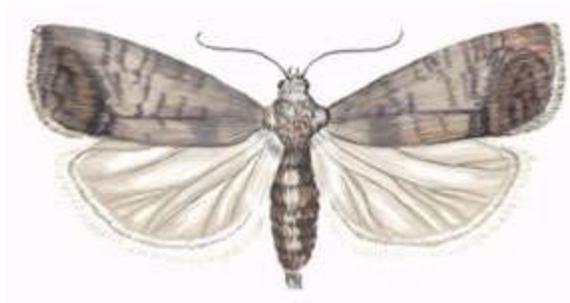


Penn State Extension



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Pest Management for Apples and Pears



Apples and pears, botanically referred to as pomes, are excellent candidates for the home garden, as long as you are committed to the attention to detail and pest management that the crops require. Advantages of homegrown pome fruit are numerous. You can grow varieties that are not readily available in grocery stores, control the level of pesticides used, and gain a greater understanding of the processes of nature that interact with the tree to produce these wonderful fruits. Remember, however, that producing high-quality apple and pear fruit requires careful observation as well as knowledge of how to respond to various pest problems that you may encounter.

Because apples and pears have many insect and disease pests, growing quality fruit in Pennsylvania is difficult without some pesticide use. Home gardeners are encouraged, however, to purchase disease-resistant varieties if they are available. Although these varieties are not resistant to all diseases that occur in Pennsylvania, they are resistant to the major ones. Pesticides still might be required, particularly in wet seasons, but their application rates can be reduced greatly. Under normal conditions, a home gardener might have to apply pesticides six to ten times to produce fruit of reasonable quality. If scab-resistant apples are planted, a gardener might need only two to three pesticide applications to produce quality apples.

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Table 1. Occurrence of Diseases, Insects, and Mites on Apples and Pears during the Growing Season

Diseases									Insects and Mites													
Timing	S	PM	R	BER	CR	SB	SR	FS	AM	CM	EAS	ERM	GA	GM	OFM	PC	PP	RAA	SJS	TPB	TSM	WAL
Dormant									—	—		—	+		—	—	++	++	++	—	—	—
1/2-inch green	++	—	—	—	—	—	—	—	—	—		+	+		—	—	++	++	++	+	—	—
Prepink	++	++	—	—	—	—	—	—	—	—		+	+		+	—	++	++	—	++	—	—
Pink	++	++	+	—	—	—	—	—	—	—	++	+	+		++	—	++	++	—	++	—	—
Bloom period	++	++	++	++	++	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	—
Petal fall	++	++	++	++	++	—	—	—	—	—	++	++	+	++	++	+	+	+	++	++	—	+
Mid-June	++	++	++	++	++	—	—	—	—	++		+	++	++	+	++	+	+	++	+	—	++
Late June	++	++	—	—	—	++	++	++	+	++		+	++		++	++	++	+	++	+	+	++
Early July	++	++	—	—	—	++	++	++	++	+		+	++		+	—	++	—	+	+	+	—
Mid-July	++	++	—	—	—	++	++	++	++	+		++	—		++	—	++	—	+	+	++	—
Late-July	++	++	—	—	—	++	++	++	++	++		++	—		++	—	++	—	+	+	++	+
Early-mid-Aug.	++	—	—	—	—	++	++	++	++	++		+	+		++	—	+	—	++	+	+	++
Late Aug-mid-Sept.	++	—	—	—	—	++	++	++	++	—		—	+		++	—	+	—	++	+	—	+

+ = pest present, possible control
 ++ = proper timing of control
 — = control generally is not needed at this time

Apply pesticides only if pests are present in damaging numbers. Bloom period is assumed to occur during the second week in May; this date should be adjusted depending on local conditions. Dates listed for sprays are approximate; they should be applied about once every two weeks.

