

Diseases in the Home Orchard

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This bulletin should aid the homeowner in identifying diseases most commonly found in home orchards. Disease descriptions and photographs are limited to those symptoms the home orchardist is most likely to encounter. A listing of the diseases included in the bulletin and their relative importance is given in Table 1. Proper orchard maintenance practices (pruning, fertilization, etc.) are always essential to the success of disease control programs.

Cultural controls are suggested in the text—consult with your local county extension agent for updated chemical controls. No one chemical can control all diseases, but some are available in combinations to increase the range of disease protection while reducing the number of applications. These multipurpose sprays are available at most nursery and garden supply stores. Chemicals must be handled with extreme caution; be sure to follow directions carefully for storage, handling and rates of application.

Apple Scab

Scab is the most common disease of apples; it must be controlled annually if high quality fruit is desired.

The scab fungus causes brown to black velvety spots or lesions on leaves and fruits (Fig. 1, 2). On leaves, spots develop on either side but are more conspicuous on the upper surface.



Fig. 1. Apple scab on leaves and fruit.

TABLE 1. Relative Importance of the Tree Fruit Diseases Found in the Home Orchard.

Disease Problems	TREE FRUIT CROP				
	Apple	Pear	Peach & Nec- tarine	Plum & Sweet Prune	Sour & Cherry
Apple Scab	vc				
Cedar-apple Rust	c				
Powdery Mildew	c				
Sooty Blotch and Flyspeck	vc	c			
Sooty Mold	c	c			
Fire Blight	c	vc			
Pear Scab		c			
Brown Rot			vc	vc	vc
Peach Leaf Curl			vc		
Peach Scab			c		
Black Knot				vc	
Cherry Leaf Spot					c

vc=very common disease requiring annual control measures

c=common disease but often limited to certain varieties or restricted to certain localities. Annual control measures required where the disease is a problem.

Leaf yellowing followed by defoliation may occur where scab is not controlled. Large scab spots may distort and crack apple fruits.

The scab fungus overwinters in apple leaves on the ground. Spores (seeds) of the fungus are released from overwintered leaves about the time apple buds begin to open in spring. Infection to leaves and fruit may occur during wetting periods from rains of nine or more hours depending on temperature.

Cover photos: (counter clockwise, top left to right): apple scab infection of calyx end of fruit, Stanley prune infected with brown rot fungus; black knot on limb of plum; cedar-apple rust gall on cedar.



Fig. 2. Apple scab developing on underside of leaves.

To control scab, remove leaves and fruit on the ground every fall. Scab resistant varieties such as Prima, Priscilla, Sir Prize, Liberty, and MacFree are ideal for the home orchard because they eliminate the need for a scab fungicide spray program. However, these varieties will need spraying for insect and mite control.

To control scab on susceptible varieties, a series of fungicide sprays must be applied to protect the developing foliage and fruit. Two or three sprays will not control scab. Apply fungicides on a 7- to 10-day schedule beginning at the green tip stage in April and continue through early June. In June, July, and early August, use a 14-day schedule. Seven to ten sprays will be required each season for good results. Fungicides will not harm honeybees and may be applied during bloom. Insecticides do harm honeybees and should not be combined with fungicides during bloom.

Cedar-Apple Rust

Cedar-apple rust infects both apple and red cedar trees. Infection to cedar is necessary for the fungus to survive from season to season.

On cedar, the fungus produces brown to reddish-brown galls that are inconspicuous until spring, when warm moist conditions cause long, orange, gelatinous horns to protrude from the galls (Fig. 3).

On apple, small, pale yellow spots develop on the upper leaf surface shortly after bloom. These spots enlarge to about one-quarter inch, become bright orange, and contain small black



Fig. 3. Cedar-apple rust gall on red cedar.



Fig. 4. Apple leaves and fruit with cedar apple rust (courtesy, J. D. Moore, U. of Wisconsin.)

specks (fungal fruiting bodies) in their center (Fig. 4). Lesions on young fruit may cause dwarfing and distortions.

Resistant apple varieties should be planted since the destruction of red cedars is often not practical for the homeowner. Susceptible varieties should be sprayed with an effective fungicide on a 7- to 10-day schedule from the pink stage of bud development to about 30 days after petal fall.

