



CAES

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APPLE SCAB

Apple scab is a destructive fungal disease of apple and ornamental crabapple in the world. Infection of leaves can cause early defoliation during the growing season. When developing fruits are infected, there is a quality reduction. Early defoliation from the disease can reduce tree vigor and fruit yield over years.

SYMPTOMS AND DIAGNOSTICS

Leaves and fruit are mostly affected by the disease although petioles, blossoms, sepals, pedicels, and bud scales are also infected. Initial infection occurs when leaf buds start opening, but symptoms become noticeable after leaves unfold and fruits begin to form. Symptoms on the leaves start as small,

irregular spots that are light brown to olive green in color. As lesions expand they become dark brown with indistinctive margins (Figure 1). Lesions on the upper surface of mature leaves become brown with distinct margins (Figure 2). Severely infected leaves often drop from the trees early. Fruit lesions begin very similar to those on leaves, but as the infected fruit matures, the lesions become dark brown and scabby (Figure 2). During periods of wet weather, fuzzy black fungal growth may be seen on lesions. Early infection on fruit may result in cracked or deformed fruit. Late infections on fruit may not show symptoms during the season, but can later develop lesions on the fruit in storages and reduce



Figure 1. Olive green spots on the lower surface of a leaf



Figure 2. Brown lesions on fruit and the upper surface of leaves

quality of apples.

DISEASE DEVELOPMENT

Apple scab is caused by the fungal pathogen, *Venturia inaequalis*. The fungus overwinters in dead leaves and fruit on the ground. In the spring, the fungus forms small black sexual fruiting bodies (pseudothecia) on fallen infected plant materials and releases sexual spores (ascospores) during periods of wet rainy weather. Ascospores are dispersed by wind and rain-splash onto newly emerging leaves and fruit and initiate infection. After the primary infection has occurred, abundant conidia (asexual spores) are formed in these lesions and are dispersed to other leaves to start the secondary infection. The secondary infection cycle repeats many times during the growing season and is associated with wet weather conditions and the levels of host resistance.

MANAGEMENT

Resistant Cultivars: Using genetic resistance is the most economical and effective way to manage apple scab. Many scab-resistant apple cultivars are available for orchards and landscapes. Resistant fruit apple cultivars include 'Enterprise', 'Akane', 'Freedom', 'Gold Rush', 'Jonafree', 'Liberty', 'Pristine', and 'Redfree'. In crabapples, cultivars 'David', 'Harvest Gold', 'Mary Potter', and 'Prainefire' are considered resistant.

Cultural practices: Remove or shred fallen leaves and infected fruit in the fall to reduce the primary inoculum. Spraying a 5% urea solution onto fallen leaves on the ground can accelerate leaf breakdown and reduce ascospore production. Space trees and prune properly to improve air circulation and allow maximum sunlight penetration into the canopies. Avoid overhead irrigation.

Fungicides: Fungicide applications are necessary if susceptible cultivars are planted. Registered fungicides for home orchards and landscapes include captan, mancozeb, sulfur, and lime-sulfur. Since fungicide applications are preventative, leaves and fruit must be covered by fungicides before infections occur. It is important to achieve thorough and uniform coverage on all leaves and developing fruit for a good control. To control primary infections, fungicide applications should begin shortly after green tip and continue until petals fall (late April to early June) at 7- to 10-day intervals.

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