
APPLE SCAB

Integrated Pest Management for Home Gardeners

Apple scab, caused by the fungus *Venturia inaequalis*, is generally considered a serious disease of apples in California, causing loss or severe surface blemishing of fruit. Apple scab is most severe in coastal areas where spring and early summer weather is cool and moist; however, it can be a problem wherever apples are grown when conditions are favorable for its development.

IDENTIFICATION

Scab infections are usually noticed first on leaves. Affected leaves become twisted or puckered and have black, circular spots on their upper surface. On the underside of leaves, the spots are velvety and may coalesce to cover the whole leaf surface. Severely affected leaves may turn yellow and drop. Scab can also infect flower stems and cause flowers to drop. Later in the season, scabby spots may be found on fruit (Fig. 1). They begin as sooty, gray-black (and sometimes greasy-looking) lesions and may have a red halo. The lesions later become sunken and tan and may have spores around their margins. Infected fruit become distorted and may crack, allowing entry of secondary organisms. Severely affected young fruit may drop.

LIFE CYCLE

The pathogen overwinters primarily in infected leaves on the ground (Fig. 2). In spring, air currents or splashing water carry primary spores from infected leaves to flowers, leaves, or fruit where they germinate and cause infections. New spores, referred to as *secondary spores*, are produced on the infected leaf or fruit surface 8 to 17 days later, allowing further spread of the disease in the tree until conditions

become too hot and dry, or the plant tissue becomes more resistant to infection. Infection occurs most rapidly between 55° and 75°F and leaves or fruit must remain wet continuously for a minimum of 9 hours for infection to occur. If spring weather is dry through fruit set, scab will usually not be a problem.

DAMAGE

Scab can destroy an apple crop. Young infected flowers or fruit may drop or the fruit may become malformed and unsightly, rendering them unusable. Defoliation follows severe early leaf infection. Late-season infections, which cause small "pinpoint" infections, generally can be tolerated in backyard trees because peeling fruit removes the scabs, and fruit are less likely to be deformed.

MANAGEMENT

Several techniques may be used to control scab; advantages of one method over another depend on the number of apple trees being managed and whether conditions are ideal for disease development. In single backyard trees, removal of leaves from beneath trees in winter may be sufficient to limit the disease to tolerable levels. In plantings of several trees, additional steps may be needed to effectively control this disease, especially in cool, moist coastal areas.

Cultural Control

Rake and remove apple leaves from the yard in autumn or winter. Foliar applications of zinc and fertilizer-grade urea will hasten leaf fall in autumn. Either destroy or thoroughly compost the leaves. For sprinkler-irrigated trees, avoid wetting the foliage with water. If

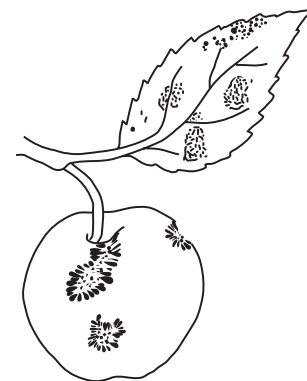


Figure 1. Leaf and fruit infected with apple scab.

you are using sprinklers that wet any of the tree's foliage, irrigate between sunrise and noon to allow adequate drying before significant infection can occur.

Disease-resistant Cultivars

Table 1 details the relative susceptibility of the different apple varieties to apple scab. Major breeding efforts for disease resistance are ongoing in New York, where Liberty, Prima, and Priscilla (as well as many newer varieties) appear to be resistant to scab.

Chemical Control

In most areas of California, apple bloom occurs over a 3- to 5-week period; sprays are only necessary if the weather is rainy. *Successful use of fungicides requires careful attention to application timing.* Preventing early infection is the most important step towards successful control of later fruit infections: once primary infections occur, it is difficult to prevent secondary fruit infections. Thus if rain threatens, it is

