



Home Orchards

Disease and Insect Control Recommendations

Apple and Pear

Apple and pear trees are subject to serious damage from pests. As a result, a preventive spray program is needed. The following practices will improve the effectiveness of the pesticides and may lessen the need for sprays.

- Plant disease-resistant varieties. This method of disease control is especially important for fire blight, where chemical control options are limited. Varieties resistant to cedar-apple rust, scab, and powdery mildew also are available and will potentially reduce the need for sprays.
 - Rake and destroy leaves in the fall if apple scab or pear leaf spot are problems. The fungi that cause these diseases can survive through the winter in infected leaves.
 - Remove diseased galls from cedar trees. Spores from these cedars can infect apples, causing cedar-apple rust. Elimination of the source of spores (cedar trees) is effective but not always possible. Where cedars are part of an established landscape, remove and destroy all galls caused by the rust fungus on cedars in the late fall. Inspect the cedars again in the early spring during or just after a rain when the orange, gelatinous fungus growth from any remaining galls is highly visible. Remove these galls.
 - Prune trees according to recommendations to improve control of all aboveground diseases. In well-pruned trees, air circulation and sunlight penetration are improved. This helps to control diseases by promoting rapid drying after rains and dew. Penetration of sprays into the canopy also is better if the trees are well pruned.
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- Prune out and destroy all dead or diseased shoots and limbs during the dormant season. This helps to reduce fire blight, fruit rots, and certain leaf spots, as the organisms that cause these diseases can survive through the winter in the wood. Removing mummified (dark, shriveled, dry) fruit helps to prevent the overwintering of the fruit rot organisms.
 - Prune out fire blight-affected shoots and blossom clusters during the growing season only as symptoms appear. Prune during dry weather and sterilize tools between cuts.
 - Control weeds that may harbor insect pests.
 - Use only copper, sulfur, and streptomycin sulfate disease control products on pear trees. Streptomycin sulfate can be used for fire blight as found in table 1.1. Copper and sulfur can be used for leaf spot, scab, quince rust, and other diseases as directed on the label. Both copper and sulfur can injure pears, so read the label carefully.

Table 1.1. Disease and Insect Management for Home Orchards

Time of Application	Pest Controlled	Material to Use ¹	Comments
Apple and Pear (cannot use captan or myclobutanil on pears; use only copper and sulfur)			
Delayed dormant: when leaves start to protrude from buds	Fire blight	Copper	Refer to label for specific application timing.
	Aphid, mite, scale	Horticultural oil	Apply three times during the dormant season.
Bud break: from ½ inch long green leaves to tight cluster	Scab	Captan	
	Aphid, mite, scale, plant bugs, leafminer	Malathion or permethrin	Repeated use of pyrethroids such as permethrin will increase mite populations. Malathion rarely induces secondary pest populations.
Pink: just before blooms open	Scab, cedar apple rust	Captan or myclobutanil	If cedar apple rust has been a problem, use myclobutanil in this stage, petal fall, and first cover sprays.
	Aphid, mite, scale, plant bugs, leafminer	Malathion or permethrin	
Bloom	Fire blight	Streptomycin	If fire blight has been a problem, apply streptomycin every 3–4 days during bloom.
	Do not apply insecticides during bloom to protect pollinators.		
Petal fall: when most of the blooms have fallen	Scab, cedar apple rust, powdery mildew	Captan or myclobutanil	
	Codling moth, leafroller, leafhopper, plum curculio, Oriental fruit moth	Malathion or permethrin	Permethrin can provide some control of stinkbugs as well.
First cover: 7 to 10 days after petal fall spray	Bitter rot, white rot, cedar apple rust, scab	Captan or myclobutanil	
	Codling moth, leafroller, leafhopper, plum curculio, Oriental fruit moth	Malathion or permethrin	
Remaining covers: at 2-week intervals until harvest restriction date	Bitter rot, white rot, sooty blotch, fly speck	Captan	
	Codling moth, plum curculio, Japanese beetle	Malathion or permethrin	

¹ Insecticides and fungicides can be mixed in the same tank and sprayed together.

Peach, Plum, and Nectarine

Peach, plum, and other stone fruits are commonly affected each year by several insect and disease problems. A spray program is therefore needed for successful fruit production. The following sanitation and cultural practices will improve the chances of success and may lessen the need for sprays.

