

Crop Profile for Peaches in Illinois

Prepared October, 2000

General Production Information

Production Facts	
U.S. Rank/ Percent	13 th / 0.83%
Bearing Acreage:	1,600,000
Yeild Per Acre:	7,810 million pounds
Total Production:	12.5 million pounds
Utilized Production:	10.0 million pounds
Price per Pound Value of Utilized Production:	\$0.406
Value of Utilized Production:	\$4,060,000
Fresh Market Production:	10.0 million pounds
Price per Unit:	\$0.406
Value of Fresh and Utilized Production:	\$4,060

Cultural Practices

Good cultural practices include planting on a well-drained site, proper fertilization, proper pruning and training, removal of any diseases or insect-infested fruit or branches, proper control of weeds, and planting disease-resistant cultivars when possible.

Peaches should be planted on a well-drained site, where soil has a depth of 2 feet or more. Peach trees do not tolerate wet "feet"; avoid wet, seepy spots, water drainage areas and heavy clay soils. Where these areas or soils cannot be avoided, bring in good soil to make a berm. For proper fertilization, make all fertilizer applications to peaches in early spring before growth begins.

Insect Pests

There are several insect pests that can cause damage to peach trees. The oriental fruit moth causes die-back of young growing tips and wormy peaches. Plum curculio lays its eggs in crescent-shaped cuts on the young fruit, causing them to drop or be wormy. Borers attack the base of the trunk and the crotches of the main scaffold branches.

Avg. % Crop Loss and Avg. Acres Infested by Peach, Plum, and Cherry Insects

Common Name	Scientific Name	Avg. % Crop Loss*			Avg. Acres Infested*		
		Peach	Cherry	Plum	Peach	Cherry	Plum
American Plum Borer	<i>Euzophera semifuneralis</i>						
Apple Curculio	<i>Tachypterellus quadrigibbus</i>						
Apple Grain Aphid	<i>Rhopalosiphum fitchii</i>						
Apple Maggot	<i>Rhagoletis pomonella</i>						
Black Cherry Aphid	<i>Myzus cerasi</i>		7.6%			11,250	
Brown Mite	<i>Bryobia rubrioculus</i>						
Casebearers, Pistol or Cigar	<i>Coleophora malivorella, serratella</i>						
Cherry Fruit fly	<i>Rhagoletis cingulata</i>		7.4%			3,409	
Cherry Fruitworm	<i>Grapholitha packardi</i>						
Cherry Leafminer	<i>Nepticula slingerlandella</i>						
Codling Moth	<i>Cydia pomonella</i>						
Dogwood Borer	<i>Synanthedon scitula</i>						
European Fruit Leancum Scale	<i>Parthenolecanium corni</i>						
European Red Mite	<i>Panonychus ulmi</i>	5.2%			56,250		
Forbes Scale	<i>Quadraspiotus forbesi</i>						

Greater Peachtree Borer							
Green Peach Aphid	<i>Myzus persicae</i>						
Grape Mealybug	<i>Pseudococcus maritimus</i>						
Japanese Beetle	<i>Popillia japonica</i>						
Leafhopper, White Apple	<i>Typhlocyba pomaria</i>						
Leafrollers							
Lesser Appleworm	<i>Grapholitha prunivora</i>						
Mineola Moth	<i>Acrobasis tricolorella</i>						
Oriental Fruit Moth	<i>Grapholitha molesta</i>	20.8%			30,397		
Oystershell Scale	<i>Lepidosaphes ulmi</i>						
Peach Bark Beetle	<i>Phloeotribus liminaris</i>						
Pear Sawfly	<i>Caliroa cerasi</i>		25.3%			1,250	
Periodical Cicada	<i>Magicicada septendecim</i>						
Plum Curculio	<i>Conotrachelus nenuphar</i>	5.5%	0.2%		22,500	6,187	
Plum Rust Mite	<i>Aculus fockeui</i>						
San Jose Scale	<i>Quadraspidiotus perniciosus</i>	10.4%	0	1.7%	56,250	10,000	35,795
Shothole Borer	<i>Scolytus rugulosus</i>						
Tarnished Plant Bug	<i>Lygus lineolaris</i>						
Twospotted Spider Mite	<i>Tetranychus urticae</i>	5.2%	7.6%	1.3%	15,340	11,250	1,988

*U.S. Averages derived from available information

Peach, Cherry, and Plum Insects

Apple Curculio

The Apple Curculio is found in the midwestern and western United States and in eastern Canada. As soon as the surface temperatures stays at 60° F or higher for 24 hours, the adults will simply crawl around on debris. If the temperatures are high above 60° F, they will fly a short distance. They attack

fruit as soon as it develops. The larvae and adults attack, eating small holes in the sides or ends. The puncturing does not make the fruit fall, but will arrest the growth at the point punctured.

Apple Grain Aphid (*Rhopalosiphum fitchii*)

The adults are green and have dark green lines running vertically and horizontally down the back; one down the middle and five across. They prefer cold, wet weather. The apple grain aphids overwinter in the egg stage.

Damage: As soon as the buds open, the young aphids start to feed on the leaves. Feeding does not cause any leaves to curl and does not cause any serious damage to the tree.

Control: The aphid is not an economic pest and will leave the orchard shortly after petal fall. Therefore, no control measures are necessary.

Apple maggot (*Rhagoletis pomonella*)

The adult apple maggot is a fly, slightly smaller than a house fly, that lays tiny yellow eggs on developing fruit. Apple maggot is primarily a problem in northern Illinois. Adult flies emergence from their overwintering sites in the soil in June, with the heaviest emergence in late June. Emergence continues through August, some may appear in September. Female flies deposit eggs just under the fruit skin; the eggs hatch in 5-10 days. Larvae tunnel through the fruit flesh and mature after fruit falls. One generation per year is usually completed in Illinois, but some areas may have a partial second generation.

Damage: Pits and dimples form on the apple as a result of egg laying damage, leading to misshapen fruit. Larvae damage the flesh by leaving large brown trails allowing decay to occur. When numerous, the fruit grows extremely dimpled and gnarled, and the flesh is ruined.

Scouting/Monitoring: Red spheres covered with sticky material placed around the outside of the tree may help reduce apple maggot damage.

Action Threshold: Insecticides should be applied when 2 to 5 flies per trap have been caught. Subsequent sprays are needed whenever more than 2 flies per trap are captured 10 to 14 days after the last spray.

American Plum Borer (*Euzophera semifuneralis*)

The larvae of the American plum borer overwinter in silken cocoons beneath the bark until the spring. The larva is 18-25 mm long and varies in color from white/gray to gray/purple. Larvae feed on burr knot tissues resulting from the dogwood borer.

Control: Apply an effective pesticide.

Black Cherry Aphid (*Myzus cerasi*)

The adult aphid is black, 3 mm long, and is either winged or wingless. They prefer to feed on sweet cherries, but feed on tart cherries as well. The aphids favor high temperatures combined with high levels of moisture. The eggs overwinter on buds or bark of smaller branches and hatch around the time the buds open.

Damage: When the females emerge from overwintering, they establish colonies by giving birth to wingless females. This process is called parthenogenetic ovoviviparous reproduction. Soon after the colonies are established, the tips of the leaves will show signs of curling.

Control: Control by contact or systematic aphicides. Direct towards females hatching from overwintering eggs.

Brown Mite (*Bryobia rubrioculus*)

The brown mite overwinters in the egg stage. After hatching, the larvae move from the twigs to the 1/2-inch green stage leaves and flower buds to feed. During the initial feeding period, their color changes from scarlet to greenish brown. Under cool conditions in spring, the larvae stage may last for more than a week. When feeding is completed, practically all the larvae return to the rough bark of the twigs and fruit spurs. After about a month, the adults deposit summer eggs. Eggs are found on both leaves and twigs shortly after the first adults appear.

Damage: Damage is caused by brown mites sucking the contents out of leaf cells. Such leaf damage reduces tree vitality and can adversely affect fruit size. Damage to the leaves and flower buds may also hinder the opening of the flowers. Leaf injury begins as a mottling and browning of leaves.

Control: Determine the relative number of mite eggs present on branches during the dormant season. Use dormant sprays with oils at the high rate to help control the overwintering eggs. An insecticide can be added to control other pests. If necessary, apply a summer application.

Casebearers, Pistol (*Coleophora malivorella*) and Cigar (*Coleophora serratella*)

The partly grown larvae overwinter in cases attached to fruit spurs or small branches of infested trees. In spring, some larvae will detach their cases and move with them to nearby buds. There they feed on leaf and fruit buds to the point that they are severely injured or destroyed.

Damage: Larvae attack growing buds at first and then feed on young leaves later in the season. They attack opening flower buds, blossoms, mature leaves and fruits. In fruit, they mine a short distance beneath the skin, causing the fruit to become slightly deformed.

Control: To prevent injury, sprays need to be applied in the pre-bloom stage

Cherry Fruit Fly (*Rhagoletis cingulata*)

Adult cherry fruit flies are about 4.5 mm long, have black bodies and yellowish heads and legs. On their backs they have a small cream colored dot near the center. They spend about ten months of the year in the soil beneath trees as pupae. In late May the pupae transform to adult flies. As far as emerging, the location of the fly deciphers when they come out of the soil. When the fly does emerge, it will spend about ten days feeding in the tree before laying eggs. Eggs are laid beneath the skin of the fruit, frequently on the sides. Each female can lay up to 300 or 400 eggs during a time span of 3-4 weeks. The eggs hatch in 5-7 days and maggots emerge and begin to feed around the pit of the cherry. They do this for about two weeks. When they're fully grown, they drop from the tree and burrow into the soil. There, they build a puparium and overwinter.

Damage: Damage is done by the females when they deposit their eggs into the fruit. By depositing the eggs directly into the fruit, they puncture the skin. The larvae also damage the fruit. They feed around the pit and in the pulp causing sunken spots to appear. The spots allow the fruit to become more susceptible to diseases.