Powdery Mildew of Apple

Powdery mildew susceptible apple varieties include: Jonathan, Rome Beauty, Cortland, Monroe, and Idared.

Diseased leaves have a white-to-grayish appearance due to the growth of the mildew fungus over the leaf surface and may become distorted and brittle with age. Shoots become covered with white fungal growth, have a withered appearance, and are often stunted in growth (Fig. 5). The mildew fungus overwinters in dormant buds and infects the leaves and shoots as they emerge in spring.

Pruning out severely infected shoots and spurs is usually adequate for controlling powdery mildew in the home orchard, particularly if mildew susceptible varieties are avoided. If many trees are involved, a fungicide may be applied at 5-7 day intervals from early pink stage to petal fall, then at a 10-14 day inter-



Fig. 5. Powdery mildew infected apple shoot.



Fig. 6. Sooty blotch and fly speck on the surface of apple (courtesy, K. D. Hickey, Pennsylvania State U.)

val until terminal growth ceases. A mildewcide may be incorporated into the regular scab control program, or select a fungicide that controls both diseases.

Sooty Blotch and Fly Speck

Sooty blotch and fly speck usually occur together on apple and pear fruits (Fig. 6). These fungi do little damage to the fruit, but the market value (appearance) of the fruit is reduced. Sooty blotch develops as olive-green-to-brown circular spots. Several small spots may coalesce and cover large areas of the fruit. Fly speck appear as groups of 10 to 20 shiny black dots or specks on the fruit. Both diseases occur in the latter part of the growing season.

Where sooty blotch and fly speck have been destructive, apply a fungicide through the summer months to within 30 days of harvest. Periodically cutting the grass and weeds so they will not come in contact with the fruit will also help control these diseases.

Sooty Molds

Sooty molds are fungi that grow on the honey-like secretion (honeydew) produced by insects such as aphids, leafhoppers, and pear psylla. Fruit and leaves affected by sooty mold become covered by a black mycelial mat of the fungus. That results in reduced yield and vigor of the tree. Problems with sooty mold can be prevented by controlling the insects that produce the honeydew.

Fire Blight of Pear and Apple

Fire blight is a bacterial disease of pears and apples. The disease kills blossoms, fruiting spurs, terminal growth, and sometimes entire trees. Infected fruiting spurs and shoots suddenly wilt and turn dark brown or black (Fig. 7). Often, tips of blighted stems have a crooked appearance. Heavily infected trees take on a scorched, "fireblight" appearance (Fig. 8). During warm, humid weather droplets of a sticky ooze may exude from diseased tissues. Infected fruit develop a brown-to-black decay, then shrivel into dark, leathery, mummies that persist on the trees.



Fig. 7. Dieback of fruit spurs from fire blight.

The bacteria live over the winter in infected wood (cankers) and ooze from cracks in the bark in the spring and early summer. Insects and splashing rains carry the bacteria from cankers to sites of infection.

To control fire blight, prune out infected spurs, shoots, and branches 10-15 inches below the infection during the winter months. If growth has started, disinfect all pruning tools between each cut with a 10% Chlorox solution. If possible, select less susceptible varieties for the home orchard. All common pear varieties are susceptible. Susceptible apple varieties to avoid include: Yellow Transparent, Jonathan, Idared, Fenton (Beacon), and Paulared. Relatively safe varieties include Golden Delicious, Delicious, and McIntosh. Where the disease is serious or the trees are quite valuable, consider using a spray program with antibiotics. The blossom stage is the most effective time to spray, and several applications at this time may be necessary to prevent disease establishment.

Pear Scab

Pear scab is most noticeable on the fruit. Initially, scab lesions appear as velvety, light-green spots which become black with age. As the fruit enlarge, the spots may increase to the size of a quarter; they often distort and crack the pear. Greenish-black spots may also develop on the lower leaf surface and on young twigs (Fig. 9).

Pear scab overwinters in infected twigs and fallen leaves. Spores (seeds) of the fungus are produced in the spring starting at the green tip



Fig. 8. Fire blight on apple, note severe dieback of spurs and shoots.



Fig. 9. Pear scab on fruit and leaves.

stage of bud development. Rain and several hours of leaf wetness are required for infection to occur.