- Prune trees according to recommendations to allow better air circulation and sunlight penetration. Pruning helps to control diseases by promoting rapid drying after rains and dew. Penetration of sprays into the canopy is also better if the trees are well pruned.
- Remove and discard old mummified fruit left hanging in the tree or laying on the ground. Mummified fruit is an important overwintering site of the brown rot fungus.
- Control black knot of plum trees by removing knots before they begin to produce spores. In late winter, prune out and destroy these rough, black swellings or galls that develop on twigs and branches.
- Avoid planting peach varieties that are highly susceptible to bacterial spot, as there are few options for control of this disease. Examples of highly susceptible cultivars are Elberta, Halehaven, Rio-Oso-Gem, O-Henry, Cresthaven, and Sunhigh.
- Control broadleaf weeds with regular mowing to control insect pests.
- Remove fruit damaged by insect feeding.

Table 1.2. Disease and Insect Management for Home Orchards

Time of Application	Pest Controlled	Material to Use ¹	Comments
Peach, Plum, and Nectarine			
Dormant: late fall to early spring before bud swell	Peach leaf curl	Chlorothalonil or copper	Fungicide application is needed for peach leaf curl only if there is a history of this disease.
	Aphid, mite, scale	Horticultural oil	Apply three times during the dormant season.
Delayed dormant: when buds swell	Aphid, mite, scale	Horticultural oil	Do not apply when temperatures are below 40°F or are predicted to fall below 40°F within 24 hours.
Pink: Just before blooms open	Black knot of plum	Captan or chlorothalonil	Fungicides are needed for plum trees only if black knot is a problem. Remove and destroy all signs of black knot during the dormant season.
	Lesser peachtree borer, peachtree borer, plum curculio, Oriental fruit moth	Malathion or permethrin	Treatment provides some control of leaffooted bug and stinkbugs. Permethrin can be used only on peaches.
Bloom	Do not apply insecticides during bloom to protect insect pollinators.		

¹ Insecticides and fungicides can be mixed in the same tank and sprayed together.

Table 1.2. Disease and Insect Management for Home Orchards (cont'd)

Time of Application	Pest Controlled	Material to Use ¹	Comments
Peach, Plum, and Nectarine			
Petal fall	Brown rot, scab	Captan, chlorothalonil, or sulfur	
	Scab, lesser peachtree borer, peachtree borer, plum curculio, Oriental fruit moth	Malathion or permethrin	Repeated use of pyrethroids such as permethrin will increase mite populations. Malathion rarely induces secondary pest populations.
Shuck split: when flower shucks begin to split	Brown rot, scab, black knot of plum	Captan, chlorothalonil, or sulfur	Do not apply chlorothalonil after shuck split.
	Lesser peachtree borer, peachtree borer, plum curculio, Oriental fruit moth	Malathion or permethrin	
Cover sprays: repeat at 10–14 day intervals	Brown rot, black knot of plum, scab	Captan	
	Lesser peachtree borer, peachtree borer, plum curculio, Oriental fruit moth	Malathion or permethrin	Repeated use of pyrethroids such as permethrin will increase mite populations. Malathion rarely induces secondary pest populations.
Preharvest sprays: 2–3 weeks before harvest ²	Brown rot	Captan or propiconazole	These are critical sprays for brown rot control. Propiconazole is more effective than captan for brown rot control.
	Lesser peachtree borer, peachtree borer, plum curculio, Oriental fruit moth, stinkbug, leaffooted bug, grasshopper	Malathion or permethrin or permethrin	Spray permethrin 14 and 7 days prior to the anticipated harvest date.

¹ Insecticides and fungicides can be mixed in the same tank and sprayed together.

² Refer to product labels for preharvest interval (PHI) or the number of days between final spray and harvest.

Blueberry

If diseases have been a problem in past years, captan can be used at intervals of 7 to 10 days from bud break to harvest. If mummy berry disease has been a problem, rake the area beneath and around plants to collect or bury any mummified fruits from the previous year's crop. This will help to reduce the incidence of mummy berry. To reduce dieback diseases, prune out and destroy dead twigs and branches.

- Monitor for insects and spray as needed.
- Monitor for spotted wing drosophila (SWD), which is a new pest that infests developing fruit. Make sprays once a week to control or prevent SWD. If maggots are found, pick all blue and ripe fruit from the plants. Also remove fruit from the ground. Burn the fruit or seal it in a bag and take it off-site for disposal.
- Apply insecticidal sprays regularly if the orchard was previously infested with SWD.

Table 1.3. Disease and Insect Management for Home Orchards

Time of Application	Pest Controlled	Material to Use ¹	Comments
Blueberry			
Dormant season	Scale	Horticultural oil	Do not apply horticultural oils within 2 weeks of sulfur applications.
Delayed dormant: when buds swell	Gall midge, thrips	Malathion or spinosad	
Petal fall: until 30 days after bloom	Leafhopper	Permethrin or pyrethrins	
Cover sprays: from 1 month after bloom until preharvest	Japanese beetle	Cabaryl or permethrin or acetamiprid	Apply as needed.
Bloom: appearance of berry color to harvest ²	Spotted wing drosophila	Malathion or acetamiprid or spinosad	Use malathion in rotation with acetamiprid and spinosad.