Control: In June, hang canary-yellow sticky traps baited with feeding attractants. One feeding attractant Cherry fruit flies will respond to is a teaspoon of ammonium acetate or ammonium hydroxide.

Cherry Fruitworm (*Grapholitha packardi*)

The 1.4 mm long, gray larva overwinter in hibernaculum until spring. After pupation, the adult emerges in the form of a small, grayish black moth and is ready to mate. Soon after, the females lay eggs. The

eggs are laid on unripe fruit where they prepare to hatch.

Damage: After about 10 days, the eggs hatch and the larvae bore into the fruit, leaving small, brown trails and damaged fruit.

Control: Chemicals must be applied and timed according to the emergence of the adults. Insecticides should be applied 10-20 days after petal fall.

Cherry Leafminer (*Nepticula slingerlandella*)

In the pupal stage, the cherry leafminer overwinters in orchard litter. Adults emerge from overwintering from late May to mid-June. The adults are small, tan colored moths with wing spans of 3.5 to 5 mm. The forewings have a black band running across the outer third. After overwintering, the female lays an average of 15 to 20 eggs and up to 80. Eggs are laid on the undersides of leaves. When larvae emerge from their shell they bore into the undersides of the leaves they're deposited on. From there they move immediately to the upper epidermis of the leaf and mine the tissue directly below it. The larva is a small, round, annulated caterpillar. The first instars are transparent; later instars become a more greenish white. The full grown larva is about 4 to 5 mm long and about 0.4 mm wide.

Damage: In the early stages the injury is difficult to detect because the larva is a leafminer. As the larva grows, the mining becomes more extensive, thus causing more extensive injury as well. It has caused severe defoliation in orchards that resulted in reduced yield and tree growth. The complete mining cycle is completed in about two weeks. When the larva is mature it cuts a small slit through the leaf and drops to the orchard floor to pupate. After the larva drops, they spin a small, light brown cocoon in the orchard litter. There, they begin to transform into pupae immediately.

Control: About mid-May, use adult attracting black light traps to catch emerging adults. Chemical controls should be directed at the adults before eggs are laid.

Codling Moth (*Cydia pomonella*)

The adult codling moth is 3/8 inches long with gray-brown forewings crossed with light gray and white lines; the wing tips are deep gold or bronze. The larva is white with a brown head. The larva's body is often tinted pink. The larva overwinter and are fully developed at this stage. Pupation occurs in the spring and the first adults are active in late April to early May. Scale like eggs are laid directly on the fruit or nearby leaves or stems so that upon hatching the larva can make its way to the center of the fruit. Upon its journey to the fruit center, the 'frass' is deposited and noticed near the calyx end of the developing fruit. The larva stage lasts 3-5 weeks and upon completion the larvae exit the fruit to pupate.

in a thick, silken cocoon on the bark or some other protected area nearby.

Damage: Codling moth damage is largely a result of the larvae chewing its way into the center of the fruit. The process causes wounds which promote the development of fruit rot. "Frass" or fecal material is pushed out through the side of the fruit skin or the calyx end. Most of the damage occurs due to the second and third generation larvae.

Control: There are three main methods to monitor codling moth activity. First in the regular examination of the fruit, second-pheromone trapping and lastly degree-day models. Pheromone traps need to be monitored from pink to harvest. The traps help guide spray timing and should target larvae emerging from eggs. Sprays should be administered after the biofix of 5 codling moths has been reached. When this happens, sprays should be applied after 250° days have been accumulated. The time period for the 5 moth standard should be on a weekly basis. You can expect about two to three generations per year. Traps should be hung in the southeast quadrant of the tree, 6 feet off the ground and also in the center; never toward the outer edges of the orchard.

Mating disruption control methods employ Isomate C-plus and CheckMate CM (studies show Isomate C-plus has consistently proven itself over CheckMate CM) to dispense a sex attractant which will prevent male moths from locating female moths. This method is best used in at least a 5 acre block with a low infestation count. Mating disruption will also only control codling moths and not the apple maggot or plum curculio that other cover sprays might help with.

Controlling Pesticides And Rates For Codling Moth

Pesticides	Rate/100gallons	Rate/Acre	Comments
Pheromones	1 per 10	min 2	Spray upon 5 moths caught and 250 degree days passed.
Isomate-C Plus	400 dispenser		Mating disruption
Lorsban 50 WP	8-12 oz	2-3 lb	
Guthion 50 WP	.5-.75 lb	2-3 lbs	
Imidan 70 WP	.75-1 lb	2.13-5.33 lb	
PennCap-M	1.5 pints	6 pints	1st and 2nd covers are key spray times

Dogwood Borer (*Synanthedon scitula*)

The dogwood borer is the larva of a small clear wing moth that feeds almost solely inside burr knots. These knots develop on the aboveground portion of rootstocks. The adult resembles a small wasp because they both have a black-and-yellow striped pattern and clear wings.

Damage: One of the first indications of an infestation is an accumulation of reddish-brown material, known as frass, on the surface of the burr knot. Feeding within the burr knot does not exactly harm the tree directly, but it might produce an entry way for diseases. However, persistent infestations can contribute to a slow decline of the tree and reduce yields as well.

Control: To prevent infestations from ever occurring, and help keep burr knots from ever forming, plant trees properly. If infestation has occurred, a thorough coverage with an effective insecticide around the lower trunk and burr knots is necessary for good control. A single application at peak emergence will also provide adequate control. For control before egg laying begins, apply white latex paint to the lower trunk.

European Fruit Leancum Scale (*Parthenolecanium corni*)

The full-grown females are yellowish brown, oval and 3-5 mm long. The scales prefer extreme weather conditions-both hot and cold, but only fertilized females overwinter. They overwinter as immature small scales on twigs.

Damage: Young crawlers cause damage by feeding along the main veins on the under sides of leaves. The infested leaves then become curled and turn yellow. Infested fruit will remain undersized or can drop prematurely. Scales cause damage by sucking sap from leaves during late July and August and from twigs during May and June of the following year. Sucking sap produces honeydew and serves as a medium for fungus growth but at the same time it can cause premature fruit.

Control: Control scale by using chemical sprays, directing them at the newly emerged crawlers. Superior oils can also be used, but they need to be applied at the delayed dormant stage.

European Red Mite (*Panonychus ulmi*)

European red mite females are brick red at maturity, but are born velvety red and change with time. White spots can often be found on the backs of the females. The males are usually a dull green to yellow and have a more slender body than the globular females. The overwintering eggs are red-orange and are somewhat flattened with a stalk growing on top. The eggs laid during the season are a yellow to orange color, are round and have no stalks. The first instar has 6 legs and all the proceeding stages have 8 legs.

The eggs hatch in the spring and the larvae move to leaves to begin feeding. The life stages are as follows: egg, larva, protonymph, deutonymph to adult. There is a resting stage between all the life stages. The time for development is anywhere from 1-3 weeks in typical conditions (warm temperatures). If the temperature is not ideal, the development will take a longer time. Depending on the weather, there will be about 6-8 generations per season.

Damage: European red mites feed by sucking out the juices and chlorophyll from leaves, eventually causing visible leaf bronzing. The injury to the tree/fruit is a poor color, size reduction and low quality. The current years' severity of infestation also determines the next years' damage and severity.

Control: All monitoring of this insect is done by scouting fields. A form of biological control is the predatory mites, lady beetles and banded thrips that help control European red mite populations. Treatments for the codling moth often deplete predator populations, contributing to a rising European red mite infestation.

=>Oil control is an effective way of preventing hatch. Oil is spread on an egg cluster and it suffocates the eggs before hatch. This is vital to demote resistance buildup in the insecticide.

=>Chemical control involves the use of long term miticides during the cluster, pink and petal fall stages.

Control Comments:

- Carzol (oil) Highly toxic to mite predators. Provides control of adult mites only, therefore must be applied repeatedly. Must be applied 7-10 days apart.
- Pyramite (oil) Highly toxic to mite predators. Most effective against motile creatures. Must be applied 7-10 days apart.
- Keithane (oil) Highly toxic to mite predators. Works under cool or warm temperatures, but must be applied back to back only to the same group of mites to avoid resistance build up. Must be applied 7-10 days apart.
- Apollo Helps control mite populations in the long term with the help of natural predators. This miticide will cut mites in the early season allowing populations big enough to be controlled by biological control.
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Forbes scale (*Quadraspidiotus forbesi*)

Mild winters contribute to the presence of the scale in the spring as opposed to the severe winters that could stop the production of the insect. The Forbes scale is very comparable to the San Jose scale. The noticeable difference between the two is that the San Jose scale has a yellow nipple while the Forbes has a raised, reddish center.

Damage: For feeding, the scales eat sap out of trees. However, their eating habits damages trees by making them weak and eventually causing them to die.

Control: Apply a chemical in the summer. Predators and parasites also contribute to controlling the scale

Grape Mealybug (*Pseudococcus maritimus*)

The nymphs go through four or five instars, depending on whether they're male or female. In late June, the adults begin to appear. The males have no mouthparts, but do have wings and are capable of flight. However, they don't get to fly very much because shortly after mating occurs, the male dies. The females, after mating, search for rough bark or older wood for egg laying. Some eggs hatch, but most of them overwinter until the following spring.

Damage: The nymphs overwinter, until spring, in egg sacs. When the crawlers leave the egg sacs, they start feeding at the bases of buds. When the buds open, they go directly to the new shoots and leaves where they settle and feed in clusters on the buds.

Control: Try to control the nymphs before they reproduce. Check rough bark or older wood in the late summer for females or eggs. When infestation is visible, it will be too late for control for the time but it will warn you to take the necessary precautions the following year. Try spraying early in the growing season when the foliage is less dense and there can be complete coverage on the trunks and limbs.

Greater Peachtree Borer

Greater peachtree borer adults have started to emerge over the last 10 days, and stone fruit growers should target trunk sprays of insecticides to prevent injury from this pest. Remember that Lorsban 4E is

registered on cherries, peaches and nectarines, but not plums, for borer control. Thiodan, Ambush/Pounce, and Penncapp-M are registered for borer control, but will give shorter residual control than Lorsban. Additionally, only Thiodan and Lorsban are registered as trunk sprays, the others are foliar applications only.

