

not be complete. When buying a pesticide, be certain that you will be using it for the purpose stated on the label.

Pecans

The spray guide for pecans is based primarily on insect biology and life cycles, because, generally, more pecan losses are from insects than disease. If you plant scab-disease-resistant varieties, you may need to treat only for insects. Another reason to concentrate on insect control is the fact that pecan fungicides are available only in commercial-size packages. Apply zinc foliar sprays frequently at the beginning of the season.

Large pecan trees are difficult to cover thoroughly with pesticide sprays. Hose-on sprayers can be used to spray trees 25-30 feet tall. When larger trees must be sprayed, employ a certified commercial pesticide applicator.

Peaches and plums

The most important times to apply disease and insect control products are at petal fall, shuck split and preharvest. You can use combination products (insecticide and fungicide together) for early- and mid-season treatments, but most of them have harvest limitations that prevent application close to harvest, when brown rot control is critical.

Fire ant management

Fire ants can be a severe problem with pecan and small fruit production both in agriculture and in urban areas. These ants can damage equipment such as electric motors and irrigation systems; their bites can interfere with harvest and cause medical problems.

Several insecticides are available for producers to use to manage fire ants. With the many possible application sites in an urban area, it is up to the individual to read the product labels for information on where they can be applied and at what rates.

When using baits either for individual mound treatment or as a broadcast application, follow these recommendations to improve bait effectiveness:

- Always use fresh bait. Avoid packages that have a rancid odor. Baits with a strong rancid odor are probably spoiled, and the ants will not be attracted to the bait.
- Store unused bait in cool dry place in a sealed container.
- Avoid applying baits if rain is expected in 12 hours.
- Before baiting a large area, conduct a prebait test by placing a small amount of bait in an area near mounds. Check the baited area after 1 hour to see if ants are gathering the bait. If they are not, conduct another prebait test in a few days.

For additional information on fire ants, see Texas Cooperative Extension publication B-6043, *Managing Imported Fire Ants in Urban Areas* or visit the Texas A&M fire ant web site at <http://fireant.tamu.edu>.

Pesticide safety

Before using any pesticide, carefully read all the instructions on the container. Follow instructions such as for wearing protective clothing during mixing or spraying. Take the necessary precautions when applying pesticides to avoid being exposed to chemicals.

Mix pesticides in a well-ventilated area or outdoors. Avoid chemical contact with your skin, and do not breathe chemical vapors.

Apply the pesticides at the proper rate. If you use less chemical than is prescribed, it may not control the pests well; if you use more than is recommended, you may damage the plant or leave too much residue on the fruit.

Store chemicals in a secure area away from pets and children. Prepare only the amount required for one application. Dispose of any unused, diluted sprays and empty pesticide containers properly. Store pesticides in their original containers.

The pesticides suggested in this guide are registered and labeled for use by the Environmental Protection Agency and the Texas Department of Agriculture. Regulations on pesticides are subject to change and may have changed since this publication was printed. The USER is always responsible for the effects of pesticide residues on livestock and crops, as well as for problems caused when a pesticide drifts or moves to others' property. Always read and carefully follow the instructions on the container label.

For more information, contact your county Extension agent.

Organic pest management

Some fungicides and insecticides are made of naturally occurring ingredients and are considered acceptable for organic gardening. For allowed products, refer to the Texas Department of Agriculture Organic Certification Program Materials List (TDA publication Q694A).

Peaches, plums, nectarines and apricots: Use sulfur fungicides throughout the spray program. Make applications at the shortest interval allowed. Shortened intervals are important during the late-bloom, shuck-split and first-cover periods and again during the preharvest period. These are periods when fruit diseases are the most damaging.

Pecans: Copper sulfate is considered an organic fungicide, and some formulations are approved for use on pecans to control pecan scab and other foliage diseases. Copper sulfate is highly toxic to fruit trees such as peaches, plums, apricots and nectarines and to some ornamental plants. Be careful when using this product near sensitive plants if there is a possibility of drift.

