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Home Fruit Spray Guide

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Complete Spray Program

In most instances, to control insect and disease problems of your fruit crops, you must follow a complete spray program. Proper timing, thorough coverage of foliage, and correct chemicals are essential. This simplified guide, designed around an all-purpose spray mixture, provides a schedule that the average home gardener can maintain without difficulty.

Of course, this simplified spray program meets only your minimum needs. Special problems could require the use of chemicals not found in an all-purpose mixture. Some pests, such as apple maggot, are difficult to control. So you might find some blemished fruit even after following this recommended spray program.

Many chemical companies sell all-purpose spray mixtures that contain recommended insecticides and fungicides. These mixtures are ready to use; mixing instructions are on the container's label. To determine if a "ready mix" is recommended, check to see if the ingredients are the same as the chemicals listed in table 1.

Many home orchards contain so many fruit trees that a pest control program becomes a burdensome chore that is often put off. If properly cared for, two or three apple trees usually produce enough fruit for a large family. Don't try to grow more trees than you will care for properly.

A good pruning program is a start toward a good pest control program. Prune your trees regularly, once every year or every other year. By reducing the height of trees, you will simplify your spraying chore. (For additional information, see Extension Folder 161, "Pruning Fruit Trees.")

Table 1. All-purpose spray mixture

Materials*	Amount to use in water†		
	1 gal.	5 gal.	25 gal.
methoxychlor 50% WP	2 tbsp.	1 cup	¾ lb.
PLUS malathion 25% WP or 50% EC	2 tbsp. 2 tsp.	¾ cup 3 tbsp.	½ lb. 1 cup
PLUS captan 50% WP	2 tbsp.	1 cup	¾ lb.

* WP = wettable powder; EC = emulsion concentrate.
† Use level measurements.

Use Insecticides and Fungicides Safely

The chemicals recommended in this guide are not highly toxic. However, they can be hazardous if you do not

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Use of commercial names does not imply endorsement nor does failure to mention a name imply criticism.

follow label directions. To prevent injury to children, pets, or yourself, follow these four safety rules:

- Read and understand the label information before using the chemical.
- Use chemicals according to directions for the crops specified and at the rates and times indicated.
- Store all chemicals under lock and key where children cannot reach them.
- Appropriately dispose of empty containers and waste chemicals.

A minimum number of days must pass between the last spray application date and the fruit harvest date; see the container label for this information. If you apply chemicals properly and observe time limitations, no hazardous residues will remain on the fruit at harvest.

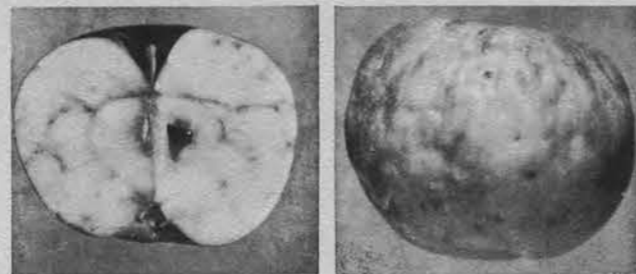
Cross-pollination of apples, crab apples, pears, plums, and cherry plums depends almost entirely on bees. To reduce injury to bees, use only recommended insecticides and apply them only at the specified times. *Do not apply insecticides to trees or other plants that are in bloom.* Do not allow spray to drift onto other blossoming plants.

Controlling Apple Maggot

A serious pest of apples is the apple maggot. In July, adult maggot flies begin to emerge and lay eggs under the skin of the fruit. After the larvae—commonly called "rail-



Orange-yellow spots of cedar-apple rust on apple leaves



Apple maggot injury (cross section and external view)

road worms"—hatch from the eggs, they tunnel through the apple flesh. During some seasons, the flies persist and lay eggs right up to frost or harvest.

To control maggot, you must kill the flies before their eggs are laid. Orchard sanitation and prompt disposal of fallen apples reduce this problem. Thorough spraying is necessary and should be practiced by all fruit growers in a neighborhood. Use *diazinon* or *Sevin* (see table 2). *Do not apply diazinon within 14 days and Sevin within 1 day of harvest. Do not use before July 1.*

Or apply the all-purpose spray at 7- to 10-day intervals, but no later than 7 days before harvest. Apple varieties that ripen in late August in the Twin Cities area need a *minimum* of five sprayings (see table 3). Eight sprayings may be needed for late varieties. (For additional information, see Entomology Fact Sheet 20, "The Apple Maggot.")