Applying trunk sprays for greater peachtree borer is especially important this year, when peaches are stressed or damaged from winter injury. Those trees that survived will be susceptible to borer injury for two to three years, and need to be protected. With Lorsban 4E, be sure to apply the product as recommended in E-154, at three quarts/100 gallons. Apply as a coarse spray to the trunk from ground level to the scaffold limbs.

There have been reports of Lorsban residue in Michigan peaches that are likely a result of this borer spray. The Michigan Department of Agriculture is planning use inspections to determine why this residue is being found.

Green Peach Aphid (*Myzus persicae*)

When cold temperatures start coming in the fall, the females give birth to female nymphs. These females then mate with males returning from summer host plants and either lay eggs under buds or overwinter as adults without laying eggs. In the spring, the overwintering females become stem mothers. By June, winged adults appear and the aphids leave the trees by July to migrate to other crops. The stem mothers are a deep pink color. The nymphs are light green with three dark lines running across the back of the abdomen.

Damage: Aphids feed on the undersides of the leaves. This causes them to turn yellow and drop.

Control: The aphids are difficult to control because it is resistant to many pesticides. When using an effective pesticide, cover the lower leaf surfaces thoroughly.

Japanese Beetle (*Popillia japonica*)

This beetle is 3/8 inches long, a metallic green color with copper brown wing covers. It has white hair peaking from below the wing covers. The Japanese beetle overwinters underground in the grub stage for about 10 months. They emerge and pupate in the near soil surface. They are a great turf pest at this point in their lives. When the beetles emerge in late June to mid July, they have the ability to do the most damage. Furthermore, due to their long maturing process, there is only one generation per season.

Damage: Japanese beetles feed on leaves, leaving behind a skeleton leaf with only the veins remaining.

The feeding occurs in groups; they start at the very top of the plant and work their way down. Japanese beetles prefer warmth and are willing to feed on already damaged fruit.

Control: Early control prevents other beetle attraction to the plant. Carbaryl is the cost effective Chemical control; but carbaryl is know to increase other pests like European Red Mites. For Carbaryl application, allow 7-10 days between applications, especially after heavy rain or flight seasons.

Controlling Insecticides And Rates For Japanese Beetle

Insecticide	Rate/100 gallons	Rate/Acre
Imidan 70 WP	.75-1 lb	2.13-5.31 lbs
Sevin 80S	1.25 lbs	5 lbs
Sevin 4F	.75-1 qt	3-4 qts
Penncap M	1-2 pts	4-8 pts

Leafhoppers, White apple (*Typhlocyba pomaria*)

White apple leafhopper adults are long, slender, webshaped with a convex back. The body is a light yellow and the head is slightly darker. The younger adults are pale white and wingless. They have no visible markings. The Rose apple leafhopper has black spots. The Potato leafhopper is light green and can walk sideways as well as backwards and forwards. The White apple leafhoppers overwinter and hatch a pink, with completion at petal fall. The nymphs feed on the underside of leaves. Overall there are two generations; one in June, and the other during harvest. The rose apple leafhoppers overwinter on roses and brambles. Nymphs emerge during the spring and feed on these wild hosts. As adulthood sets on, the leafhoppers move to apples. The second and third generation feed solely on apples. Potato leafhoppers don't overwinter, instead they migrate north through the growing season. Therefore, their damage is unpredictable due to jet stream changes and different migration patterns.

Damage: As a result of apple and rose leafhopper feeding, whitish spots or stippling is evident on the upper leaf surface. They also cause "tar-spotting." This is honeydew secretions covering lower fruit. The nymphs and adults remove chlorophyll and sap from lower leaf surface which can affect fruit and bud formation. These nymphs and adults can be inhaled by fruit pickers.

Control: Monitor by scouting. Treat if 3 out of 25 leaves on a tree are found. Treat young blocks for potato if there have been problems in the past. Leafhoppers have become resistant to cover sprays like Guthion and Imidan. Provado is used more effectively and is less disruptive to mite management.

Leafrollers

Damage: The fruit tree leafroller (*Archips argyrospila*) and red-banded leafroller (*Argyrotaenia velutinana*) feed principally on leaves, but also feeds on blossoms, flower buds, and fruits during bloom. Tiny larvae work their way into opening leaf buds to feed. Once the tree has leafed out, larvae tie up leaves and live within leaf rolls, feeding on leaves or fruit. Damaged fruits that remain on the tree develop deep bronze-colored scars with roughened, netlike surfaces.

Scouting/Monitoring: The decision to apply insecticides for specific leafrollers should be based on the history of damage in specific orchards. In certain orchards there may be no need to take special precautions for leafrollers while in other orchards insecticides are routinely needed for control. Sampling for eggs and small larvae is not practical because of the difficulty seeing them. Monitoring adult populations with pheromone traps is useful for timing insecticide applications against redbanded leafroller and tufted apple budmoth.

Action Threshold: [See NCSU](#)

Lesser Appleworm (*Grapholitha prunivora*)

The lesser appleworm overwinters as a full-grown larva in a cocoon on the tree. Fully mature larva is about 9 mm long and has a characteristic pink tinge to its abdomen. During the spring-during the pre-bloom stage-the larva changes into pupa. The first moths appear in the fields around petal fall, with the majority appearing around the first cover spray. Mating then occurs and eggs are laid singly on leaves and fruit, leaving a white appearance. The larvae appear in early June and immediately search for fruit on which to feed.

Damage: The lesser appleworm larva prefer to enter fruit through the calyx end, but entering through the side is common as well. The larvae are shallow eaters and will cause damage rarely deeper than 1/4 inch. When it matures, the larva bores into the outside of fruit through the skin and causes it to drop to the ground. They can also cause twig injury by consuming the central parts of twigs and then work their way down the shoot for 3-6 inches. Twigs infested by larvae will exhibit wilted leaves, which later die.

Control: Spray applications should be directed at the adults before they lay their eggs and also at the newly hatched larvae before they enter the fruit. Timing of sprays is of great importance.

Mineola Moth (*Acrobasis tricolorella*)

As a partly grown larva, the mineola moth overwinters in a hibernaculum that is usually found on smaller branches. When they emerge from the hibernaculum in mid-April, they crawl to a cluster of buds and form a nest. After the feeding period of 4-5 weeks, the larvae drop to the ground and pupate in the orchard litter. Some time after, the adult moth emerges. They are about 9-12.5 mm long, with a white stripe running across the middle of the forewings. When the females emerge after pupating for 40-50 days, they will probably be carrying an average of 138 eggs. These eggs are deposited on the undersides of leaves and will hatch in 7-9 days.

Damage: The larva feeds on a cluster of buds by entering in through the base of the bud and eating the entire bud contents. One larva may destroy several buds by this form of feeding. Not only do the larva feed on the buds, but they damage the leaves as well. The larva will roll leaves and web them together, forming a clump. This causes the leaves to die. Just as quick as the leaves die, more are pulled together.

Control: Spray chemicals to control either in the overwintering stage or at the beginning and peak of emergence of moths.

Oriental Fruit Moth (*Grapholitha molesta*)

As full-grown larvae, the oriental fruit moth overwinters in cocoons which are found in bark crevices and orchard litter. Severe winters may kill up to 90% of overwintering cocoons, but still leaves enough larvae to produce a normal spring. The full-grown larvae are pink, have brown heads, and measure 10-11 mm long. In mid-March the larvae pupate. Then they emerge in late May/early June and they lay their eggs. The females can lay anywhere from 30-60 eggs and leave them on fruit stems and bark. The maximum egg production occurs when the temperatures are at 70° and above.

Damage: When eggs hatch, most larvae burrow into twigs; only a few attack fruit.

Twig Injury

By burrowing into the twig, the larva consumes the central part and gradually works its way down the shoot. Twigs infested by larvae usually have one or more wilted leaves. The further the distance down the shoot the larva goes, the more leaves become wilted. Wet weather following a dry spell kills the larvae when they're in twigs. This weather drowns them in sap that is produced.

Fruit Injury

Early in the season, the larva feed on fruit by entering into the side. As the fruit grows, a visible dark blotch forms wherever the point of entrance was. Later in the season, with full-grown fruit, most larva enter through the stem because it is usually the first part it reaches as it wanders around for food. No trace of entering is found when they enter this way because they inconspicuously work their way into the fruit without injuring the skin.

Control: Use pheromone traps to monitor adult activity and to time spray applications. Hang traps in April, check them twice a week. Use 10 traps for a 10-acre orchard placing them at least 100 feet apart. Spray recommended pesticides at peak times. For the first generation, spray about 6 days after the first peak adult emergence. For the second generation, spray about 3 days after peak adult emergence. To protect ripening fruit, spray 10-12 days before harvest. If peak emergence of third generation adults occurs weeks before harvest, spray 3 days after emergence.

Oystershell scale (*Lepidosaphes ulmi*)

The male scales are small winged insects. The female are about 0.7 mm long and cream in color. They are grub-like creatures without legs or antennae. The female can overwinter, but only when fertilized. She will carry 40 to as many as 150 eggs. These eggs hatch in the spring where they begin their nymph stage.

Damage: The scale weakens the plant by its feeding and is occasionally found on the fruit so that it is not salable.

Control: Use cover sprays at the crawler stage for effective control. Also, superior oil can be used, but only in the prebloom stage. Many predators such as birds, mites, and wasps are also effective means of control of the oystershell scale.

Peach Bark Beetle (*Phloeotribus liminaris*)

The adult peach bark beetle is about 2.5 mm long and brown. As an adult the beetle overwinters in the tree. Some adults overwinter within their pupal cells in dead or dying trees, others bore into healthy or unhealthy trees where they make hibernation cells. In the spring, they leave their cells and migrate to healthy trees that they burrow into and get food. The female beetles also burrow into the the bark for the purpose of laying from 80 to 160 eggs. After 17 to 20 days, the eggs hatch. The newly hatched larvae are white and have yellowish heads. In 20-30 days, they reach full growth and pupate within the bark. After 4-6 days, they have completed the pupal stage and transform into beetles.

