a more comprehensive system of orchard floor management. Herbicides have replaced cultivation as the predominant method of weed control. Maintenance of non-competitive vegetation between tree rows and a vegetation-free strip in the tree row is standard practice. Research has shown that weeds can reduce tree growth as much as 50% making weed control an essential practice in newly planted orchards and a highly recommended practice in established orchards. Radiant heating provided by bare soil surfaces may contribute to some degree of spring frost protection and the absence of flowering weeds can lower the incidence of cat-facing injury from plant bugs and stink bugs.

Herbicides Labeled for Peaches

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 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 no use on soils with less than 1% organic matter.

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 vines leaf out.

Restricted entry interval: 12 hours

Comments: Apply only to plants established one year or more. Do not apply to newly transplanted trees until soil has settled. Rainfall/irrigation required within 21 days. For non-bearing orchards only, do not use within one year of harvest.

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. Do not allow spray to contact fruit or foliage.

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 two years or more. Requires rainfall or irrigation

within 4 weeks of application for product activation. Application may result in temporary bleaching or chlorosis of leaves from which the plant will recover. Do not apply after bud break on sandy loam soils

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 or fruit set.

Restricted entry interval: 12 hours

Comments: Do not apply to newly planted trees until soil has settled and no cracks are present. Requires rainfall or irrigation of 0.5 to 1.0 inches to activate product.

Oxyfluorfen

Formulations: Goal 2XL

Target weeds: grasses and broadleaf weeds

Application: Single application of 2.0 to 8.0 pt. in a minimum of 40 gallons of water/acre. Apply only to dormant bearing and non-bearing trees.

Restricted entry interval: 24 hours

Comments: Do not spray foliage. Do not apply if leaves or fruit are present or if buds have begun to swell.

Pendimethalin

Formulations: Prowl 4EC

Target weeds: grasses and broadleaf weeds

Application: Single application of 2.4 to 4.8 qt. in a minimum of 20 gallons of water/acre applied to soil. Apply to weed free soil.

Restricted entry interval: 12 hours

Comments: Apply only to dormant, nonbearing trees. Do not apply if buds have begun to swell. If no rainfall occurs within 21 days of application, irrigate to incorporate.

Pronamide

Formulations: Kerb 50WP

Target weeds: grasses and broadleaf weeds

Application: Single application of 2.0 to 8.0 lb. in 20 to 40 gallons of water/acre. Applied during the

cool, wet season (soil temp. <55° F but before soil freezes). Application rate is dependent on soil texture, lower rates on coarser textured soils.

Restricted entry interval: 12 hours

Comments: Do not apply to fall planted trees established less than one year or spring planted trees established less than 6 months old. Restricted use pesticide.

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 or fruit set.

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 one year old.

Terbacil

Formulations: Sinbar 80W

Target weeds: grasses and broadleaf weeds

Application: Single application of 2.0 to 3.0 lb. per acre in a minimum of 20 gallons of water. Apply in fall or early spring before weed growth begins or fruit set occurs.

Restricted entry interval: 12 hours

Comments: Apply only to trees established three years or more. Do not apply within 60 days of harvest. Do not use on soils of less than 1% organic matter or where roots are exposed.

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 (minimum of 75-day interval between applications) or within 2 weeks of bloom

Restricted entry interval: 12 hours

Comments: Do not use on newly planted trees. Do not contact foliage, limbs or stems. Research indicates best results are achieved in winter, before bud break.

Bentazon

Formulations: Basagran liquid

Target weeds: some broadleaf weeds and yellow nutsedge

Application: Apply as multiple applications (1-2) in established plantings as a directed spray to actively growing weeds. Apply 1.5 to 2 pt./ acre plus crop oil concentrate.

Restricted entry interval: 12 hours

Comments: May require sequential applications for perennial grass control. Grasses need to be actively growing. For use in non-bearing orchards that will not be harvested within one year of treatment.

