College of Agriculture, Food and Environment
Cooperative Extension Service

Plant Pathology Fact Sheet **PPFS-FR-T-16**

Sooty Botch & Flyspeck of Apple

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Importance

Sooty blotch & flyspeck (SBFS) (Figure 1) is a common late summer disease complex. The resulting superficial blemishes do not cause fruit decay, but they can reduce market value for commercial produce. Infections of the waxy cuticle can also shorten storage life, as it allows for accelerated desiccation during refrigerated storage.

Host Range

Apples in commercial and backyard plantings are susceptible to SBFS. While all apple cultivars are susceptible, some seem to be more prone to disease than others. Symptoms are more obvious on light-colored fruit, such as 'Golden Delicious' (Figure 2). Early-maturing varieties are often harvested before disease develops, while late-maturing cultivars have more exposure to inoculum (infective fungal spores). The disease has a wide host range that also includes other pome fruits (such as crabapple and pear), grape, pawpaw, persimmon, and vining vegetable crops (such as winter squash).

Many wild and weedy woody hosts also serve as reservoir hosts for the SBFS pathogens (such as apple, crabapple, brambles, and grape that have escaped cultivation, as well as green brier vine, sassafras, smooth sumac, sycamore, and willow). Even though infections on these alternative hosts often go unnoticed, they provide a source for inoculum for apple orchards.

Symptoms & Signs

Colonies of sooty blotch and flyspeck fungi appear in late summer as fruit approach full size. Disease "symptoms" are actually dark-colored fruiting bodies (pycnoththyria, thalli, thyriothecia) and fungal masses (hyphae). These fungal structures emerge on the outer waxy layer of fruit, which gives this disease complex its characteristic appearance.

SBFS is described by two types of symptoms and signs: blotches (sooty blotch) and specks (fly speck). Blotches are characterized by dark, olive-green to black-brown sooty smudges with indefinite borders. Discolored areas may coalesce to cover large portions of fruit. Specks appear as clusters of separate, pinhead sized, tiny black, round specks with sharply defined borders. The individual dots may develop

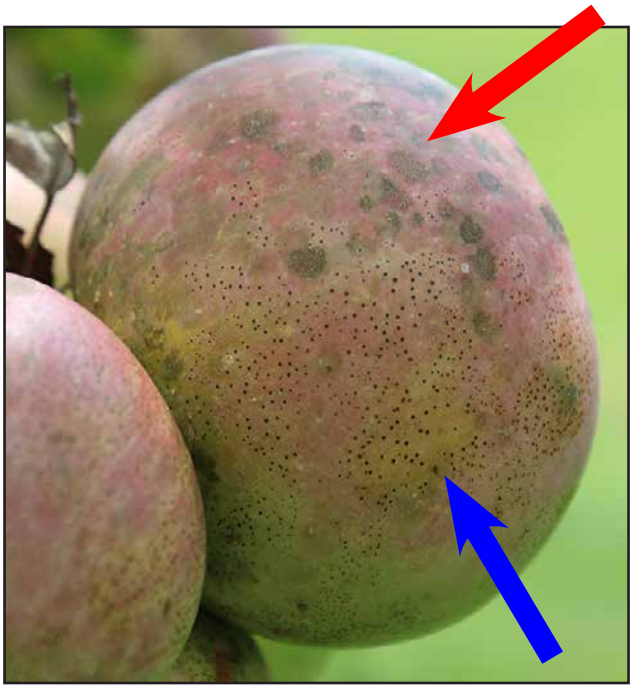

Figure 1. Sooty blotch and flyspeck, although considered a single disease complex, is described by dark smudges (formerly known as the sooty blotch) (red arrow) and clusters of dark fungal specks (formerly known as flyspeck) (blue arrow) that colonize apple fruit late in the season.

Figure 2. Sooty blotches and specks are often more obvious on light-colored fruit, such as 'Golden Delicious' shown here.

in groups of just a few to over a hundred. Multiple clusters may be present on a single fruit. Blotches and specks often appear together on the same fruit. SBFS occurs in the waxy cuticle of apple fruit and does not cause decay. However, the fungi can disrupt this protective waxy layer resulting in moisture loss (desiccation), shortening storage life.