Table 2. Efficacy of Fungicides on Apples and Pears

Diseases

FF = fruit finish

FR = fruit rots (black rot, white rot, bitter rot)

PM = powdery mildew

R = rusts

S = apple scab

SB + FS = sooty blotch and flyspeck

Pesticides	S	PM	R	FR	SB + FS	FF
Captan	1	5	5	1	2	1*
Copper	2	1	3	2	2	4
Lime Sulfur	1	2	3	1	1	1
Maneb	1	5	1	1	1	1
Neem	4	4	4	4	4	?
Myclobutaryl	1	1	1	5	5	1
Sulfur	2	1	2	3	3	2

Degree of control: 1 = best; 2 = good; 3 = fair; 4 = slight; 5 = none

FF = Fruit finish on yellow varieties when used as recommended: 1 = very good; 2 = good; 3 = fair; 4 = poor

* Lime sulfur may also cause leaf burning

Table 3. Efficacy of Insecticides and Miticides on Apples and Pears

Note: Due to a wide array of various products containing the same active ingredient for insecticide recommendations, when appropriate, the active ingredient is listed instead of the name of formulated product.

Insects and Mites

AM = apple maggot
 CM = codling moth
 EAS = European apple sawfly
 ERM = European red mite
 GAA = green apple aphid
 GM = gypsy moth
 OFM = oriental fruit moth
 PC = plum curculio
 PP = pear psylla
 RAA = rosy apple aphid
 SB = stink bugs
 SJS = San Jose scale
 TPB = tarnished plant bug
 TSM = two-spotted spider mite

Pesticides	AM	CM	EAS	ERM	GAA	GM	OFM	PC	PP	RAA	SB	SJS	TPB	TSM
Azadirachtin	—	—		3	3	4	—	—	—	3	3	—	4	—
<i>Bacillus thuringiensis</i> (Bt)	4	3		4	4	1	3	4	4	4	4	4	4	4
Carbaryl ^a	2	2		4	2	1	2	2	3	3	3	3	3	4
Diazinon	2	2		3	2	2	2	2	2	2	2	2	2	3
Esfenvalerate ^b	2	2	2	4	2	2	2	2	2	2	2	4	2	4
Horticultural Oil	4	4		1	2	4	4	—	2	3	4	1	4	1
CM granulosis virus	—	1		—	—	—	3	—	—	—	—	—	—	—
Imidacloprid	2	—		—	1	4	—	3	1	1	3	—	3	—
Malathion	2	2	3	4	4	2	2	2	3	4	—	2	2	3
Pyrethrum	4	4	3	—	3	4	4	3	3	3	3	—	3	—
Rotenone	3	3	3	—	—	3	3	3	—	—	3	—	3	—
Safer Soap	4	4		2	4	4	4	4	2	4	—	2	4	2
Spinosad	2	4		—	—	1	4	—	—	—	4	—	4	—
Surround	3	4	3	4	4	—	4	2	1	3	3	—	3	4

a. Sevin may worsen the mite problem and, when used shortly after bloom, can cause apples to fall from the tree.

b. This compound is very toxic to bees and should not be used until after petal fall.

Degree of control: 1 = best; 2 = good; 3 = fair; 4 = poor

Table 4. Pesticide Recommendations for Apples

The following spray schedule will provide desirable disease and insect control during normal seasons. If the weather is dry, the time between spray applications can be increased to 21 days; if the weather is wet, sprays should be applied every 10 to 14 days. To avoid harming bees, do not use an insecticide in sprays applied during the bloom period. Due to a wide array of various products containing the same active ingredient for insecticide recommendations, when appropriate, the active ingredient is listed instead of the name of formulated product. Follow all instructions and application rates listed on pesticide labels.

