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HOMEOWNER'S

Fruit and Nut

SPRAY GUIDE

George Philley, James Robinson, Bill Ree and George Ray McEachern*

Insects and diseases can cause problems in peaches, plums, nectarines and pecans. Homeowners who grow these fruit trees can more easily identify the problems and select the proper control methods if they are familiar with insect pests and diseases, their life cycles and the damage they cause.

Because such problems vary from one area of Texas to another and from one year to the next, it is important that you keep records of pest and disease occurrences. These records can help you make wise control decisions, such as on the timing of pesticide applications.

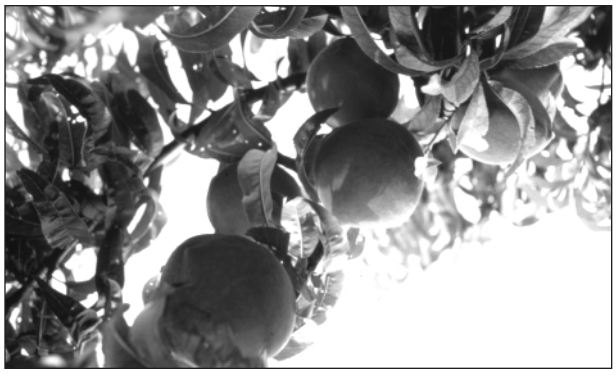
Plant diseases are most severe in periods of frequent rain or dew and mild temperatures (75 to 85 degrees F). Early-maturing peach varieties are more likely to be affected by brown rot than are late-maturing varieties; late varieties are often damaged more by peach scab.

Insect infestations are not as dependent on weather as are diseases. Insect populations can be monitored by using traps baited with pheromones.

Cultural practices

Healthy plants can survive some insect and disease damage better than can stressed plants. Trees grow best if you select adapted disease-resistant varieties, follow a well-balanced fertility program, and irrigate and prune as needed.

*Professor and Extension Plant Pathologist; Professor and Extension Entomologist; Extension Agent-Entomology (Pecans); and Professor and Extension Horticulturist; The Texas A&M University System



It's important to clean up and dispose of plant residue to reduce the damage from peach scab, plum curculio, hickory shuckworm, and brown rot of peach. Diseased material that is properly composted can be recycled as mulch or organic material.

Pesticide options

Homeowners face a number of problems in buying chemical products to control diseases and insects. Some products have had their uses canceled or are not as available to homeowners as they once were, and the most effective ones are not always packaged in small quantities and may only be available in commercial-size packages.

If you buy commercial-size packages, the cost is high, the unused portion must be stored for a long time, and the label lists the rates in amounts per acre, which is difficult to convert when mixing a few gallons of spray material.

Another problem is that many products have limits on the number of times they can be applied per season. These limitations may require that you buy more than one chemical to achieve season-long control of diseases or insects.

In some cases, a commercial-size package is your only option. The number of larger packages was limited as much as possible in this guide, but that also limits the pesticide selection. To get a bigger selection, fruit hobbyists with more than a few trees should consider commercial-size packages. For homeowners with just a few trees, the best option may be the combination (insecticide + fungicide) products available at nursery and garden centers (see Table 4).

Disease-control products available in small packages are listed in Table 3. There are so many insect-control options that a complete listing is impractical here. 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 dis-

ease. 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.

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 in both agriculture and 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. Bait 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.

Table 1. Homeowner's spray guide for pecans

Timing	Pest	Pesticide	Rate/1 gal water[1]	Remarks
Dormant season (winter)	**Insects** Scale insects, mite eggs, phylloxera	97% oil emulsion	4 oz	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	2 tsp	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 bees that are not actively growing.

[1]Because the concentration of pesticides varies in different products, refer to the label for the specific rate per 1 gallon spray solution.