General considerations: For infection to occur, most plant diseases require that the leaf, fruit or nut remain wet for a certain period. The following precautions reduce the length of time the plant is wet after dew or rainfall:

- Prune the trees to allow sunlight to penetrate the leaf canopy.
- Space the trees to allow for air circulation.
- Plant the trees in an area that will receive early-morning sun and where air circulation is not blocked by buildings or other plants.
- Avoid wetting trees during irrigation.

Select varieties that are naturally resistant to the major diseases of your area. Resistance does not mean that the plants are immune to infections. Fungicide applications are usually more effective on plants with some resistance.

Table 1. Homeowner's spray guide for pecans.

Timing	Pest	Pesticide	Remarks
Dormant season (winter)	Insects Scale insects, mite eggs, phylloxera	97% oil emulsion	Spray tree trunks and branches thoroughly. Apply only once, in late dormant but before budbreak. Agitate the spray mixture enough to prevent the oil and water from separating.
Budbreak —just as the buds begin to split and show green color; terminal bud growth should be 2 inches long	Nutritional Rosette	zinc sulfate WP or zinc nitrate (NZN) liquid	Zinc sprays are essential for early-season pecan growth. Early, frequent applications work best. Elemental zinc is toxic to most plants except pecans and grapes; therefore, avoid drift. If drift is a possibility, do not use zinc sulfate near peaches, plums, nectarines, apricots or other zinc-sensitive plants. Do not use any zinc product at rates higher than the label stipulates, because it can burn the foliage. When applying more than one zinc spray in 2 weeks, reduce the rate by half. Never spray young trees that are not actively growing.
	Insects Phylloxera	malathion malathion 50% EC	If dormant oil was not used, then treat trees where a history of phylloxera damage indicates a need for control.
	Diseases Scab and other foliage and nut diseases	thiophanate-methyl (Topsin-M 70% WP) ¹ or fenbuconazole (Enable® 2F) ¹	Do not apply after shuck split. Do not apply after shuck split. Limit is 4 applications/season.
Prepollination —when leaves are one-third grown and before pollen is shed, mid-April	Nutritional Rosette	Same as for budbreak	Imidacloprid is applied as a soil drench.
	Diseases Scab and other foliage and nut diseases	Same as for budbreak	
	Insects Sawfly	imidacloprid 1.47% (see Table 2) or malathion or carbaryl	
Pollination —when casebearer eggs appear on tips of nutlets, May	Nutritional Rosette	Same as for budbreak	Using pecan nut casebearer traps will help you time the sprays. Apply sprays during egg hatch. (Consult your county Extension agent for precise local timing or see Extension publication E-173, <i>Controlling Pecan Nut Casebearer</i> .)
	Insects Pecan nut casebearer and walnut caterpillar	malathion or carbaryl or spinosad 0.5% or <i>Bacillus thuringiensis</i> , B.t.	
	Diseases Scab and other foliage and nut diseases	Same as for budbreak	

¹Commercial-size package
WP—wetable powder
EC—emulsifiable concentrate
F—flowable
L—liquid

Pecans (continued)