Table 2. Chemicals for special problems

Materials*	Amount to use in water		
	1 gal.	5 gal.	25 gal.
Insecticides:			
Sevin—for apple maggot 50% WP	2 tbsp.	1 cup	¾ lb.
diazinon—for apple maggot 50% WP	1 tbsp.	½ cup	½ lb.
Kelthane—for mites 35% WP	1 tbsp.	½ cup	½ lb.
Superior oil—for scale and mites	5 tbsp.	1 pt.	½ gal.
Fungicides:			
Bordeaux mixture (2-2-50)†	(Follow label directions)		
ferbam—for several diseases 76% WP	2 tbsp.	1 cup	¾ lb.
Sulfur—for powdery mildew	(Follow label directions)		
**mancozeb	2 tbsp.	1 cup	¾ lb.
zineb—for several diseases 75% WP	2 tbsp.	1 cup	¾ lb.

* WP = wettable powder; EC = emulsion concentrate.

** mancozeb—trade names, Dithane M-45 and Manzate 200

† Dissolve 2 ounces copper sulfate in 1 gallon water; mix 2 ounces fresh hydrated lime in 2 gallons water. Pour copper sulfate solution into lime water, stir, and strain through cloth. Use immediately. Bordeaux mixture is available as a powder ready to be mixed with water. This powder is satisfactory but probably less effective than the fresh mix. You can use Bordeaux mixture at any time, but do not mix it with other spray chemicals.

Table 3. Spray guide for apples and pears

(Observe limitations on use of chemicals)

Time to spray	Material to use	Pests controlled
1. Delayed dormant: (before leaves are out ½ inch)	Superior oil (70 second viscosity)	Scale and mites
2. Pink spray: when fruit buds show pink at tips	All-purpose mixture (see table 1)	Apple scab, cedar-apple rust,* aphids, cankerworms
3. Petal fall: after three-fourths of petals have fallen	All-purpose mixture	Apple scab, cedar-apple rust,* aphids, curculio, codling moth
4. First cover spray: 5-7 days after petals fall	All-purpose mixture	Apple scab, cedar-apple rust,* aphids, curculio, codling moth, oystershell scale, mites†
5. Second cover spray: 10 days after first cover	All-purpose mixture	Apple scab, cedar-apple rust,* aphids, codling moth, mites†
Additional cover sprays including apple maggot control.		
6. Additional cover sprays, repeat every 7-10 days	All-purpose mixture or Sevin and captan or diazinon and captan	Apple maggot, codling moth, aphids, mites,† apple scab

* Where cedar-apple rust is a problem, add ferbam, mancozeb, or zineb (see table 2).

† For mite control, add Kelthane but not within 7 days of harvest (see table 2).

Fire Blight of Apple and Pear

Fire blight is a destructive disease that is difficult to control in pear and apple orchards. Infection occurs during the entire growing season. High nitrogen fertilization and severe pruning increase the trees' susceptibility to fire blight.

Whenever possible, plant varieties with a high fire blight tolerance, such as Cortland, Haralson, and McIntosh apples and Centennial crab apple.

To eliminate infected branches, prune during the dormant period, preferably in late fall and winter. If possible, cut branches at least 6 inches below infected areas and burn these pruned branches before leaf buds begin to break.

During the growing season, you must use a chemical to disinfect pruning tools between pruning cuts on trees. Liquid household chlorine bleach mixed half and half with water is a suitable chemical for this purpose. (For additional information see Plant Pathology Fact Sheet 17, "Fire Blight.")

Nonbearing Fruit Trees

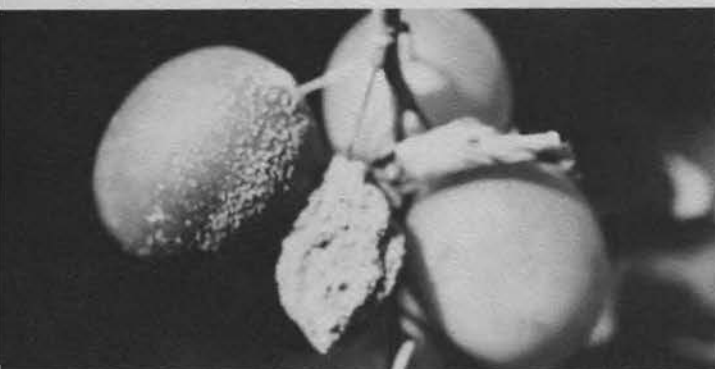
Young fruit trees need protection from certain pests. These plantings can be severely damaged or lost because



Black spots of apple scab on apple leaves of buffalo treehoppers, grasshoppers, aphids, and apple scab. Apply the all-purpose mixture when needed (see tables 1 and 3).