Pecans (continued)				
Timing	**Pest**	**Pesticide**	**Rate/1 gal water[1]**	**Remarks**
Budbreak (continued)	**Insects** Phylloxera	Malathion Malathion 50% EC	2 Tbs	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)[2] or	1/2 - 1 Tbs	Do not apply after shuck split.
		Fenbuconazole (Enable® 2F)[2]	1 1/2 tsp/10 gal	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.		
	Diseases Scab and other foliage and nut diseases	Same as for budbreak.		
	Insects Fall webworm	*Bacillus thuringiensis* or	Refer to label.	Repeat sprays as pest problem recurs. Look for eggs on undersides of leaves.
		tebufenozide (Confirm T/O 2F) or	1/2 to 1 tsp	Do not apply within 14 days of harvest. **For more information, see Extension publication L-1811, "Fall Webworm."**
		Malathion (Malathion® 50% EC) or	2 tsp	
		Carbaryl (Sevin® liquid)	Refer to label.	
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 L-5134, "Controlling 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, "Walnut Caterpillars."**
	Insects Pecan nut casebearer and walnut caterpillar	Same as for prepollination		
	Diseases Scab and other foliage and nut diseases	Same as for budbreak		

[1]Because the concentration of pesticides varies in different products, refer to the label for the specific rate per 1 gallon spray solution.

[2]Commercial-size package
WP - wettable powder
EC - emulsifiable concentrate
F - flowable
L - liquid

Pecans (continued)				
Timing	**Pest**	**Pesticide**	**Rate/1 gal water[1]**	**Remarks**
Second-generation casebearer (42 days after first casebearer spray)	**Insects** Pecan nut casebearer Aphids **Diseases** Scab and other foliage and nut diseases	Same as for prepollination Malathion (Malathion 50% EC) or Dimethoate (Cygon® EC) Same as for budbreak	2 tsp Refer to label.	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. This insect is common in late season.
Cover sprays	**Diseases** Scab	Same as for budbreak		The number of cover sprays is based on weather conditions, variety and presence of scab fungus. Maintain spray applications as long as weather conditions favor disease development.
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)[2]	1/2 - 1 Tbs	Treat where there is a history of disease or when rainfall is prolonged.
Half-shell hardening – early to mid August	**Insects** Aphids Hickory shuckworm Pecan weevil **Diseases** Scab and other foliage and nut diseases.	Same as for aphids listed above Carbaryl (Sevin® liquid) or tebufenozide (Confirm T/O 2F) Carbaryl (Sevin® liquid) Same as for budbreak	Refer to label. 1/2 - 1 tsp Refer to label.	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. This insect is common in late season. Do not apply within 14 days of harvest. 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 L-5362 "Controlling the Pecan Weevil."

[1]Because the concentration of pesticides varies in different products, refer to the label for the specific rate per 1 gallon spray solutio

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Table 2. Homeowner's spray guide for peaches and plums

Timing	Pest	Pesticide	Rate/1 gal water[1]	Remarks
Dormant season	**Insects** Scale insects	97% dormant oil	4 oz	Apply when temperature is between 40 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	Copper fungicide or Chlorothalonil (see listing of products, Table 3)	Refer to label for specific rate	Apply if there is a history of leaf curl.
Petal-fall (when flower petals begin to fall) 5 days after bloom (combination products are an option – see Table 4).	**Insects** Plum curculio	Malathion (Malathion 50% EC) or Carbaryl (Sevin® liquid) or Permethrin 2.5% EC	2 tsp Refer to label 2 oz	Apply when 75 percent of petals have fallen, and there is a history of insect damage.
	Peach twig borer	Permethrin 2.5% EC	2 oz	
	Lesser peach tree borer	Permethrin 2.5% EC	2 oz	
	Diseases Scab	Captan or Chlorothalonil or Sulfur (see listing of products, Table 3) or Thiophanate-methyl (Topsin-M® 70% WP)2	 1-2 Tbs	Treat where there is a history of disease problems.
Shuck split (when the calyx separates from base of newly formed fruit) 14 days after bloom. (Combination products are an option – see Table 4).	**Insects** Catfacing insects, plum curculio	Same insecticides as for petal fall.		Treat where there is a history of catfacing insects and/or plum curculio.
	Diseases Scab	Same fungicide selection as at petal fall.		

[1]Because the concentration of pesticides varies in different products, refer to the label for the specific rate per 1 gallon spray solution.