¹ Insecticides and fungicides can be mixed in the same tank and sprayed together.

² Refer to product labels for preharvest interval (PHI) or the number of days between final spray and harvest.

Blackberry

An intensive spray program is generally not needed for blackberry plants. Fungicide and insecticide sprays can be applied as needed. The following sanitation practices will reduce the need for pesticide sprays.

- Remove and destroy nearby wild blackberries to reduce the source of pests.
- Remove and destroy fruiting canes immediately after harvest.
- Promote rapid drying and good air circulation within the canopy by controlling weeds and keeping the plants properly thinned.
- Pick berries often during the harvest period to minimize the amount of overripe fruit. This will reduce problems with berry rots, sap beetles, wasps, and fruit flies.
- Promptly dig up and remove or destroy plants infected with orange rust as soon as symptoms appear in spring. Symptoms of orange rust include willowy growth of new shoots and the presence of orange spore pustules on the undersides of the leaves.
- Remove and destroy infected canes before blooms begin to open to control the spread of rosette. You can recognize rosette by the presence of clusters of stems on fruiting canes that produce a bunchy appearance. Flower sepals are extended and pinkish in color on plants with rosette.
- Make sprays once or twice weekly to control or prevent spotted wing drosophila (SWD), which is a new pest that infests developing fruit.

Table 1.4. Disease and Insect Management for Home Orchards

Time of Application	Pest Controlled	Material to Use ¹	Comments
Blackberry			
Prebloom	Aphid, Japanese beetle, fruitworm, stink bug	Malathion	
Early to midbloom	Anthracnose, rosette, rusts	Copper, myclobutanil, or sulfur	Apply a fungicide if anthracnose, rosette, or rust has been a problem in the past.
Do not apply insecticides during bloom to protect insect pollinators.			
Cover sprays: every 2 weeks postbloom	Anthracnose, rosette, rusts	Copper, myclobutanil, or sulfur	Apply a fungicide if anthracnose, rosette, or rust has been a problem in the past. Myclobutanil and sulfur are not effective against anthracnose.
Bloom: appearance of berry color to harvest ²	Japanese beetle	Acetamiprid or carbaryl	Apply as needed.
	Spotted wing drosophila	Malathion, acetamiprid, or spinosad	Malathion rarely induces secondary pest populations. Use malathion in rotation with acetamiprid and spinosad.

¹ Insecticides and fungicides can be mixed in the same tank and sprayed together.

² Refer to product labels for preharvest interval (PHI) or the number of days between final spray and harvest.

Bunch Grape

Most grape plantings, except muscadine, require a preventive schedule of fungicide and insecticide sprays for successful production. Pests such as black rot can completely destroy a crop of fruit. However, the following sanitation and cultural practices will reduce the need for pesticides.

- Keep vines well pruned according to recommended standards. This prevents overgrowth of vines and a dense canopy. It also removes insect-infested wood. Pruning improves air circulation and sunlight penetration, thus promoting rapid drying after rains and dew. Penetration of sprays into a foliar canopy also is better when vines are pruned.
- Remove and destroy mummified fruit (shriveled, dry, raisin-like) on vines as well as fruit on the ground. Fruit rot organisms of grapes can survive through the winter on old vines and dried fruit on the vines and ground.
- Prune and destroy vines with stem cankers as they are also a site for fungi to survive through the winter.

Table 1.5. Disease and Insect Management for Home Orchards

Time of Application	Pest Controlled	Material to Use ¹	Comments
Bunch Grape			
Dormant season	European red mite, mealy bug, scale	Horticultural oil	Make two applications of horticultural oil during the dormant season.
Delayed dormant: when buds swell	Mealy bug	Malathion	
New growth sprays: when new growth reaches 2–4 inches long and again 7–10 days later	Black rot, Phomopsis, powdery mildew, downy mildew	Captan or mancozeb	
Prebloom: just before blooms open	Black rot, Phomopsis, powdery mildew, downy mildew	Captan, mancozeb, or myclobutanil Malathion	Mancozeb and myclobutanil are most effective against black rot.
Bloom	Black rot, powdery mildew, downy mildew	Captan or myclobutanil	
Postbloom: when most bloom caps have fallen	Black rot, powdery mildew, downy mildew Leaffooted bug, stinkbug, Japanese beetle, grape berry moth, grape curculio, rose chafer	Captan or myclobutanil Malathion or carbaryl	
Summer cover sprays	Japanese beetle, green June beetle, grape berry moth, grape curculio	Malathion or carbaryl	
Preharvest sprays²	Green June beetle, Spotted wing drosophila, wasp, yellow jacket	Malathion or carbaryl	

¹ Insecticides and fungicides can be mixed in the same tank and sprayed together.