Clethodim

Formulations: Select 2EC

Target weeds: grasses

Application: Apply as multiple applications (2-4) in established plantings as a directed spray to actively growing weeds. Apply 6 to 16 fl. oz./ acre plus crop oil concentrate containing at least 15% emulsifier at 1% v/v

Restricted entry interval: 12 hours

Comments: May be applied as a spot treatment. May require sequential applications for perennial grass control. Grasses need to be actively growing. For use in non-bearing orchards that will not be harvested within one year of treatment.

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, repeat application needed for bermudagrass and johnsongrass, does not control nutsedge. Do not apply within 14 days of harvest.

Glyphosate

Formulations: Roundup Ultra

Target weeds: grasses and broadleaf weeds

Application: Apply as a single preplant broadcast application to control perennial weeds prior to establishment or 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 make application later than 90 days after bloom. Do not allow spray to contact desirable vegetation, including green shoots or foliage, as severe damage will result. Do not apply within 17 days of harvest.

MSMA

Formulations: Clean Crop, MSMA

Target weeds: bahiagrass, morningglory, sandbur, and suppression of nutsedge

Application: Multiple applications (2-4) of 2.5 pt./acre. Repeat applications at 14 day intervals may be necessary.

Restricted entry interval: 12 hours

Comments: Do not apply more than 3 applications per year. Do not contact bark or foliage. For use in non-bearing orchards only

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. Do not apply within 14 days of harvest.

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 25 days of harvest.

Sulfosate

Formulations: Touchdown 5

Target weeds: grasses and broadleaf weeds

Application: Apply as a single preplant broadcast application to control perennial weeds prior to establishment or as multiple applications (2-4) in established plantings as a directed spray or wiper application (20% solution in water) to actively growing weeds. Use an approved surfactant or wetting agent containing at least 75% active ingredient at 2 qt. per 100 gallons of water to improve coverage of weed foliage. Up to 6.4 pt. in 10-30 gallons of water/acre/year depending on weed species.

Restricted entry interval: 12 hours

Comments: Do not make application later than 90 days after bloom. Do not allow spray to contact desirable vegetation, including green shoots or foliage, as severe damage will result. Do not apply within 17 days of harvest.

Herbicides Used on Peaches

Crop	Class	Herbicide	Trade Name(s)	% Ac Trt. as reported by growers in 1991	% Ac. Trt. in 2002	Avg. # Applic.
Peach	Herbicide	Diuron	Karmex 80WDG	7	35	1
Peach	Herbicide	Glyphosate	Roundup Ultra	3	10	1
Peach	Herbicide	Oryzalin	Surflan 4AS, Oryzalin 4AS	6	10	1
Peach	Herbicide	Paraquat	Gramoxone Extra, BOA	30	70	2
Peach	Herbicide	Sethoxydim	Poast EC	0.5	50	1
Peach	Herbicide	Simazine	Princep 4L, Princep 90WDG	12	50	1

Contacts

Profile Compiled by:

Dr. Donn Johnson
Department of Entomology
319 Agriculture Building
University of Arkansas
Fayetteville, AR 72701
Phone: 479-575-2501
Fax: 479-575-2452
E-mail: dtjohnso@uark.edu

Dr. R. Keith Striegler
Department of Horticulture
316 Plant Science Building
University of Arkansas
Fayetteville, AR 72701
Phone: 479-575-2790
Fax: 479-575-8619
E-mail: kstrig@uark.edu

Barbara A. Lewis
Department of Entomology
319 Agriculture Building
University of Arkansas
Fayetteville, AR 72701
Phone: 479-575-3398
Fax: 479-575-2452
E-mail: balewis@uark.edu

Chris Lake
Department of Horticulture
316 Plant Science Building
University of Arkansas
Fayetteville, AR 72701
Phone: 479-575-2603
Fax: 479-575-8619
E-mail: clake@uark.edu

Contact Personnel:

Ples Spradley
Pesticide Assessment Specialist
Cooperative Extension Service
University of Arkansas
P.O. Box 391
Little Rock, AR 72203
Phone: 501-671-2234
Fax: 501-671-2303
E-mail: pspradley@uaex.edu

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