Time to Spray	Suggested Materials^a	Pests to Be Controlled
Green Tip—when leaves are 1/4 inch long	Oil <i>plus</i> Copper	Scales, mite eggs aphids, scab, powdery mildew ^b
Prepink—first pink color of flower buds ^c	GPPproduct mix, <i>or</i> Captan 50WP	Scab, aphids, caterpillars, scales, rust, powdery mildew
Pink—just before blossoms open ^c	Same materials as Prepink <i>plus</i> Safer Soap ^c	Scab, rust, powdery mildew aphids, scales
Petal Fall—90% of flower petals off ^c	Captan <i>plus</i> imidacloprid <i>plus</i> esfenvalerate <i>or</i> Surround <i>plus</i> CM granulosis virus	Scab, rust, powdery mildew curculio, caterpillars, oriental fruit moth, European apple sawfly
10–14 days after petal fall ^c	GPPproduct mix, <i>or</i> Captan, <i>plus</i> Spinosad, <i>plus</i> Last Call mating disruption, <i>plus</i> CM granulosis virus	Scab, rust, powdery mildew leafrollers, codling moth, oriental fruit moth
14 days later ^{c, d, e}	GPPproduct mix, <i>or</i> Captan 50WP <i>plus</i> Spinosad, <i>plus</i> Surround, <i>or</i> Safer Soap ^c , <i>or</i> summer oil ^e Calcium chloride	Summer rots, sooty blotch, flyspeck, scab, caterpillars, aphids Corking, bitter pit of apple
Continue applications on ^{c, d, e} 10- to 14-day interval until harvest. Read the label as to the preharvest interval of when to stop spraying.	Same materials as last spray	Scab, summer rots, sooty blotch, flyspeck, scab, apple maggots, mites, worms

Notes

- a. Match pesticide efficacy against problem pests before selecting spray material (see Tables 4.5 and 4.6).
- b. Where powdery mildew is a problem, add wettable sulfur in prepink through late-June sprays. Do not apply sulfur if the temperature is predicted to be 80°F or higher on the day of application.
- c. Safer Soap will probably russet fruit.
- d. If cork spot or bitter pit is a problem, the addition of calcium chloride can help reduce their occurrence.
- e. Summer oil can not be used 14 days before and after captan application or fruit russetting will occur.

Table 5. Pesticide Recommendations for Scab-Resistant Apple Varieties

The following spray schedule and times might vary by as much as 2 weeks, depending on the region of Pennsylvania in which the trees are located. Apply sprays only if disease and insects have been a problem as determined by scouting procedures. These varieties can tolerate some disease and insect pressure without adversely affecting tree health and fruit quality. Varieties differ in their susceptibility to pests, and young trees are more susceptible to all pests. Due to a wide array of various products containing the same active ingredient, for insecticide recommendations, when appropriate the active ingredient is listed instead of the name of formulated product. Always consult the label before making pesticide applications. Labels vary greatly between commercial products of the same material. It is important to refer to the label for the best timing and application rates when applying pesticides. Also read the text for information on cultural practices to minimize the application of pesticides. To avoid harming bees, do not use an insecticide in sprays applied during the bloom period.

Time to Spray	Suggested Materials	Pests to Be Controlled
Dormant—late March to early April	Oil (dormant oil)	Aphid and mite eggs
Green tip—when leaves are ¼ inch long	Superior Oil plus Esfenvalerate	Mites and rosy apple aphids Scales
Prepink—first pink color of flower buds	<i>Bacillus thuringiensis</i>	Tent caterpillars Gypsy moth larvae ^a
Petal fall ^b —90% of flower petals off	Imidacloprid <i>plus</i> Surround <i>plus</i> Esfenvalerate	Plum curculio, codling moth
Mid-June to mid-August	Captan Safer Insecticidal Soap CM granulosis virus <i>or</i> Last Call mating disruption	Summer fruit rots ^c , sooty blotch, flyspeck Green aphids mites Codling moth, oriental fruit moth
Mid-July to August	CM granulosis virus <i>plus</i> Imidacloprid	Codling moth, Japanese beetle
Early July to early September	Spinosad rotenone	Apple maggot, leafrollers

a. If larvae numbers are high and if trees are young, two spray applications might be necessary.

b. Plum curculio and codling moth can severely damage fruit. If the amount of fruit damage was severe the previous season, a second application 7 to 10 days after petal fall might be necessary.

c. A total of two to four fungicide applications per season might be needed to protect fruit surfaces, depending on the amount of disease in the orchard.

An OUTREACH program of the College of Agricultural Sciences

Reference:

This handout has been adapted from *Fruit Production for the Home Gardener*, published by Penn State University in 2006.

This publication can also be viewed on-line at <http://ssfruit.cas.psu.edu/default.htm>.

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