² Refer to product labels for preharvest interval (PHI) or the number of days between final spray and harvest.

Strawberry

Strawberry plants often can be grown almost disease-free without spraying. Weather conditions, however, can cause diseases to develop and spread, and spraying will be necessary. The following practices will improve the effectiveness of the pesticides and may lessen the need for sprays.

- Practice dormant season sanitation. This can reduce disease pressure most years. Strawberry leaf spots and botrytis blight pathogens can survive through the winter on old leaves and debris on the bed. Clipping old leaves, raking, and composting or destroying will help with disease control.
- Control weeds during the growing season. Weeds increase disease by reducing light penetration and air circulation, and they intercept pesticide sprays. Weeds also can harbor insects and mite problems.
- Spotted wing drosophila (SWD) is a serious, invasive pest that infests developing fruit. To reduce the population of SWD, remove fruit that has fallen to the ground as well as fruit on plants that is diseased or damaged.
- Alternate insecticides so that SWD does not build resistance to insecticides.

Table 1.6. Disease and Insect Management for Home Orchards

Time of Application	Pest Controlled	Material to Use ¹	Comments
Strawberry			
Plant establishment to dormant	Spider mite	Horticultural oil or insecticidal soap	
Prebloom	Crown borer, strawberry weevil, leafroller, insects that cause cat-facing, snail, slug, strawberry clipper	Carbaryl or malathion	
Bloom	Gray mold, anthracnose	Captan	
Postbloom to harvest ²	Gray mold, anthracnose, aphid, tarnished plant bug, spider mite, whitefly, spotted wing drosophila	Captan Malathion or carbaryl; use insecticidal soaps for spider mites	

¹ Insecticides and fungicides can be mixed in the same tank and sprayed together.

² Refer to product labels for preharvest interval (PHI) or the number of days between final spray and harvest.

Table 2. Products Available in Small Packages for Disease Control in Home Fruit Crops

Active Ingredient	Product Name
Acetamiprid	Ortho Flower, Fruit & Vegetable Insect Killer
Boscalid + pyraclostrobin + lambda cyhalothrin	Bonide Fruit Tree & Plant Guard
Captan	Hi-Yield Captan Fungicide Bonide Captan Fruit and Ornamental Southern Ag Captan Fungicide
Carbaryl	GardenTech Sevin Insect Killer
Chlorothalonil	Ferti-lome Broad Spectrum Lawn and Garden Fungicide Bonide Fung-onil Concentrate Monterey Fruit Tree, Vegetable, and Ornamental Fungicide Ortho Garden Disease Control Hi-Yield Vegetable, Flower, Fruit, and Ornamental Fungicide

Table 2. Products Available in Small Packages for Disease Control in Home Fruit Crops (cont'd)

Copper fungicides	Concern Copper Soap Fungicide Hi-Yield Copper Fungicide Bonide Copper Liquid Concentrate Monterey Liqui-Cop Southern Ag Liquid Copper Fungicide Fertilome Natural Guard Copper Soap Liquid Fungicide
Horticultural oil	Bonide All Seasons Horticultural Spray Oil Ferti-lome Horticultural Oil Spray Monterey Horticultural Oil Southern Ag Parafine Horticultural Oil
Malathion	Bonide Malathion Insect Control Hi-Yield 55% Malathion Insect Spray Ortho Max Malathion Insect Spray Spectracide Malathion Insect Spray Southern Ag Malathion 50% EC
Mancozeb	Bonide Mancozeb Flowable with Zinc
Myclobutanil	Spectricide Immunox Multipurpose Fungicide Ferti-lome F Stop Lawn & Garden Fungicide Monterey Fungi-Max
Permethrin	Bonide Eight Insect Control Vegetable Fruit & Flower Hi-Yield Indoor/Outdoor Broad Use Insecticide
Propiconazole	Bonide Infuse Systemic Disease Control
Pyrethrins	PyGanic Gardening
Spinosad	Southern Ag Conserve Naturalyte Insect Control Bonide Captain Jack's Dead Bug Brew Ferti-lome Borer, Bagworm & Leafminer Spray Monterey Garden Insect Spray
Streptomycin	Ferti-lome Fire Blight Spray
Sulfur	Bonide Sulfur Plant Fungicide Ferti-lome Dusting Sulfur (also usable as wettable spray) Hi-Yield Wettable Dusting Sulfur (also usable as wettable spray) Safer Brand Garden Fungicide Southern Ag Wettable or Dusting Sulfur

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For more information, contact your county Extension office. Visit www.aces.edu/directory.

Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or canceled, the rate listed here is no longer recommended. Before you apply **any** pesticide, check with your county Extension agent for the latest information.

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