Soil Treatment for White Grubs

White grubs are soil insects that injure strawberry plants by feeding on roots. You can expect a serious problem if you plant the strawberry bed in an area that was previously in sod. Use chlordane to control white grubs. On a 1,000 square foot area, apply either: (1) 2½ pounds of a 10 percent granular or dust formulation or (2) 4 ounces of a liquid emulsion formulation containing 8 pounds of chlordane per gallon. Incorporate into the soil before planting.



Brown rot of plum

Apple fireblight



Table 4. Spray guide for stone fruits—apricots, cherries, plums
(Observe limitations on use of chemicals)

Time to spray	Material to use	Pests controlled
1. Dormant: before buds open in spring	Bordeaux Mixture or lime sulfur (See table 2)	Black knot,* plum pocket
2. Petal fall: when three-fourths of petals have fallen	All-purpose mixture plus ferbam	Brown rot, curculio
3. Shuck fall: when shucks or membranous coverings start to fall	All-purpose mixture plus ferbam	Brown rot, leaf spot, curculio, aphids
If leafhoppers, mites, borers, leaf spot, or brown rot are troublesome, apply first cover and preharvest sprays.		
4. First cover: 10 days after shuck fall	All-purpose mixture plus ferbam	Brown rot, leaf spot, aphids, mites, leafhoppers, borers**
5. Preharvest: when normal fruits first show color, check label for waiting period before harvest	All-purpose mixture plus ferbam	Brown rot, mites, leafhoppers, borers**

* Cut out and destroy diseased parts.

** Apply as a drenching spray to trunk and larger branches.

Table 5. Spray guide for strawberries
(Observe limitations on use of chemicals)

Time to spray	Material to use	Pests controlled
1. Preplanting soil treatment	Chlordane (see page 6 for application method)	White grub
2. When blossom buds first appear	All-purpose mixture This is the most important spray	Sawfly, weevil, plant bug, spider mite, fruit rot,* leaf diseases
3. Weekly to harvest	Captan	Blossom blight, leaf diseases, fruit rot*

One or more of the following sprays might be needed, although treatments listed above usually are sufficient:

As needed but not within 2 days of harvest	Kelthane	Cyclamen mite (most severe on everbearing varieties), spider mite
As needed between bloom and within 3 days of harvest	Malathion	Strawberry leaf rollers, leafhoppers, aphids, plant bug, sap beetle†
As needed	Sulfur	Powdery mildew
Post-harvest, every 2 weeks through September	All-purpose	Insects and diseases

* See Plant Pathology Fact Sheet 2, "Strawberry Diseases."

† Sap beetles often are attracted by overripe fruit. To prevent these beetles, do not allow overripe fruit to accumulate in the planting.

Table 6. Spray guide for raspberries
(Observe limitations on use of chemicals)

Time to spray	Material to use	Pests controlled
1. When leaves are fully expanded	All-purpose mixture	Anthracnose,* spur blight,* sawfly
2. When blossom buds first appear	All-purpose mixture	Anthracnose, spur blight, fruit worm
3. Weekly, but not within 3 days of harvest	All-purpose mixture	Spider mite, aphids, anthracnose, spur blight
4. Postharvest, as needed	Sulfur	Powdery mildew
5. Postharvest, 14 day intervals	All-purpose mixture	Anthracnose, spur blight, spider mite

* See Plant Pathology Fact Sheet 8, "Raspberry Diseases."

NOTE: For cane borers, prune out and destroy infested canes.

Table 7. Spray guide for currants and gooseberries
(Observe limitations on use of chemicals)

Time to spray	Material to use	Pests controlled
1. When terminal leaves are ½-1 inch long	All-purpose mixture Use ferbam or zineb in place of captan (see table 2)	Currant worm, aphids, fruit maggot, leaf spot, rust
2. When berries are forming and post-harvest if needed	Same as above, but do not use ferbam within 14 days of harvest	Currant worm, leaf spot, rust
3. As needed	Sulfur	Powdery mildew

Table 8. Spray guide for grapes
(Observe limitations on use of chemicals)

Time to spray	Material to use	Pests controlled
1. When blossoming starts	Ferbam or 2-2-50 Bordeaux mixture (see table 2)	Black rot
2. 8-10 days after bloom	All-purpose mixture plus ferbam	Leafhoppers, grape berry moth, black rot
3. When grapes in clusters start to touch	All-purpose mixture plus ferbam	Black rot, leafhoppers, grape berry moth
The following sprays will be needed if control of downy mildew is a problem:		
4. Immediately after bloom	2-2-50 Bordeaux mixture or zineb	Downy mildew
5. 12-14 days after bloom	2-2-50 Bordeaux mixture or zineb	Downy mildew

NOTE: Beware of weed spraying with 2,4-D in vicinity of grape vines or on nearby roadsides. Grape vines are very susceptible to injury from 2,4-D.

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