Damage: In order for the beetles to get food, they have to burrow into the tree. This leaves many wounds in the tree. The holes that are left will soon have sap flowing out of them. The constant flow of sap eventually weakens the tree.

Control: Apply fertilizer to help restore weakening trees. Remove trees that wil not recover. Apply effective pesticides when beetles are active.

Pear Sawfly (*Caliroa cerasi*)

The pear sawfly is also known as the pear slug. The larvae is 1.2 mm long. It starts off a light brown color and gets darker as it eats. However, as it grows, it turns back to a lighter shade. The larvae overwinter in a cocoon below the ground until spring. When they emerge and mate, the female deposits her eggs in the leaves of the tree where it takes the eggs 7-11 days to hatch.

Damage: When the larvae emerge from their shells, they begin to eat, leaving small holes in the leaves. After 2-3 weeks, the larvae are ready to become adults so they bury themselves into the ground and change into the pupal stage. In late July, beginning of August, the larvae are now adults and they lay their eggs. The second generation of larvae will cause a greater amount of injury, almost complete defoliation.

Control: In the spring and in late July, early August, check for olive-green slug-looking larvae covered in slime. No special pesticides are necessary-the cover sprays will control them.

Periodical Cicada (*Magicicada septemdecim*)

The adult cicada is about 38 mm long, is a flying insect with clear wings, and has a black body. They usually emerge from the soil in late May. The males start to produce a high-pitched whine to attract the female nymphs. Soon after, the female begins to lay up to 400 eggs. She slices into the wood of a branch and places her eggs inside. Egg laying takes place for about one month; then the adults die.

Damage: Egg laying severely damages branches, which eventually break off in the wind. After the eggs hatch, the tiny nymphs fall to the ground and burrow into the soil. There, nymphs feed on grass roots and, eventually, tree roots for the next 17 years.

Control: Apply a recommended pesticide during the emergence stage, particularly to trees younger than four years old. Summer pruning should be done within a four to six week period after eggs are laid (but before nymphs fall to the ground) and the prunings then burned to prevent the nymphs from going into the ground. For effective control, examine the orchard twice a week during the egg-laying period to see if the pesticide was effective.

Plum Curculio (*Conotrachelus nenuphar*)

The plum curculio is a typical snout beetle, 1/4 inch long with a dark brown body and patches of white or gray. It has 4 humps on the wing covers and the snout is 1/4 the length of the body. The larvae are legless, grayish white grubs with brown heads. At maturity, the larvae are 1/3 inches. The plum curculio overwinters as an adult in ground litter or soil. The adults migrate into orchards each spring. Border rows show the first evidence of damage. They have only one generation emerge per season/year.

Damage: Feeding and egg-laying are the damaging factors resulting from plum curculio infestations. The scars from the egg-laying can be up to 1/4 inches deep. Egg-laying also causes the disshaping of fruit by the time harvest comes around. Larvae feeding results in premature fruit drop which ultimately decreases the chances of a good harvest.

Control: Plum curculio are controlled with petal fall and first cover insecticides which are aimed at the adults, before egg-laying. Considerable egg laying damage can occur over a short time, which will produce a lot of larvae to feed on the plants. Cool weather can often delay immigration from foreign orchards; using insecticides at this point will help control.

Controlling Insecticides And Rates For Plum Curculio

Insecticide	Rate/100 gallons	Rate/Acre
Guthion 50WP	.5-.75lb; .75 lbs in severity	2-3 lbs
Imidan 70WP	.75-1 lbs; 1 lb in severity	2.13-5.33 lbs
Lorsban 50WP	8-12 oz	2-3 lbs
Ambush 25WP	not after petal fall	6.4-25.6 oz
Ambush 2EC	not after petal fall	6.4-25.6 oz
Asana XL	2-5.8 fl oz	4.8-14.5 fl oz
Pounce 25WP	not after petal fall	6.4-12.8 oz
Pounce 3.2EC	not after petal fall	4-8 fl oz

Plum Rust Mite (*Aculus fockeui*)

The plum rust mites are wormlike insects which are basically invisible on foliage. The female mite overwinters in dead or shrunken buds or sometimes in crevices of twigs and bark. Only a small percentage survive the winter. After overwintering, when the buds start to open, the mites begin to migrate to leaves. There, they feed for a few days before starting to lay eggs.

Damage: In July, peak populations occur and several hundred mites can be present on each leaf. This is when the greatest injury occurs, but it is not noticeable until later in the season. The injury comes from the feeding because it causes the leaves to roll upward and turn brown.

Control: Apply effective pesticides when the mites are becoming a problem. If necessary, apply chemical controls after harvest.

San Jose Scale(*Quadraspidiotus perniciosus*)

The adult female insect secretes and lives under a nipple-shaped waxy scale. The scales are usually distributed over the woody parts of the tree but may also be on the fruit. Frequently, a reddened halo appears around the scale on both twigs and fruit. Severely infested trees show decreased vigor, thinning foliage and yellowing leaves.

Shothole Borer (*Scolytus rugulosus*)

The shothole borer adult is 2.5 mm long, and black with red wing tips. The beetles appear in early June. For females to lay their eggs, they must gnaw a hole through the bark of the tree and prepare a chamber for the eggs. A single female will produce 75-90 eggs. The eggs hatch in 3 or 4 days. The larvae that emerge are white with reddish heads. When full grown, they are about 2.5 mm long. After feeding for 30-36 days, they have reached full growth and are then ready to pupate. The pupal period lasts 7-10 days and then the young begin to deposit eggs. Two generations will occur annually.

Damage: The beetle and larva both favor trees that have been greatly weakened or that are dying. These trees provide the most acceptable food for them. It is not until after their preferred food has been used that they will attack vigorous trees. It is by these attacks that trees are injured because it weakens them. When they attack a healthy tree, the gum will check the entrance of the beetles and will prevent the development of larvae when eggs are deposited. The pest attacks the trunk, branches, and twigs.

Control: Eliminate breeding places in the orchard and in land adjacent to orchards. Apply fertilizer to help restore weakened trees. Apply effective pesticides when the beetles are active.

Tarnished Plant Bug (*Lygus lineolaris*)

Shiny, circular spots of excrement on various plant parts indicate the presence of tarnished plant bugs. These bugs pierce the terminal growth, squares, flowers and bolls with their needle-like mouthparts and extract plant juices. The most conspicuous result is the appearance of warty growths on flower petals and inside the bolls. The more economically important damage, however, is not as noticeable. Injured pinhead squares and terminals drop from the plant. The anthers of larger squares may turn black resulting in poor pollination and reduced boll set. Larger bolls, opening prematurely, expose lint which becomes discolored, clings inside the warty boll, and is difficult to harvest. Finally, cotton seed harvested from heavily infested fields germinates poorly.

Twospotted Spider Mite (*Tetranychus telarius*)

Damage: Feeding damage from light infestations first appears as pale patches on the leaves. Heavier infestations cause the entire leaf to become light-colored, dry up, and turn a reddish brown. The under surfaces of the leaf will have a webby covering under which the adult mite feeds and lays eggs. Although called "red spider," their color can vary from almost colorless to yellow, red, green, or nearly black.

Scouting/Monitoring: Only mite populations determine whether conditions are right for biological control to occur and when alternative control measure are needed. Healthy, properly tinned trees can sustain considerably more than 7 to 10 mites per leaf. In most cases, trees can tolerate a minimum of 20 mites per leaf without any observable effects on fruit yield or quality. The threshold of 7-10 mites per leaf is used because in the absence of biological control control it is difficult to prevent mites from exceeding 20 or more per leaf when miticide applications are delayed.

Action Threshold: Anytime during winter collect 25 to 100 fruit spurs from trees throughout the block. If less than 10% of the spurs are infested, European red mite probably will not become a problem that season. If more than 10% of the spurs are infested, an oil spray should be applied before bloom. The action threshold increases as the season progress, reflecting the increasing capacity for trees to tolerate late season mite injury without fruit damage or yield reduction. It also reflects the greater potential for biological control as the season progresses. Control improves the closer eggs are to hatching. If summer control becomes necessary, the thresholds range from 10 to 30 mites per leaf depending on the age, variety, and condition of the tree, and the abundance of the mite predators.

Insecticide Product Rates, Unit Rate, REI, PHI and Target Insects

Trade Name	Common Name	Product Rates		Unit	REI	PHI	Crop Infested**	Target Insects
		low	hi					
				rate	hrs	days		

Ambush	permethrin				24	7*-P 3*-Ch	Ch, P	Green peach aphid, Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer
Apollo	clofentezine				12	21	Ch, P	European red mite
Asana XL	esfenvalerate				12	14*	Ch, P, Pl	Green peach aphid, Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer
Carzol	formetanate hydrochloride				48	21*-P 7*-Pl	P, Pl	Tarnished plant bug, European red mite

Diazinon	diazinon				24	20-P 10-Ch, PI	Ch, P, PI	Green peach aphid, Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer
Guthion	azinphosmethyl				48*	21*-P 15*- Ch,PI	Ch, P, PI	Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer
Imidan	phosmet				24	14-P 7-ch,PI	Ch, P, PI	Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer

Lannate	methomyl				*	4	P	Green peach aphid, Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer
Lorsban	chlorpyrifos				14*- P,Ch *-PI	24	Ch, P, PI	Peachtree borer, Lesser peachtree borer
Penncap-M	methyl parathion (encapsulated)				21-P, PI 14-Ch	48	Ch, P, PI	Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer

Pounce	permethrin				7*-P 3*-Ch	24	Ch, P	Green peach aphid, Plum curculio, Tarnished plant bug, Cherry fruit flies, Oriental fruit moth, Peachtree borer, Lesser peachtree borer
Sevin	carbaryl				3	12	Ch, P, Pl	Cherry fruit flies, Oriental fruit moth

*See label for further instructions

**Ch=Cherry, P=Peach, Pl=Plum

Diseases

Brown rot is a serious peach disease. It can attack the blossoms and the developing or ripening fruit and even form cankers on small twigs. It must be prevented to ensure harvest of good-quality fruit. Bacterial spot infects leaves, twigs and fruit. Few peach cultivars are resistant to bacterial spot. However, preventive sprays may be used early in the next season to protect the subsequent crop.