[2]Commercial-size package

WP - wettable powder

EC - emulsifiable concentrate

F - flowable

L - liquid

Peaches and plums (continued)				
Timing	**Pest**	**Pesticide**	**Rate/1 gal water[1]**	**Remarks**
Cover sprays (repeat at 14-day intervals) (Combination products are an option – see Table 4.)	**Insects** Catfacing insects, plum curculio	Same as for petal fall.		
	Diseases Scab	Captan or Sulfur (see Table 3)		
Pre-harvest (for early-maturing varieties and during periods of frequent rain or dew-spray 3 weeks, 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 4.)	**Insects** June beetles and wasps	Carbaryl (Sevin® liquid)	Refer to label.	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.
	Diseases Brown rot	Thiophanate-methyl (Topsin M® 70% WP)[2] or Captan (see Table 3) or Myclobutanil (see Table 3)	1-2 Tbs 1/2 fl oz	Do not apply within 1 day of harvest. May be applied up to day of harvest.
Post harvest – mid to late August	**Insects** Peach tree borer			For best results, treat for borers after Sept. 1. Sprays should be applied to the trunk of the tree.
		Permethrin 2.5% EC or Endosulfan (Thiodan® 9.7% EC)	2 oz 2 Tbs	Do not apply within 7 days of harvest. Use 2 applications, 3-4 weeks apart.
	Diseases Peach rust	Chlorothalonil (See listing of products, Table 3).	Refer to label	Begin applications at first sign of rust in the summer and continue at 2- to 3-week intervals until early October. Rust is a problem in counties south of a line from Houston to Hallettsville and Rio Grande City.

[1]Because the concentration of pesticides varies in different products, refer to the label for the specific rate per 1 gallon spray solution.

[2]Commercial-size package

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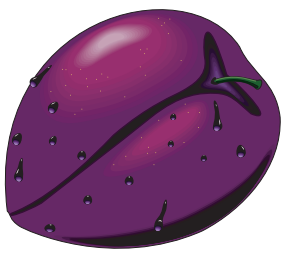
Table 3. Products available in small packages for disease control on peaches and plums				
Pesticide	**Trade name**	**Brand name**	**Rate/gal.**	**PHI*/Remarks**
Captan	Captan Fungicide (50% WP)	Hi-Yield	2 Tbs	0. Not cleared on plums.
	Captan Fruit & Ornamental (50% WP)	Bonide	2 Tbs	0. Not cleared on plums.
Chlorothalonil	Multi-Purpose Fungicide - Daconil (29.6%)	Ortho	2 1/4 tsp	Do not apply after shuck-split.
	Fung-onil Concentrate (29.6%)	Bonide	3 Tbs/4 gal	Do not apply after shuck-split.
	Bravado Fungicide (29.6%)	Monterey	3 Tbs/4 gal	Do not apply after shuck-split.
(Copper fungicides) Copper ammonium complex	Liqui-Cop (8%)	Monterey	2-4 Tbs	Do not apply after full bloom. Not cleared on plums.
Copper sulfate	Bordeaux Mix Fungicide	Hi-Yield	8-9 Tbs	Do not apply after pink bud. Not cleared on plums.
	Bordeaux Fungicide	Dexol	8-9 Tbs	Do not apply after pink bud. Not cleared on plums.
Copper hydroxide	Copper Fungicide	Hi-Yield	1/3 - 5 1/3 tsp	Peaches: 3 wks; plums: do not apply after white bud.
Myclobutanil	Immunox Multi-Purpose Fungicide (1.55%)	Spectracide	1/2 fl oz	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 4. Combination products for disease and insect control on peaches and plums				
Pesticide	**Trade name**	**Brand name**	**Rate/gal.**	**PHI*/Remarks**
Captan 10% + malathion 7.5%	Fruit Tree Spray	Ferti-Lome	3 1/2 Tbs	Peaches – 7 Plums – 3
Captan 12% + malathion 6% +	Liquid Fruit Tree Spray	Dexol	2 1/2 Tbs	21 – not cleared for use on plums
methoxyclor 12% + carbaryl 0.3%	Fruit Tree Spray	Bonide	2 1/2 Tbs	21 – not cleared for use on plums
Captan 12% + malathion 6% + carbaryl 0.3%	Rescue	Martin's	2 1/2 Tbs	21 – not cleared for use on plums

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



Organic disease 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 period 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.

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