Timing	Pest	Pesticide	Remarks
Post pollination	Insects Second-generation casebearer (42 days after first casebearer spray)	Same as for pollination	
	Aphid (June-July)	imidochlopid 1.47%	Treat yellow aphids when an average of 25 per compound leaf are found or when excessive honey dew is produced. Repeated use of insecticides can result in strains of aphids that resist insecticides. This can increase losses. Treat black pecan aphids when three or more are found per compound leaf after July 1. This insect is common in late season.
	Diseases Scab and other foliage and nut diseases Fall webworm	Same as for budbreak Same as for pecan nut casebearer	The number of sprays is based on weather conditions, variety and presence of scab fungus. Repeat spray applications as long as weather conditions favor disease development. For more information, see Extension publication L-1811, <i>Fall Webworm</i> .
Water stage—when inside of the nut begins to fill with liquid, mid to late July	Diseases Scab and other foliage and nut diseases	thiophanate-methyl (Topsin-M® 70% WP) ¹	Treat where there is a history of disease or when rainfall is prolonged.
	Walnut caterpillar	Same as for pecan nut casebearer	For walnut caterpillar, look for eggs on the undersides of foliage. The absence of foliage also indicates walnut caterpillar damage. No webs are associated with walnut caterpillars. For more information, see Extension publication L-1835, <i>Walnut Caterpillars</i> .
Half-shell hardening—early to mid-August	Insects Aphids	Same as for aphids listed above	Treat yellow aphids when they average 25 per compound leaf or when excessive honey dew is produced and aphid populations persist. Treat black pecan aphids when 3 or more are found per compound leaf after July 1. This insect is common in late season.
	Hickory shuckworm	carbaryl or spinosad 0.5%	
	Pecan weevil	carbaryl	Treat areas with a history of pecan weevil infestation. One to three treatments at 10- to 14-day intervals are needed for heavy weevil infestations. Make first application around August 20. For more information, see Extension publication E-343, <i>Controlling the Pecan Weevil</i> .
	Diseases Scab and other foliage and nut diseases	Same as for budbreak	

¹Commercial-size package
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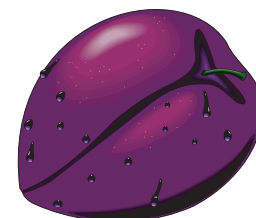
Table 2. Insecticides available in small packages for insect control on pecans.

Active Ingredient	Product Name	Distributor	Remarks
carbaryl	Liquid Carbaryl Garden Spray (carbaryl 23.7%)	Fertilome	Do not apply within 5 days of harvest
imidachloprid	Bayer Advanced Tree & Shrub Insect Concentrate (imidachloprid 1.47%)	Bayer	Apply as a soil drench
malathion	50% Malathion Insect Spray (malathion 50%)	Green Light	Do not apply within 7 days of harvest
spinosad	Green Light Lawn and Garden Spray with Spinosad (0.5% spinosad)	Green Light	Do not apply within 14 days of harvest
<i>Bacillus thuringiensis</i> , B.t.	Bt Worm Killer	Green Light	Check for pecan on label
Dormant oil	Dormant Spray and Summer Oil (99% paraffini oil)	Fertilome	Apply in late winter when trees are dormant

Table 3. Homeowner's spray guide for peaches and plums

Timing	Pest	Pesticide	Remarks
Dormant season	Insects Scale insects	97% dormant oil	Apply when temperature is between 45 and 70 degrees F. Apply only if scales are observed. Repeat applications in 2-3 weeks. Agitate the spray mixtures enough to prevent the oil and water from separating.
Late dormant	Diseases peach leaf curl Bacterial spot	copper fungicide or chlorothalonil (see listing of products, Table 4) copper fungicides	Apply if there is a history of leaf curl.
Petal-fall —when 75% of the petals have fallen, 5 days after bloom; combination products are an option – see Table 6.	Insects Plum curculio Peach twig borer Lesser peach tree borer Diseases Scab	malathion (malathion 50% EC) or carbaryl (Sevin® liquid) or permethrin 2.5% EC permethrin 2.5% EC permethrin 2.5% EC captan or chlorothalonil or sulfur (see listing of products, Table 4) or thiophanate-methyl (Topsin-M® 70% WP) ¹	Use insecticides only if there is a history of insect damage. Removal of wild plums can eliminate overwintering sites of plum curculio and reduce infestations. Repeated applications of permethrin may promote scale and mite outbreaks. Insecticides applied during bloom will kill honey bees. Treat where there is a history of disease problems.