Avg. Crop Loss and % Crop Area Infested by Peach Diseases

Common name	Scientific Name	Avg. % Crop Loss*	Avg. Acres Infested*
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Bacterial Canker	<i>Pseudomonas syringae</i>	2.6%	5,681
Bacterial spot	<i>Xanthomonas campestris</i>	11.1%	6,818
Brown Rot	<i>Monilinia fructicola</i>	15.3%	26,931
Leucostoma Canker	<i>Leucostoma cinata</i> - anamorph <i>Cytospora leucostoma</i>		
Peach Leaf Curl	<i>Taphrina deformans</i>	3.5%	28,227
Peach Mosaic	None		
Peach Scab	<i>Cladosporium carpophilum</i>	11.1%	22,500
Perennial canker	(species of:) <i>Valsa leucostoma</i> and <i>Valsa cincta</i>		
Phytophthora Root Rot	<i>Phytophthora spp.</i>		
Rhizopus Rot	<i>Rhizopus stolonifer</i>		
Root Knot	<i>Meloidogyne spp.</i>		
Stem-pitting disease	None	as much as 75%	

*Based on US Averages

Avg. Crop Loss and % Crop Area Infested by Plum Diseases

Common name	Scientific Name	Avg. % Crop Loss	% Crop Area Infested
Black knot	<i>Dibotryon morbosum</i>	without control; 100%	
Plum pockets	<i>Taphrina communis</i>		
Scab, black spot or freckles	<i>Cladosporium carpophilum</i>		

Avg. Crop Loss and % Crop Area Infested by Cherry Diseases

Common name	Scientific Name	Avg. % Crop Loss	% Crop Area Infested
Black knot	<i>Dibotryon morbosum</i>	without control; 100%	
Cherry leaf spot	<i>Higginsia hiemalis</i>		

Avg. Crop Loss and % Crop Area Infested For All Stone Fruit Diseases

Common name	Scientific Name	Avg. % Crop Loss	% Crop Area Infested
Bacterial spot	<i>Xanthomonas campestris</i>	15-50% or more	
Brown rot	<i>Monilinia fructicola</i>	50% or more on unsprayed	
Stem-pitting disease	None	as much as 75%	

Peach Diseases

Common name(s): Perennial canker

Scientific name(s): (2 species) *Valsa leucostoma* and *Valsa cincta*

Distribution: mid-west

Aggravating factors:

Humid weather (optimum temp. 81°).

How disease is spread:

-Fruiting bodies known as pycnidia form on the cankered surface and leak out thousands of small pycnidiospores which are then spread by rain, insects, machinery, birds, and pruning tools.

-Survives on dead leaves and cankered tissue.

Comments:

-Winter-hardy varieties, those that defoliate rapidly and those that heal rapidly, show the least amount of infection.

Control:

1. When planting, avoid low-lying sites.
2. Separate old plants from new (within a quarter mile) to reduce infection.
3. Fertilize in the late winter or early spring. Do not excessively use nitrogen fertilization or maturation may be prolonged.
4. Prune trees annually. (suggested during period from late winter until just after bloom)
5. Avoid mechanical injury by:
 1. Use a sod cover to avoid root injury
 2. Use chemical weed control around trunks
 3. Apply a sun-reflective paint to south and southwest sides of tree trunks-
(use a latex-type, white house paint, diluted with equal parts water).
 4. Dress any wounds with a tree paint
6. Control insects and other diseases.

(RPD : no. 806)

Common name(s): Bacterial spot

Scientific name(s): *Xanthomonas campestris subsp. pruni*

Aggravating factors:

-Warm, windy weather (70-85°).

-Stormy, rainy weather.

-Between June and July.

-Sandy soil and heavy dews.

How disease is spread:

-Overwinters in twigs.

-Bacteria ooze is formed and spread by insects, winds, and rains.

Comments:

-The disease makes little progress during hot, dry summer weather.

Loss range: 15-50% or more

Control:

1. Avoid low-lying sites with poor air and soil drainage.

2. Destroy nearby wild or neglected stone fruits.

3. Buy and plant only disease-free fruit trees from a nursery.

-locate new plants as far away from older ones as possible.

4. Select cultivars resistant to bacterial spot.

5. Prune trees annually to allow for good air circulation and to maintain trees.

6. Fertilize where needed, based on a soil test.

7. Follow a suggested spray schedule. Spray.

(RPD : no. 810)

Common name(s): Peach scab

Scientific name(s): *Cladosporium carpophilum*

Distribution: mid-west

Aggravating factors:

-Warm, wet weather (65-75°).

-Poor sanitation.

-Low lying, moist soils.

How disease is spread:

-Overwinters on twigs.

-Conidia are produced and spread by wind and splashing rains.

Comments:

-Most common when no fungicide control problem is practiced.

Control:

1. Avoid low-lying sites with poor soil drainage and air circulation.
2. Destroy nearby wild or neglected peaches, nectarines, plums, and apricots.
3. Prune trees annually to allow for good air circulation. The open-center system is recommended.
4. Control with fungicide sprays.

(RPD : no. 811)

Common name(s): Stem-pitting disease

Scientific name(s): None

Aggravating factors:

- Nutrient deficiencies.
- Cultivator or herbicide injury.
- Damage by cold or damage by mice and woodchucks.
- Wood- and root-rotting fungi.

How disease is spread:

- Commonly, the spread is in the row from an infected tree to an adjacent, healthy tree.
- Transmitted from infected tree to healthy tree by grafting and budding through the soil.

Comments:

- Once infected, stem-pitted trees do not resume normal growth.

Loss range: as much as 75 %

Control:

1. Purchase only trees certified as free of specific viruses.
2. The prompt removal and burning of stem-pitted trees is advisable.
3. Do not immediately replant in sites where stem-pitted trees have been destroyed.
4. Avoid repeated use of sites for growing stone fruit trees.

(RPD : no. 808)

Common name(s): Peach leaf curl or leaf blister

Scientific name(s): *Taphrina deformans*

Aggravating factors:

-Cool, moist weather.

-Optimum temp. 50-70°.

How disease is spread:

-Conidia are produced and spread by air currents or rain splashing.

Comments:

-If preventive measures are not taken before trees break dormancy in early spring, control of disease is impossible.

Control:

1. Apply a single, thorough dormant spray before the buds begin to swell

-(in late fall, winter, or early spring).

2. If a dormant spray is omitted, all that can be done is:

1. Fertilize with nitrogen in early spring

2. Reduce drought stress by periodic irrigations

3. Thin fruits heavily to reduce the demand on the remaining leaves

(RPD : no. 805)

Common name(s): Brown rot

Scientific name(s): *Monilinia (sclerotinia) fructicola*

Aggravating factors:

- Warm, moist weather.
- Humidity of 85% or more.
- Throughout May and June.

How disease is spread:

- Overwinters in mummified fruit on ground, in trees, and in twig and branch cankers produced the preceding year.
- Conidia are produced and spread by air currents.

Loss range: 50% or more in unsprayed orchards

Control:

1. Proper sanitation.
2. Perform open-center pruning which will insure complete spray coverage and fast drying of spray on the foliage and fruit.
3. Control insects by spraying.
4. Use varieties.
5. Perform careful handling at the time of harvest and packing.

(RPD : no. 804)

More Peach Diseases

Bacterial Canker (bacterium - *Pseudomonas syringae*):

Elongated cankers develop at the base of buds and randomly on the trunk and scaffold limbs. Damaged areas are slightly sunken and somewhat darker in color than the surrounding bark. At both the upper and lower margins of the canker, narrow brown streaks extend into healthy tissue. As the trees break dormancy in the spring, gum is formed by the surrounding tissue and may exert enough pressure to break through the bark and flow. The area beneath the canker has a soured odor. Individual scaffolds or

the entire tree usually dies shortly after leafing out in the spring. Roots are not affected. Extensive suckering often occurs at the tree base.

Leucostoma Canker (fungus - *Leucostoma cinata* - anamorph *Cytospora leucostoma*):

The fungus is a weak pathogen and is rarely a problem in well managed orchards with rapidly growing trees. Pimple-like bumps develop on the surface of cankers. During the growing season small streams of gum are formed at each pimple. In most cases a callus layer forms around the damaged area and the canker is walled off. In a few cases the canker growth will resume in the fall after the callus growth is slowed. Leucostoma canker may become established in a limb through pruning cuts or sunburn injury. Affected trees should be pruned to remove the canker sites and fertilized to promote growth.

Peach Mosaic (virus):

This viral disease affects peach and plum. General symptoms are delayed foliation, and small, narrow, crinkled, mottled, yellow leaves. Internodes are shortened, and lateral buds break, giving a rosette appearance. The few fruit produced are deformed resulting in bumpy, misshapen, small fruit. Spread is by grafting and the peach bud mite, *Eriophyes insidiosus*. Remove all virus-infected trees as soon as they are discovered.

Phytophthora Root Rot (fungus - *Phytophthora* spp.):

Roots infected by this fungus show extensive root necrosis. Although Phytophthora Root Rot has not been verified in Texas, its presence is suspected based on its wide distribution. Phytophthora Root Rot is most severe on replant sites or in orchards planted on poorly drained soils.

Rhizopus Rot (fungus - *Rhizopus stolonifer*):

This fungus is most active during warm, humid weather. Fruit infection results in a "black whiskered" appearance caused by fungal strands which produce an abundance of black spores. Rhizopus attacks peaches and plums only at maturity. Disease prevention is primarily based on orchard sanitation, preharvest fungicides, and rapid refrigeration of processed fruit. Picking containers should be such that fruit receives a minimum amount of handling. Packing equipment should cause minimum injury. Pad any area where fruit will drop onto a belt or roller.