To control pear scab in the home garden: 1) avoid highly susceptible pear varieties such as Flemish Beauty, Winter Nelis, Seckel, and Anjou; 2) plant and prune trees so they have good air circulation and are not crowded by other trees; and 3) remove the fallen leaves in late fall. If the disease becomes serious, a series of fungicide sprays should be applied during late April at green tip and continued through till petal fall. Additional sprays may be necessary during seasons with heavy infection periods.

Brown Rot

Brown rot of apricots, cherries, nectarines, peaches, plums and prunes is a common and

destructive disease in the home orchard. It is primarily a disease of mature fruit, although immature fruit and blossoms may become diseased under certain conditions. The first symptom of disease is the development of a small, circular, light brown area of decay on the surface of the fruit (Fig. 10, 11). Diseased areas expand rapidly, often encompassing fruits in one or two days.

Under humid conditions, ash-gray tufts of fungal growth develop along the surface of the decayed area. The presence of these fungal masses helps distinguish brown rot from other disease problems. Rotted fruit may fall to the ground or dry up like a mummy and persist in the tree.

To control brown rot, fungicide sprays are needed every 4 to 6 days during bloom and weekly beginning 3 to 4 weeks before harvest. Fungicide sprays are needed particularly during periods of warm, wet, humid weather. Removing fruits, mummies, and blighted twigs from trees and the ground after harvest makes control easier. Good control of insects that injure the fruit also helps to control this disease.

Peach Leaf Curl

This disease is a common problem on peach and nectarines. Symptoms of leaf curl appear about the time the shucks fall from the fruits that have set. Leaf curl is first recognized by a puckering and curling of the leaves (Fig. 12). Infected leaves are thickened and often flushed with red or purple. In dry weather, the leaves die and drop off. Young shoots and fruit may also become infected. The swollen tissues often have a grayish appearance from spores of the peach-leaf curl fungus developing along the surface.

Leaf curl can be controlled by a single fungicidal spray applied in autumn after leaf fall or in the spring before bud break. Sprays applied after bud break are generally ineffective.

Peach Scab

This disease occurs on apricots, nectarines and peaches. Infected fruit exhibit small circular, dark green to olive spots (Fig. 13). These spots may coalesce to cover large areas on the



Fig. 10. Brown rot on peach fruit.



Fig. 11. Decay of sweet cherries from brown rot. Similar symptoms are produced on prunes and sour cherries.

fruits. Severely infected fruit are reduced in size and may have cracked or withered skin. A series of fungicide sprays may be applied beginning 10-12 days after the petal fall stage of bud development to 40 days before harvest. Sprays for brown rot may help reduce peach scab infection.

Black Knot of Plum and Prune

Black knot occurs on both wild and cultivated plums and prunes. It causes elongated swellings or knots on twigs, scaffold limbs, and sometimes the trunk (Fig. 14). The knots are usually 6-12 inches in length but only 2 or 3 inches wide. Young knots are greenish and soft but become black and hard with age.



Fig. 12. Peach leaf curl.



Fig. 13. Scab on peach fruit.



Fig. 14. Black knot on branches of prune.

To control black knot, remove infected twigs and branches in late fall or early spring (by March 15). Cut the branches off about six inches below the base of the knot. Also, remove severely infected trees and wild seedlings in the vicinity of the home orchard. Sanitation measures usually control the disease adequately, but may be supplemented with a fungicide program if the disease is unusually difficult to control. The most effective times to spray are green tip, bloom, petal fall, and shuck fall. Additional sprays until terminal growth stops may be necessary under severe conditions.

Cherry Leaf Spot

Cherry leaf spot is a disease of tart and sweet cherries and some prune varieties. It is more common in orchards than on isolated trees in the backyard.

Infected leaves turn yellow and fall off (Fig. 15). When examined closely, small (about 1/8 inch in diameter), circular, purple spots are visible on the upper leaf surface and light pink to white masses are visible in the center of the



Fig. 15. Tart cherry tree defoliated from leaf spot.



Fig. 16. Tart cherry leaves with leaf spot.

spots, on the lower leaf surface (Fig. 16). Often the center of the spots will fall out giving the leaf a "shot-hole" appearance.

Control measures include removing infected leaves from around the trees in autumn or early spring. Fungicide sprays may be applied, starting at petal fall or when the first leaves have unfolded, 10 days after petal fall, 24 days after petal fall and the last soon after harvest.

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