College of Food, Agricultural, and Environmental Sciences, Department of Plant Pathology

Scab of Apple

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Apple scab is one of the most serious diseases of apple worldwide. In addition to apples, crabapples and mountain ash are also susceptible to apple scab disease. Apple scab is caused by the fungus, *Venturia inaequalis*. Both the leaves and fruit can be affected. Infected leaves may drop prematurely resulting in unsightly trees, with poor fruit production. This early defoliation may weaken trees and make them more susceptible to winter injury or other pests. Diseased fruits are blemished and often severely deformed and may also drop early.



Figure 1. Apple scab lesions on apple leaves.

Disease Development and Symptoms

Disease development is favored by wet, cool weather that generally occurs in spring and early summer. The fungus survives the winter on diseased leaves that have fallen under the tree the previous year. In the spring, when buds are beginning to develop, the fungus produces millions of spores (ascospores). These spores are released into the air during rainy periods in April, May and June. They are then carried by the wind to young leaves, flower parts and fruits and infection is initiated.



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Figure 2. Apple scab lesions on fruit.

Symptoms first appear as spots (lesions) on the lower leaf surface, the side of the leaf that is first exposed to the fungal spores as the buds open. At first, the lesions are small, velvety, olive green in color, and have unclear margins (Figure 1-left). On some crabapples, infections may be reddish in color. The fungus produces a second type of spore (conidium) in these lesions. These spores are carried and spread by splashing rain to other leaves and fruits and new infections occur. As the spots age, the infections become darker with more distinct margins (Figure 1right). Lesions may appear more numerous closer to the mid-vein of the leaf. If heavily infected, the leaf becomes distorted and drops early in the summer. Trees of highly susceptible varieties may be severely defoliated by mid to late summer.

Fruit symptoms are similar to those found on leaves. However, the margins of the spots are often more distinct on the fruit (Figure 2) than on the leaves. Fruit may also be deformed.

Apple Scab Management

Apple scab can be successfully managed by integrating resistant varieties, cultural practices, and chemical or biological control.

Variety selection

Planting resistant or scab immune apple varieties is the ideal method for managing scab. Backyard and organic growers are strongly encouraged to plant resistant varieties in order to reduce or eliminate the need for fungicide applications. There are numerous apple varieties with complete resistance or moderate resistance to apple scab (Table 1). All other varieties, including most commercially grown varieties are susceptible to scab; however, they differ in their degree of susceptibility. Scab resistant varieties vary in susceptibility to early-season diseases and all are susceptible to summer diseases (J.Beckerman, BP-132-W).



Figure 3. Fallen leaves should be raked and in the fall to reduce new infections in the spring.



Cultural practices

Moira

Rake and destroy fallen leaves below apple and crabapple trees in the fall (Figure 3). This will dramatically reduce the number of spores that can start the disease cycle (Figure 4) over again the following spring. Leaves can also be chopped with a mulching lawn mower or flail mower but this practice should be coupled with two or three applications of 5% urea to fall foliage. Urea applications increase leaf decomposition.

For new plantings, select a site that gets direct sun for at least eight hours and space trees so that air can move easily through the tree canopies and orchard. Tree spacing will depend on the type of apple tree (dwarf vs. standard) and trellising system. Prune trees yearly to open the canopy and promote leaf drying.

Table 1. Varieties with resistance to apple scab.

Apple varieties with complete resistance to scab	
Crimson Crisp	Novamac
Crimson Gold	Priscilla
Enterprise	Pristine
Freedom	Redfree
Galarina	Scarlet Prima
Goldrush	Sir Prize
Jonafree	Sundance
Liberty	Williams Pride
Nova Easygro	
Apple varieties with moderate resistance to scab	
Adam's Permain	NJ90
Ashmead's Kernel	Suncrisp
Haralson	Yellow Transparent
Honey Crisp	
Apple varieties with low resistance to scab	
Akane	Murray
Belmac	Nova Spy
Britegold	Paulared
Florina (Querina)	Pinova (Corrail)
Grimes Golden	Redfree
Honey Gold	Runkel
Macfree	Wolf River

Chemical and biological control

Where resistance to scab is not present, the application of fungicides is the primary method to manage apple scab. Organic and backyard growers can use biocontrol products to suppress disease development but these products should be used in combination with resistant varieties to achieve maximum control.

Proper timing of fungicides is critical for effective control of apple scab. Applications should begin early in the season when the first green tips begin to emerge and continue on a 7- to 10-day schedule through out the season. Early applications will reduce the number of seasonal sprays needed to manage apple scab and will increase fruit production and quality. Commercial growers can consult the *Midwest Fruit Pest Management Guide* (Bulletin 506) for current fungicide recommendations and spray schedules.

Backyard growers are limited in the number of highly effective fungicides available for apple scab management. Most of the available fungicides are protectants and will need to be applied after heavy rains. For current fungicide recommendations backyard growers can consult the *Controlling Diseases and Insects in Home Fruit Plantings* (Bulletin 780) guide. Both guides can be obtained from your county extension office or the CFAES Publications online bookstore at estore.osu-extension.org.

Useful References

Beckerman, J., Disease Susceptibility of Common Apple Cultivars. Purdue Extension, BP-132-W



Figure 4. Apple scab disease cycle. Image courtesy of W. Wilcox, Cornell University, NYSAES, Geneva, NY.

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