Root Knot: (Nematode - *Meloidogyne* spp.)

Use resistant rootstocks.

Rootstock	Root Knot (<i>Meloidogyne</i> sp.)
Nemaguard	Resistant
Lovell	Susceptible
Elberta	Susceptible
Nemared	Resistant (Has not been extensively evaluated in Texas)

Different races exist within root knot species. Some have been shown to attack "resistant rootstocks" under greenhouse conditions.

Plum Diseases

Common name(s): Black knot

Scientific name(s): *Dibotryon morbosum*

Distribution: throughout U.S.

Aggravating factors:

- Where pruning and spraying are not commonly practiced.
- Cool, wet weather (55-77°).
- Early spring season.

How disease is spread:

- Conidia is produced and spread by air currents and splashing rain.

-Overwinters in perithecia (sexual fruiting structure).

Loss range: Unless effective control measures are taken, it will eventually stunt and/or kill a tree.

Control:

1. Purchase only disease-free trees from a reputable nursery.
2. Prune and burn all infected wood.
3. If possible, burn all nearby wild, neglected or worthless plum and cherry trees.
4. Apply a dormant spray in early spring-before bud breaks.
5. Follow a complete pest control program.

(RPD : no. 809)

Common name(s): Plum pockets

Scientific name(s): *Taphrina communis*

Aggravating factors:

-Cool, moist weather.

-Optimum temp. 50-70°.

How disease is spread:

-Conidia are produced and spread by air currents or rain splashing.

Comments:

-If preventive measures are not taken before trees break dormancy in early spring, control of disease is impossible.

Control:

1. Apply a single, thorough dormant spray before the buds begin to swell

(in late fall, winter, or early spring).

2. If a dormant spray is omitted, all that can be done is:

1. Fertilize with nitrogen in early spring
2. Reduce drought stress by periodic irrigations
3. Thin fruits heavily to reduce the demand on the remaining leaves

(RPD : no. 805)

Common name(s): Scab, black spot or freckles

Scientific name(s): *Cladosporium carpophilum*

Distribution: mid-west

Aggravating factors:

-Warm, wet weather (65-75°).

-Poor sanitation.

-Low lying, moist soils.

How disease is spread:

-Overwinters on twigs.

-Conidia are produced and spread by wind and splashing rains.

Comments:

-Most common when no fungicide control problem is practiced.

Control:

1. Avoid low-lying sites with poor soil drainage and air circulation.
2. Destroy nearby wild or neglected peaches, nectarines, plums, and apricots.
3. Prune trees annually to allow for good air circulation. The open-center system is recommended.
4. Control with fungicide sprays.

(RPD : no. 811)

Cherry Diseases

Common name(s): Cherry leaf spot

Scientific name(s): *Higginsia (coccoomyces) hiemalis*

Distribution: mid-west

Aggravating factors:

- Rainy weather
- Optimum temp. 61°
- Late spring, early autumn.

How disease is spread:

- Overwinters in dead leaves on ground.
- Conidia forms on undersides of leaves and is spread by rain splashing and wind.

Control:

1. Collect and destroy the fallen leaves.

2. Apply a suggested fungicide.

(RPD : no. 800)

Common name(s): Black knot

Scientific name(s): *Dibotryon morbosum*

Distribution: throughout U.S.

Aggravating factors:

- Where pruning and spraying are not commonly practiced.
- Cool, wet weather (55-77°).
- Early spring season.

How disease is spread:

- Conidia is produced and spread by air currents and splashing rain.
- Overwinters in perithecia (sexual fruiting structure).

Loss range: Unless effective control measures are taken, it will eventually stunt and/or kill a tree.

Control:

1. Purchase only disease-free trees from a reputable nursery.
2. Prune and burn all infected wood.
3. If possible, burn all nearby wild, neglected or worthless plum and cherry trees.
4. Apply a dormant spray in early spring-before bud breaks.
5. Follow a complete pest control program.

(RPD : no. 809)

Diseases For All Other Stone Fruits

Common name(s): Bacterial spot

Scientific name(s): *Xanthomonas campestris subsp. pruni*

Aggravating factors:

- Warm, windy weather (70-85°).
- Stormy, rainy weather.
- Between June and July.
- Sandy soil and heavy dews.

How disease is spread:

- Overwinters in twigs.
- Bacteria ooze is formed and spread by insects, winds, and rains.

Comments:

- The disease makes little progress during hot, dry summer weather.

Loss range: 15-50% or more

Control:

1. Avoid low-lying sites with poor air and soil drainage.
2. Destroy nearby wild or neglected stone fruits.
3. Buy and plant only disease-free fruit trees from a nursery.

-locate new plants as far away from older ones as possible.

4. Select cultivars resistant to bacterial spot.

5. Prune trees annually to allow for good air circulation and to maintain trees.

6. Fertilize where needed, based on a soil test.

7. Follow a suggested spray schedule. Spray.

(RPD : no. 810)

Common name(s): Stem-pitting disease

Scientific name(s): None

Aggravating factors:

-Nutrient deficiencies.

-Cultivator or herbicide injury.

-Damage by cold or damage by mice and woodchucks.

-Wood- and root-rotting fungi.

How disease is spread:

-Commonly, the spread is in the row from an infected tree to an adjacent, healthy tree.

-Transmitted from infected tree to healthy tree by grafting and budding through the soil.

Comments:

-Once infected, stem-pitted trees do not resume normal growth.

Loss range: as much as 75 %

Control:

1. Purchase only trees certified as free of specific viruses.
2. The prompt removal and burning of stem-pitted trees is advisable.
3. Do not immediately replant in sites where stem-pitted trees have been destroyed.
4. Avoid repeated use of sites for growing stone fruit trees.

(RPD : no. 808)

Common name(s): Brown rot

Scientific name(s): *Monilinia (sclerotinia) fructicola*

Aggravating factors:

- Warm, moist weather.
- Humidity of 85% or more.
- Throughout May and June.

How disease is spread:

- Overwinters in mummified fruit on ground, in trees, and in twig and branch cankers produced the preceding year.
- Conidia are produced and spread by air currents.

Loss range: 50% or more in unsprayed orchards

Control:

1. Proper sanitation.
2. Perform open-center pruning which will insure complete spray coverage and fast drying of spray on the foliage and fruit.

3. Control insects by spraying.

4. Use varieties.

5. Perform careful handling at the time of harvest and packing.

(RPD : no. 804)

Fungicide Product Rates, Unit Rate, REI, PHI and Target Diseases

Trade Name	Common Name	Product Rates		Unit	REI	PHI	Crop Infested*	Target Diseases
		low	hi	rate	hrs	days		
Benlate 50 WP	benomyl	24	32	oz	24	3	Ch, P, PL	brown rot, cherry leaf spot, peach scab
Bravo 720F	chlorothalonil	3 ^{1/8}	5 ^{1/2}	pts	48	**	Ch, P, Pl	peach leaf curl, brown rot, cherry leaf spot
Captan 50 WP	captan	**	**	**	96	0	Ch, P, Pl	brown rot, peach scab, cherry leaf spot
Indar 75 WSP	fenbuconazole		2	oz	12	0	Ch, P	brown rot, peach scab, cherry leaf spot
Mycoshield 17%	oxytetracycline		12	oz/100 gal water	**	21	P	bacterial spot
Nova 40WP	myclobutanil	2.5	6	oz	24	7**	Ch, P	brown rot, powdery mildew

Orbit 41.8%	propiconazole		4	fl oz	24	0**	Ch, P, Pl	brown rot
Ronilan 50WP	vinclozolin	1	2	lbs	12	14	Ch, P	brown rot
Rubigan 1EC	fenarimol	6	12	fl oz	12	0	Ch	cherry leaf spot, powdery mildew
Sulfur 6F	sulfur	1 ^{1/2}	3 ^{1/2}	pts	24	0	Ch, P, Pl	brown rot, peach scab, powdery mildew
Syllit 65WP	dodine	1	2	lbs	48	0	Ch	cherry leaf spot
Topsin-M 70WP	thiophanate-methyl		1 ^{1/2}	lbs	12	1	Ch, P, Pl	brown rot, peach scab, cherry leaf spot
Ziram 76DF	ziram		6	lbs	48	14	Ch, P	brown rot, peach leaf curl, peach scab

*Ch=Cherry, P=Peach, Pl=Plum

**See label for directions

Weeds

Avg. Crop Loss and % Crop Area Infested by Weeds

Common Name	Scientific Name	Avg. % Crop Loss*	Avg. Acres Infested*

Annual Sowthistle	<i>Sonchus oleraceus</i>		
Barnyardgrass	<i>Echinochloa crus-galli</i>		
Black Nightshade	<i>Solanum nigrum</i>	13%	2,840
Canada Thistle	<i>Cirsium arvense</i>		
Common Chickweed	<i>Stellaria media</i>	4.5%	19,318
Common Lambsquarters	<i>Chenopodium album</i>	26%	2,840
Dandelion	<i>Taraxacum officinale</i>		
Field Bindweed	<i>Convolvulus arvensis</i>	13%	2,840
Foxtail	<i>Setaria spp.</i>		
Giant Green Foxtail	<i>Setaria viridis</i>		
Hairy Nightshade	<i>Solanum sarrachoides</i>		
Morningglories	<i>Ipomoea spp.</i>	4.5%	19,318
Orchardgrass	<i>Dactylis glomerata</i>		
Palmer Amaranth	<i>Amaranthus palmeri</i>		
Pigweed	<i>Amaranthus spp.</i>		
Posion-ivy	<i>Toxicodendron radicans</i>		
Quackgrass	<i>Agropyron repens</i>		
Redroot Pigweed	<i>Amaranthus retroflexus</i>	26%	2,840
Yellow Foxtail	<i>Setaria lutescens</i>	26%	2,840
Yellow Nutsedge	<i>Cyperus esculentus</i>	13%	2,840

*Based on US Averages

Annual Sowthistle (*Sonchus oleraceus*)

This is an annual weed, reproducing by seeds. This weed can reach a height of 3 to 6 feet when mature. The leaves have wavy edges and prickles. The annual sowthistle thrives in moist conditions. It can indirectly affect the development of apples because it hosts nematodes, aphids, and viruses.