¹Commercial-size package
WP–wetable powder
EC–emulsifiable concentrate
F–flowable
L–liquid



Peaches and plums (continued)

Timing	Pest	Pesticide	Remarks
<p>Shuck split—when the calyx separates from base of newly formed fruit, 14 days after bloom; combination products are an option – see Table 6</p>	<p>Insects Catfacing insects, plum curculio</p> <p>Diseases Scab</p>	<p>Same insecticides as for petal fall</p> <p>Same fungicide selection as at petal fall</p>	<p>Treat where there is a history of catfacing insects and/or plum curculio.</p>
<p>Cover sprays—repeat at 14-day intervals; combination products are an option – see Table 6</p>	<p>Insects Catfacing insects, plum curculio</p> <p>Diseases Scab Brown rot</p>	<p>Same as for petal fall</p> <p>captan or sulfur (see Table 3)</p>	<p>Removing brown rot mummies (diseased fruit) during fall and winter can reduce disease infection the following spring.</p> <p>During wet weather in the spring, applications of captan can reduce brown row as fruit begins to ripen.</p>
<p>Pre-harvest—for early-maturing varieties and during periods of frequent rain or dew—spray 3 week, 2 weeks and 3 days before picking; for mid- to late-maturing varieties—spray at 2 weeks and at 3 days before picking; combination products are an option if applied within preharvest interval (PHI) – see Table 6</p>	<p>Insects June beetles and wasps</p> <p>Diseases Brown rot</p>	<p>carbaryl (Sevin® liquid)</p> <p>thiophanate-methyl (Topsin M® 70% WP)¹ or captan (see Table 4) or myclobutanil (see Table 4)</p>	<p>Do not apply within 3 days of harvest. June beetles and wasps are attracted to and feed on ripe fruit. Treat only if insects are present.</p> <p>Do not apply within 1 day of harvest.</p> <p>May be applied up to day of harvest.</p>
<p>Post harvest—late August to early September</p>	<p>Insects Peach tree borer</p>	<p>permethrin 2.5% EC or endosulfan (Thiodan® 9EC)</p>	<p>Apply the insecticide spray to soak the trunk thoroughly from the scaffold limbs to the soil. Remove tall weeds to ensure good coverage of the soil around the base of the trunk. Do not apply insecticide to fruit or foliage.</p> <p>Do not apply within 21 days prior to harvest</p> <p>Endosulfan: Use 2 applications, 3-4 weeks apart. Symptoms of bacterial canker and borers can be confused. Bacterial canker causes dieback of twigs and branches and death of flower and leaf buds. Elongated, sunken areas (cankers) form at the base of the dead buds. Cutting into the canker reveals a brown margin. Sap may ooze from infested fruit. In contrast, peach tree borers feed on the inner bark at the base of the tree. Infestations can be identified by the accumulation of waste, wood chips and gum on the bark. Cutting into these areas will reveal tunnels and, often, the white larval stage of the peach tree borer. Treat for borers only if this pest is known to occur in your growing region (if unsure, contact your county Extension agent) or if borer damage and borers are present.</p>

¹Commercial-size package
 WP—wetttable powder
 EC—emulsifiable concentrate
 F—flowable
 L—liquid

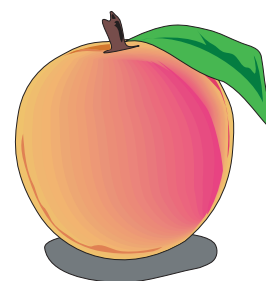


Table 4. Products available in small packages for disease control on peaches and plums

