



Scab Diseases of Apple, Crabapple & Other Rose Family Hosts

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INTRODUCTION

Scab diseases commonly affect tree fruit and woody ornamentals in the rose family (Rosaceae). When tree fruit are infected, quality, quantity, and appearance are negatively impacted, which reduces marketable yield. Infected ornamentals drop blossoms prematurely and produce fewer flowers the next spring. In all hosts, the lasting effect of scab is even more damaging when trees are weakened from premature leaf drop year after year.

COMMON HOSTS

Tree fruit: apple and pear

Woody ornamentals: flowering crabapple, hawthorn, mountain ash, and pyracantha (firethorn).

[Note: While the focus of this publication is on scab diseases affecting Rosaceae hosts, similar diseases on hosts in other plant families, such as willow (Salicaceae) and pecan (Juglandaceae), are caused by closely related fungal pathogens.]

SYMPTOMS

Leaves

Olive-green to brown spots (lesions) with indefinite, feathery margins (FIGURE 1) appear on upper and/or lower surfaces of infected leaves. Spots range from the size of a pinhead to slightly smaller than a dime. As disease progresses, lesion margins become more distinct and covered with a greenish-black, velvety fungal growth. Eventually, lesions thicken and bulge upward (FIGURE 2). If heavily infected, leaves may become disfigured and/or turn yellow. Diseased leaves often drop prematurely.

Fruit

Initially, symptoms on fruit appear as green to brown spots, similar to those on leaves. However, fruit spots may be more distinctly outlined compared to leaf lesions (FIGURE 3). Older lesions turn dark brown to black and



FIGURE 1. SCAB LESIONS ON LEAVES INITIALLY HAVE INDEFINITE, FEATHERY MARGINS.



FIGURE 2. OLDER FOLIAR LESIONS THICKEN, PUCKER, AND ARE RAISED.



FIGURE 3. SCAB FRUIT LESIONS ARE INITIALLY OLIVE-GREEN BUT BECOME DARK BROWN AND CORKY WITH AGE.

FIGURE 4. SCAB CAN RESULT IN FRUIT DISTORTION; OLDER FRUIT LESIONS CRACK.

FIGURE 5. PYRACANTHA FRUIT BECOME BLACKENED AND DISTORTED WHEN AFFECTED BY APPLE SCAB.



develop a corky or “scabby” appearance. These lesions often crack as fruit enlarge (FIGURE 4). Infections on young, developing fruit result in uneven growth and may cause fruit to become severely deformed. Similar symptoms develop on fruit of susceptible woody ornamentals, such as pyracantha (FIGURE 5). Heavily infected fruit may drop prematurely.

CAUSE & DISEASE DEVELOPMENT

Scab is caused by fungal species in the genus *Venturia*.

Apple, crabapple, and many ornamentals: *Venturia inaequalis* (various host-specific strains)

Pear: *Venturia pirina*

Pyracantha: *Venturia inaequalis* f. sp. *pyrancanthae*

Venturia spp. overwinter in infected leaves that have fallen to the ground. During spring rains, spores (ascospores) are released and carried by wind currents and rain splash to newly emerged leaves, flower sepals, and young fruit. Ascospores initiate primary infections during periods of continuous leaf wetness resulting from either rain or dew. Primary infections may continue to occur from bud break until 2 to 4 weeks after petal fall. Later in spring, a second spore type (conidia) develops within primary lesions. Conidia produce additional infections when they are splashed onto susceptible tissues. Consequently, a few ascospores from primary infections can produce hundreds or thousands of conidia that contribute to secondary infections throughout the growing season.

The time period required for primary and secondary infections depends upon air temperature and duration of the wetting period. A discussion of the relationship between leaf wetness, temperature, and infection periods can be found on pages 20-22 in the *Midwest Tree Fruit Pest Management Handbook* (ID-93). Research into this relationship has formed the basis for computer programs used to predict potential infection periods (see Disease Forecasting section, below).

DISEASE MANAGEMENT

Resistant cultivars

The most effective scab management program begins with scab-resistant cultivars. Refer to *Disease Susceptibility & Resistance of Common Apple Cultivars* (PPFS-FR-T-28) for information on scab resistance in popular apple cultivars. A number of crabapple cultivars are also highly resistant to apple scab; refer to *The Flowering Crabapple* (ID-68).

Cultural practices

Critical steps in preventing and managing scab diseases include reducing fungal inoculum (contributed by diseased leaves and fruit from the previous season), along with altering and monitoring environmental conditions that promote infections. These cultural practices are essential to ensure fungicide efficacy.

- Prune trees to improve air circulation, thereby promoting rapid drying of fruit and leaves and reducing leaf wetness periods. Canopy thinning also allows for more effective spray coverage.
- If defoliation occurs early in the year, provide water and mulch to reduce additional stress and maintain plant vigor.
- Destroy fallen leaves and fruit to reduce the amount of inoculum present the following spring. Commercial orchards may apply nitrogen to promote the breakdown of leaf tissues. Refer to *Midwest Fruit Pest Management Guide* (ID-232).

Fungicides

A well-timed spray program is the primary means for managing scab on susceptible apple, pear, and crabapple cultivars; the key is to prevent initial infections. Fungicides for management of primary infections are recommended from bud break until 2 to 4 weeks after petal fall. Thus, disease management during primary infection periods aids in control of disease development throughout the rest of the growing season. Refer to *Midwest Fruit Pest Management Guide* (ID-232) for specific spray recommendations.

Disease Forecasting

Disease prediction models analyze local weather data to determine when an infection period may have occurred and apply forecasting data to predict future risk. When using these models, sprays are limited to periods of high risk, so the number of fungicide applications is reduced when compared to calendar-based spray programs. Most universities have predictive systems in place; Kentucky apple growers should refer to the UK Ag Weather Center website apple scab model.

ADDITIONAL RESOURCES

Additional information can be found on the UK Plant Pathology Extension Publications webpage <https://plantpathology.ca.uky.edu/extension/publications>

Fruit Trees

- Bagging Apples: Alternative Pest Management for Hobbyists (EntFact-218)
- Cultural Calendar for Commercial Apple Production (PPFS-FR-T-25)
- Disease and Insect Control Programs for Homegrown Fruit in Kentucky (ID-21)
- Disease Susceptibility & Resistance of Common Apple Cultivars (PPFS-FR-T-28)
- Midwest Fruit Pest Management Guide (ID-232)
- Midwest Tree Fruit Pest Management Handbook (ID-93)

Woody Ornamentals

- Flowering Crabapple (ID-68)
- Woody Plant Disease Management Guide for Nurseries and Landscapes (PPFS-OR-W-29)

Disease Prediction Models

- Ag Weather Center Disease Prediction Models (website)
- Using Prediction Models to Manage Diseases in Fruit (PPFS-FR-T-07)

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