Barnyardgrass (*Echinochloa crus-galli*)

Annual. This weed germinates from 0 to 5 inches deep in the soil. The seeds remain viable for several years, and plants may emerge throughout the summer. Barnyardgrass is most troublesome in low, moist, warm areas.

Black Nightshade (*Solanum ptycanthum*)

This summer annual can produce thousands of berries; each berry contains up to 50 seeds. While nightshade is generally not considered a serious pest in Illinois, severe infestations in individual fields do occur. Tillage and row cultivation are effective for early, newly emerged seedlings.

Canada thistle (*Cirsium arvense*)

Perennial. Canada thistle has a vigorous, rhizomatous root system. Propagation is by rootstock and seeds; only female plants produce seed. Canada thistle is listed as a noxious weed in Illinois, and is most severe in the northern counties of Illinois. Preplant tillage and row cultivation can control small seedlings but are less effective in controlling plants arising from rootstocks.

Common Chickweed (*Stellaria media*)

Winter annual. Often very robust and dense in growth and becoming a serious competitor for light, water, and nutrients.

Common Lambsquarters (*Chenopodium album*)

Annual. Common lambsquarters produce numerous small seeds which germinate after an overwintering process. Optimal temperature for germination is 70F, but can germinate between 40 to 94, which suggests early germination capabilities. Survival is favored by rains which dilute or leach herbicides from the soil surface.

Dandelion (*Taraxacum officinale*)

Perennial. Low growing plant typically found in low to moderate populations. Can compete for soil moisture and result in poor stands.

Field Bindweed (*Field Bindweed*)

This is a perennial weed, reproducing from seed and from spreading roots. The plant is a branched vine which spreads over the ground and on trees. The leaves are arrowhead-shaped and 2 to 3 inches long. It produces flowers which are either white or pink. Control is difficult because of deep roots.

Foxtail spp. (*Setaria spp.*)

Annual. The three species of foxtails in Illinois are giant foxtail (*Setaria faberi*), green foxtail (*S. viridis*) and yellow foxtail (*S. glauca*). Giant foxtail is the most competitive of the three species. Foxtails are considered the most important weeds species in Illinois. One plant may produce several heads with 500-1000 seeds per head that can germinate in one to several years after production. These plants are adapted to most Illinois conditions, tend to compete with crops and make cultivation and plowing difficult. All foxtails are more serious in reduced and no-till fields.

Hairy Nightshade (*Solanum sarrachoides*)

Annual. First true leaves of hairy nightshade have wavy edges and prominent veins. The leaves have numerous fine, short hairs, especially along the underside of the main vein. Berries are green or yellowish brown when mature. The pedicels, like stems and leaves, are usually hairy. Mature plants grow about 2 feet tall.

Morningglories (*Ipomoea* spp.)

Annual. Tall morningglory and ivyleaf morningglory are the two major annual morningglory species found on Illinois soils. The seeds of these summer annuals may survive for several years in soil. Infestations are most common in moist soils along river bottomland, but these plants can be found most anywhere in the state. Annual morningglories adapt to crops by vining about the crop, so shading by the canopy is not particularly successful in reducing growth. Newly emerged seedlings can be controlled by tillage and cultivation, but this may result in conditions that favor emergence by weeds deeper in the soil profile. After vines begin to twine about the stems of the crop, cultivation may not be as effective.

Orchardgrass (*Dactylis glomerata* L.)

Perennial. Orchardgrass is adapted to well-drained soils and is tolerant to shade. It can survive in flooded or wet soil conditions but will tolerate moderately poor drainage. This weed can be established in early spring or late summer. Stems are erect, ranging from 1 to 4 feet in height. Leaves vary in color from green to bluish-green depending on cultivar. Leaves are flat, sharply pointed, and V-shaped in cross section. When mature, leaf margins and leaf sheaths are somewhat rough to the touch. Orchardgrass is a host for many insects and diseases.

Palmer Amaranth (*Amaranthus palmeri*)

Annual. The palmer amaranth can grow 1 to 6 feet high, and reproduces by seeds. There is one thick principal stem, and the lateral branches are usually short. The stem often turns red with age. The leaves are hairless, 2 to 8 inches long (including the stalks), and have very prominent whitish veins on the lower surface.

Pigweed (*Amaranthus* spp.)

Annuals. Pigweeds are prolific seed producers, and one plant can produce over 100,000 seeds in one growing season. The seeds of this plant may remain viable for years. Pigweeds are a problem in no-till systems because undisturbed soils favor germination of the minuscule seeds, and the debris keeps the field moist and allows for extended germination. Other favorable germination locations are where excess nitrogen is available, and where no soil applied herbicides have been used. Localized populations of some biotypes of pigweed have shown triazine or acetolactate synthase (ALS)-inhibitor resistance. The pigweeds include both tall and common waterhemp.

Poison Ivy (*Toxicodendron radicans*)

Perennial. Reproduces by seed, which may be spread by birds and by creeping stems. This plant can either grow uprightly to a height of 3 feet, or it can climb trees and fences as a vine. There are three leaflets on each leaf. Leaflet edges are smooth to roughly toothed and can be variable in shape. Flowers are small, round, and white. Plants may be spread through birds eating the fruit and spreading the seed in their droppings. This weed contains poisonous oils that can produce a serious rash on contact or by being in the smoke of burning plants. This is a very troublesome weed to control in orchards, but control is necessary because of the hazard to persons pruning or harvesting.

Quackgrass (*Elytrigia repens*)

Quackgrass is a cool season perennial that reproduces by rhizomes, and to a lesser amount by seeds. New plants sprout at axillary buds, and rhizomes may remain viable for years. Quackgrass is most often a problem in the northern part of the state. Tillage can be an effective control.

Yellow nutsedge (*Cyperus esculentus*)

Perennial. Yellow nutsedge causes severe weed infestations and is quite serious across Illinois. It reproduces from tubers as the seed does not survive overwintering, and tubers can adapt to almost any soil type and conditions. Tubers germinate at up to 12 inches of soil and remains viable for up to three years in soil.

Herbicide Product Rates, Unit Rate, REI, PHI and Target Weeds

Trade Name	Common Name	Product Rates		Unit	REI	PHI	Target Weeds
		low	hi				
2,4-D mixed amine	2,4-D	1	1.5	lb	48	14	BL
Dazomet	Basamid		8	oz/100 sq ft	24		weed seeds

<u>Prism 0.94EC, Select 2EC</u>	Clethodim	0.1	0.25	lb	24		grasses
<u>Napropamide</u>	Devrinol		4	lb	12	35	most annual grasses and BL
<u>Diquat</u>	Diquat dibromide	0.375	0.5	lb	24		grasses, BL
<u>Direx 4L or 80DF, Diuron 80 WDG, Drexel Diuron 4L or 80, Karmex DF, Riverside Diuron 4L or 80DF</u>	Diuron	1.6	4	lb	12	90	grasses, BL
<u>Clean Crop DSMA Plus 3.6L, Liquid DSMA 3.6L</u>	DSMA (+surfactant)	3.2	6.3	lb	12		grasses
<u>Fusilade DX</u>	Fluazifop-P-Butyl	0.25	0.375	lb	12		most annual and perennial grasses
<u>Isoxaben</u>	Gallery	0.5	1	lb	12		BL
<u>Credit 4WS, Glyfos X-tra 4WS, Rattler 4WS, Roundup Custom 5.4 WS, Rounup Original, Original RT, Ultra, Ultra RT 4WS</u>	Glyphosate	0.5	5	lb	12	1	most annual and perennial weeds and grasses
<u>Oxyfluorfen</u>	Goal	1.25	2	lb	24		BL
<u>Pronamide</u>	Kerb	1	4	lb	24		grasses, BL

<u>120 Herbicide, 912 Herbicide, Bueno 6, Drexel MSMA, Helena MSMA, Helena Plus H.C., MAGMA, Target MAGMA 6 Plus, Turfmate 6 Plus</u>	MSMA (+surfactant)	2	3	lb	12		grasses, BL
<u>Solicam DF</u>	Norflurazon	2	4	lb	12		grasses, BL
<u>Gramoxone Extra 2.5L</u>	Paraquat	0.6	1	lb	12		most annual grasses and BL
<u>Pentagon DG, Prowl 3.3 EC</u>	Pendimethalin	2	4	lb	12		grasses, BL
<u>Poast 1.5 EC</u>	Sethoxydim	0.3	0.5	lb	12	14	annual and perennial grasses
<u>Clean Crop Simazine 4L or 90 WG, Drexel Simazine 4L or 90 DF, Princep 4L or Caliber 90, Riverside Simazine 4L or 90 DF</u>	Simazine	1.5	4	lb	12		grasses, BL
<u>Terbacil</u>	Sinbar	1.6	3.2	lb	12		grasses, BL
<u>Snapshot 2.5 TG</u>	Snapshot (premix)	2.5	5	lb	12		grasses, BL
<u>Oryzalin</u>	Surflan	2	6	lb	12		grasses, BL
<u>Touchdown 5L or 6L (sulfosate)</u>	Touchdown	0.5	4	lb	12 4 (6L)		grasses, BL

<u>Albaugh</u> <u>Trifluralin 4EC,</u> <u>Clean Crop</u> <u>Trifluralin HF</u> <u>4EC, Gowan</u> <u>Trifluralin 4 or 5</u> <u>EC or 10G,</u> <u>Helena</u> <u>Trifluralin 4 EC,</u> <u>Riverside</u> <u>Trifluralin 4EC</u> <u>or Trific 60DF,</u> <u>Sedagari</u> <u>Trifluralin 480</u> <u>4EC, Treflan</u> <u>HFP 4EC or TR-</u> <u>10, TRI-4 HF,</u> <u>Trilin 4 or 5 EC</u> <u>or 10G, Wilbur-</u> <u>Ellis Trifluralin</u> <u>10G</u>	Trifluralin	0.5	1	lb	12	60	grasses, BL
<u>Vapam HL</u> <u>(metam-sodium)</u>	Vapam		0.75	qt/100 sq ft	48		grasses, germinating weed seeds
<u>XL 2G</u>	XL 2G (premix)	4	6	lb	12		grasses, BL

Restrictions and Comments on Stone Fruit Herbicides

Trade Name(s): 2,4-D amine

Herbicide: 2,4-D

Restrictions/Comments:

Maximum 2 applications per season. Do not graze or feed cover crops from treated orchards. Consult label for restrictions and precautions.