Pesticide	Trade Name	Distributor	PHI*	Remarks
captan	Captan Fungicide (50% WP)	Hi-Yield	0	Not cleared on plums.
	Captan Fruit & Ornamental (50% WP)	Bonide	0	Not cleared on plums.
chlorothalonil	Garden Disease Control (29.6%)	Ortho		Do not apply after shuck-split.
	Fung-onil Concentrate (29.6%)	Bonide		Do not apply after shuck-split.
	Fruit Tree, Vegetable & Ornamental Fungicide (29.6%)	Monterey		Do not apply after shuck-split.
(copper fungicides)	Liqui-Cop (8%)	Monterey		Do not apply after full bloom.
copper ammonium complex				Do not apply after pink bud. Not cleared on plums.
copper sulfate	Bordeaux Mix Fungicide (12.5%) Bordeaux Powder (12.7%)	Hi-Yield		Do not apply after pink bud.
		Dexol		Not cleared on plums.
copper hydroxide	Copper Fungicide (23%)	Hi-Yield		Peaches: 3 weeks; plums: do not apply after white bud.
copper salts	Copper liquid concentrate	Bonide		Do not apply after pink bud. Not cleared on plums.
myclobutanil	Immunox Multi-Purpose Fungicide (1.55%)	Spectracide	0	
sulfur	All major companies market a sulfur product		0	

*PHI = Pre-harvest interval, the minimum number of days before harvest that product can be used.

Table 5. Products available in small packages for insect control on peaches. See label for rates.

Active Ingredient	Product Name	Distributor	Remarks
carbaryl	Liquid Carbaryl Garden Spray (carbaryl 23.7%)	Fertilome	Do not apply within 5 days of harvest.
neem oil or azadirachtin	Fruit Tree Spray (pyrethrins 0.25%, neem oil 70%)	Green Light	Most effective when applied on a 7-14 day interval.
endosulfan	Thiodan Insect Spray (endosulfan 9.9%)	Dragon Chemical	Do not apply within 21 days of harvest.
	0.75 Thiodan Insect Spray (endosulfan 9.9%)	Southern Agricultural	Do not re-enter treated area for 24 hours.
malathion	50% Malathion Insect Spray (malathion 50%)	Green Light	Do not apply within 7 days of harvest.
	Malathion Insect Control (malathion 50%)	Bonide	
	Ortho Malathion Plus (malathion 50%)	Ortho	
	Malathion 50% EC	Southern Agricultural	
	Malathion Insect Spray (malation 28%)	Hi-Yield	
permethrin	Borer Miner Killer Concentrate (permethrin 2.5%)	Bonide	Do not apply within 7 days of harvest.
	Borer Killer (permethrin 2.5%)	Green Light	
	Bug Stop Garden & Lawn Insect Control Concentrate (permethrin 2.5%)	Spectracide	
pyrethrins	Fruit Tree Spray (pyrethrins 0.25%, neem oil 70%)	Green Light	Most effective when applied on a 7-14 day interval.
dormant oil	Horticultural Oil Spray (petroleum oil 97%)	Green Light	Apply in late winter when trees are dormant.
	Oil and Lime Sulfur Spray (80% horticultural oil, calcium polysulfides 5%)	Bonide	
	Volck Oil Spray (petroleum oil 97%)	Ortho	
	Dormant Spray (97% paraffinic oil)	Hi-Yield	
	Dormant Spray and Summer Oil (99% paraffinic oil)	Fertilome	
spinosad	Lawn and Garden Spray with Spinosad (0.5% spinosad)	Green Light	Do not apply within 14 days of harvest of peaches, or 7 days for plum.
	Borer, Bagworm, Leafminer and Tent Caterpillar Spray (0.5% spinosad)	Fertilome	
	Conserve Naturalyte Insect Control (0.5% spinosad)	Southern Agricultural	
	Garden Insect Spray (0.5% spinosad)	Monterey Lawn and Garden Products	

Table 6. Combination products for disease and insect control on peaches and plums.

Pesticide	Trade Name	Distributor	PHI*	Remarks
captan 10% + malathion 7.5%	Fruit Tree Spray	Ferti-Lome	7 3	Peaches Plums
captan 12% + malathion 6% + carbaryl 0.3%	Fruit Tree Spray	Bonide	21	Not cleared for use on plums. Limit 8 applications/ season.
captan 12% + malathion 6% + carbaryl 0.3%	Rescue	Martin's	21	Not cleared for use on plums. Limit 8 applications/ season.

*PHI = Pre-harvest interval, the minimum number of days before harvest that product can be used.