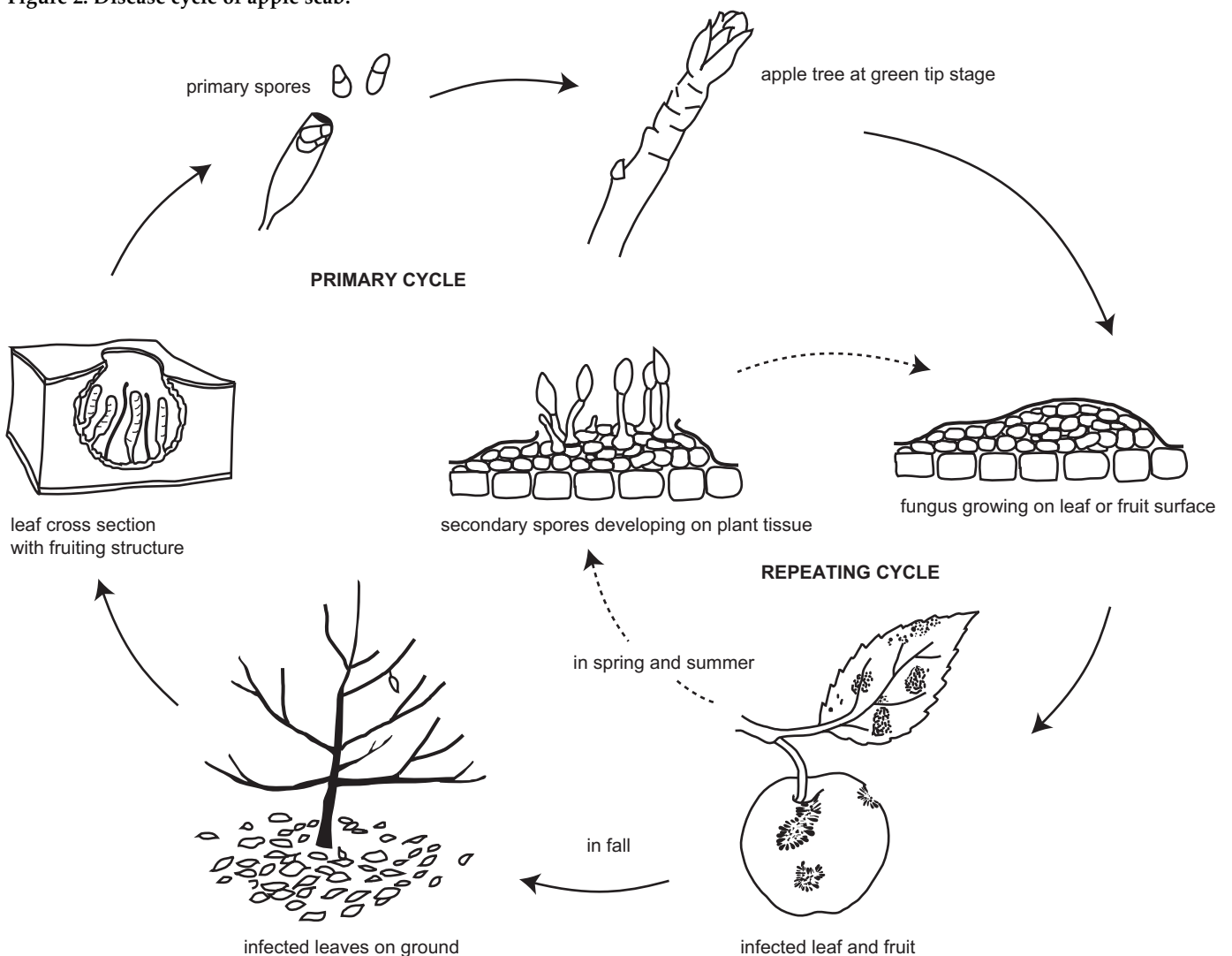
important that a fungicide be applied just as soon as the tips of the green leaves can be seen. A second spray may be needed 10 to 14 days later, once the blossom cluster is visible but before it has opened. If rainy weather continues, apply a third spray toward the end of the bloom period when most of the petals have fallen.

As the season progresses, the surfaces of the fruit and foliage become more resistant to infection, but extended wet, foggy weather can bring enough wetness to cause an infection period from secondary spores that develop on leaves and fruit. If no scab infections

Table 1. Susceptibility of Apple Varieties to Apple Scab.

Susceptible		Highly resistant	
Bellflower	Monroe	Easy-Gro	Mac-free
Blushing Gold	Mutsu	Enterprise	Prima
Fuji	Paula Red	Florina	Priscilla
Gala	Red Delicious	Freedom	Pristine
Golden Delicious	Rome Beauty	Gold Rush	Redfree
Granny Smith	Stayman Winesap	Jon Grimes	Sir Prize
Gravenstein	Winesap	Jonafree	Spigold
Grimes	Yellow Newtown	Liberty	Williams Pride
Ida Red	York Imperial		
Jonathan			

Figure 2. Disease cycle of apple scab.



are evident one month after petal fall, however, secondary infections will probably not be a problem.

Several fungicides are available for the control of apple scab. These include fixed copper, Bordeaux mixtures, sulfur, liquid lime sulfur, soaps, and summer oils. Copper or Bordeaux sprays are generally used only from green tip to full bloom to reduce the risk of fruit russetting, a chemical burning of the fruit skin. In some years, however, russetting may occur even when these materials are used only before full bloom. (For more information on Bordeaux mixture and copper sprays, see *Pest Notes: Bordeaux Mixture*, listed in "References.") When you use sulfur-

containing compounds (Bordeaux, sulfur, liquid lime sulfur), they *must not* be applied within 3 weeks of an oil application or when temperatures are near or over 90°F. Use soaps or narrow range oil (superior or supreme) in a 1 to 2% solution with water.

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For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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