Trade Name(s): Dazomet

Herbicide: Basamid

Restrictions/Comments:

For nonbearing stone fruits: Soil treatment prior to propagating or outplanting nonbearing plants. Rates are for incorporation depth of 8": for annual weeds, incorporate into top 4-6".

Days to Harvest: 1 year

Trade Name(s): Prism 0.94 EC, Select 2EC

Herbicide: Clethodim

Restrictions/Comments:

For nonbearing stone fruits: Do not apply under stress conditions or if rainfall is expected in 1 hour. Do not apply through any type of irrigation system. Do not apply more than 0.5 lb/acre per season. Do not graze treated fields or feed treated forage or hay to livestock. Refer to label for restrictions and precautions.

Trade Name(s): Napropamide

Herbicide: Devrinol

Restrictions/Comments:

Apply in fall through early spring, prior to weed emergence. For newly planted and established crop. An additional 8 lb. 50-DF/A may be applied during growing season in the West. Allowable time for Devrinol to remain on soil surface is 24 hours. See label for use and irrigation directions.

Trade Name(s): Diquat

Herbicide: Diquat dibomide

Restrictions/Comments:

Days to harvest: 1 year. For non bearing stone fruit: Apply by ground only. Use high rate when weeds are large or dense. Do not allow spray to contact green stems, foliage, or fruit. Use a shield or wrap plant when spraying around young trees or vines. Do not apply through any type of irrigation system. Do not graze treated areas. Refer to label for use restrictions and precautions.

Trade Name(s): Direx 4L or 80DF, Diuron 80 WDG, Drexel Diuron 4 L or 80, Karmex DF, Riverside Diuron 4L or 80DF

Herbicide: Diuron

Restrictions/Comments:

Use only where peach trees have been established for at least 3 years. Apply as directed spray avoiding contact of fruit and foliage with spray. Refer to label for soil limitations.

Trade Name(s): Clean Crop DSMA Plus 3.6L, Liquid DSMA 3.6L

Herbicide: DSMA (+surfactant)

Restrictions/Comments:

For nonbearing stone fruit: Do not use around trees from which crop will be harvested within 1 year of treatment. Do not allow to contact leaves, stems, or bark of trees. If necessary, use shield for nursery plantings or young trees. For regrowth, up to 3 applications per year may be applied.

Trade Name(s): Fusilade DX

Herbicide: Fluazifop-P-Butyl

Restrictions/Comments:

For nonbearing stone fruit: Apply to annual grasses when they are 2-8" tall before tilling and/or seedhead formation. For perennial grasses, apply by growth stage dependent on species. Add crop oil concentrate or nonionic surfactant. Do not apply to tree fruits that may be harvested for food within 1 year after application. Refer to label for specific directions, restrictions, and precautions.

Trade Name(s): Isoxaben

Herbicide: Gallery

Restrictions/Comments:

For nonbearing peaches: Apply late summer to early fall or early spring, prior to germination of target weeds. Do not apply through any type of irrigation system. Refer to label for directions and precautions.

Trade Name(s): Credit 4WS, Glyfos X-tra 4WS, Rattler 4WS, Roundup Custom 5.4 WS, Roundup Original, Original RT, Ultra, Ultra RT 4WS

Herbicide: Glyphosate

Restrictions/Comments:

General weed control, middles (between rows of trees), strips (in row of trees). Do not allow spray, drift, or mist to contact foliage or green bark of trunk, branches, suckers, fruit, or other parts of trees and vines.

Trade Name(s): Oxyfluorfen

Herbicide: Goal

Restrictions/Comments:

Apply at preemergence or postemergence. Direct spray toward base of tree or vine, avoiding direct plant contact. Add 2 pt./100 gal. spray nonionic surfactant.

Trade Name(s): Pronamide**Herbicide:** Kerb**Restrictions/Comments:**

Apply in fall after fruit is harvested, but prior to soil freezing-up. Do not apply to seedling trees less than 1 year old, fall transplanted stock that has been transplanted less than 1 year, or to spring transplanted stock that has been transplanted less than 6 months. Do not graze treated orchards.

Trade Name(s): 120 Herbicide, 912 Herbicide, Bueno 6, Drexel MSMA, Helena MSMA, Helena Plus H.C., MAGMA, Target MAGMA 6 Plus, Turfmate 6 Plus**Herbicide:** MSMA**Restrictions/Comments:**

For nonbearing peaches: Do not exceed 3 applications per year. Do not allow spray to contact leaves, stems, bark of trees, or use around trees from which crop will be harvested within 1 year after application. Refer to label for use directions and precautions.

Trade Name(s): Solicam Df**Herbicide:** Norflurazon**Restrictions/Comments:**

Apply to soil surface from fall to early spring before weeds emerge, except on crops where otherwise specified. Do not use on nursery stock. Rate varies by soil type. Refer to label for

length of time trees must be established in the field.

Trade Name(s): Gramoxone Extra 2.5L

Herbicide: Paraquat

Restrictions/Comments:

Apply as directed spray when weeds and grasses are succulent and new growth is from 1-6" high. Add nonionic surfactant or crop oil concentrate. Do not allow spray to contact green stems, fruit, or foliage. Use a shield or wrap when spraying around young trees. For mature woody weeds, green suckers, late germinating weeds, grasses, and perennials, retreatment or spot treatment may be necessary. Do not graze treated areas. Refer to label for use directions, restrictions, and precautions.

Trade Name(s): Pentagon DG, Prowl 3.3 EC

Herbicide: Pendimethalin

Restrictions/Comments:

Apply before weeds emerge. For nonbearing peaches: Use low rate for short-term control; high rate for long-term control. Apply spray directly to ground beneath trees. Refer to label for further use directions and precautions.

Trade Name(s): Poast 1.5 EC

Herbicide: Sethoxydim

Restrictions/Comments:

Apply at postemergence. Add 2 pt./A oil concentrate. Refer to label for restrictions and limitations.

Trade Name(s): Clean Crop Simazine 4L or 90 WG, Drexel Simazine 4L or 90 DF, Princep 4L or Cliber 90, Riverside Simazine 4L or 90 DF

Herbicide: Simazine

Restrictions/Comments:

Apply prior to weed emergence. Trees must be established 1 year or more. Make only one application per year. Refer to label for use directions and precautions.

Trade Name(s): Terbacil

Herbicide: Sinbar

Restrictions/Comments:

Apply in spring before weeds emerge or during early seedling stage. For nonbearing peaches: Established for at least 3 years. Do not allow drift to come in contact with fruit. Do not graze or feed forage to livestock. Do not replant to any crop within 2 years after treatment.

Trade Name(s): Snapshot 2.5 TG

Herbicide: Snapshot (premix)

Restrictions/Comments:

Apply in late summer to early fall or early spring or immediately after cultivation. For nonbearing peaches: Apply to trees that will not bear fruit for at least 1 year. Do not apply to bedding plants, nursery seedbeds, or transplanted beds.

Trade Name(s): Oryzalin

Herbicide: Surflan

Restrictions/Comments:

Apply before weeds emerge. Rate depends on length of control desired. Surface apply once existing weeds are controlled by tillage or contact herbicide. May be applied through solid set sprinkler irrigation system. Single 1/2-1" rain or sprinkler irrigation within 21 days required. Not recommended on soils with organic matter higher than 5%.

Trade Name(s): Touchdown 5L or 6L (sulfosate)

Herbicide: Touchdown

Restrictions/Comments:

Days to harvest: 1 year. Apply to actively growing grasses and weeds. For nonbearing peaches: Nonionic surfactant or wetting agent required. In addition, ammonium sulfate can be added to nonbearing crops. Do not allow spray, spray drift, or mist to contact green foliage or green bark on trunk, suckers, open wounds, or other green parts of trees and vines. Avoid contact with stumps as tree injury may occur from root grafting. Do not apply through any type of irrigation system. Refer to label for use of directions, restrictions, and precautions.

Trade Name(s): Albaugh Trifluralin 4EC, Clean Crop Trifluralin HF 4EC, Gowan Trifluralin 4 or 5 EC or 10G, Helena Trifluralin 4 EC, Riverside Trifluralin 4EC or Trific 60DF, Sedagari Trifluralin 480 4EC, Treflan HFP 4EC or TR-10, TRI-4 HF, Trilin 4 or 5 EC or 10G, Wilbur-Ellis Trifluralin 10G

Herbicide: Trifluralin

Restrictions/Comments:

Rate varies by soil type and amount of rainfall. Use incorporation methods not injurious to crop. Refer to label for directions and precautions.

Trade Name(s): Vapam HL (metam-sodium)

Herbicide: Vapam

Restrictions/Comments:

Make shallow basin over planting site after removing dead or diseased trees and as much of root system as possible. Add Vapam to stream of water while filling basin. Apply in sufficient water to penetrate at least 6 ft. Tarping of replant sites is required when within 1/2 mile of populated areas. Do not apply to desirable lawns and plants within 3 ft. of drip line of desirable plants, shrubs, or trees. Do not use in greenhouses, enclosed structures, confined areas, or when fumes may enter nearby houses.

Trade Name: XL 2G**Herbicide:** XL 2G (premix)**Restrictions/Comments:**

Apply prior to germination of target weeds. For nonbearing stone fruits: Do not apply to trees that may be harvested for food within 1 year after application. Refer to label for use directions and precautions.

References

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