Cause & Disease Development

SBFS was once thought to be two separate diseases, but they are better described as a single complex of numerous fungal species. It is now known that SBFS can be caused by as many as 100 different fungi, at least nine species of which are commonly recovered from orchards in the eastern U.S. Causal fungi include *Dissoconium* spp., *Geastrumia* sp., *Microcyclosporella* spp., and *Peltaster* spp., among others. Each species and combination of species can have different preferences, levels of aggressiveness, and other traits, which can complicate SBFS management.

SBFS fungi can overwinter in and on branch tips, in bark crevices, and on dead wood, as well as in dried fruit (mummies) that remain on trees. Additional overwintering sites include twigs and branches of many cultivated species, forest trees, and weedy woody plants (see Host Range).

In spring, overwintering hyphae and fungal structures (such as thyriothecia, pycnoththyria, and sclerotium-like bodies), depending on fungal species, produce large numbers of spores (conidia) that are spread by wind, rain splash, or wind-driven rain; these spores can infect branch spurs or infect fruit directly. Once SBFS fungi colonize an orchard, the disease is likely permanently established, although disease may be completely absent during dry years.

Fruit infections, which are favored by extended warm temperatures (65° to 80°F), are more prevalent in early to mid-summer. Under ideal conditions, evidence of these infections may be visible within 14 days; however, SBFS does not generally become apparent until 25 to 60 days after infection. This means that SBFS colonies become visible in August in Kentucky. SBFS fungi flourish in high humidity areas, such as orchards that are subject to heavy dews and fog or those with limited air flow. Summer weather in Kentucky is typically humid, so disease is relatively common in all or most orchards and backyards.

Disease Management

Orchard establishment

Site selection

- Choose a location in full sun with good air circulation to facilitate drying and to help reduce humidity inside tree canopy.
- Space trees as far as possible from wooded areas or hedgerows where alternative hosts may serve as sources for inoculum. The greater the distance from tree lines, gardens, and fruit plantings, the better.

Cultivar selection

- Select early-maturing cultivars that are harvested before disease becomes severe in late summer.
- No cultivars are documented to show resistance to SBFS.

Sanitation and other cultural practices

- Remove woody, weedy plants and nearby potential reservoir hosts, including cultivated and wild woody hosts.
- Remove mummified fruit that are attached to trees and prune dead and diseased branches that can harbor fungi; discard or destroy prunings and dropped fruit.
- Prune trees to open canopy for increased light penetration and air movement so fruit surfaces dry more quickly.
- Thin fruit to separate fruit clusters.
- Cool fruit after harvesting.

Fungicides

- A routine fungicide spray program should normally control SBFS. Refer to ID-232 (commercial growers) or PPFS-FR-T-18 (residential growers) listed in Additional Resources or contact a local county Extension office for current recommendations.
- A disease prediction model is available to assist in timing fungicide sprays for managing several apple diseases, including SBFS.

Additional alternatives for residential producers

Bag developing fruit

- Oriental fruit bags have been shown to protect developing fruit from sooty blotch and flyspeck, as well as from fruit rot diseases and insect pests.
- Typically, fruit bags are applied when fruit are 1 inch in diameter and removed prior to harvest. Note: Infection may occur before bags are attached, depending upon fungal species in the orchard. Thus, a fungicide application may be required before bag placement. More research is needed in this area.

Remove damage from fruit

- Vigorous scrubbing can help remove the fungi from the waxy outer layer.
- Fruit can be peeled prior to consumption. However, eating symptomatic fruit poses no human health risk, nor does it affect the taste of apple fruit.
- A postharvest dip for 5 to 7 minutes in dilute chlorine bleach or fruit wash, followed by brushing, can eradicate fungi before storage.

Additional Resources

Plant Pathology Extension Publications Website

- Tree Fruit Disease Publications
https://plantpathology.ca.uky.edu/extension/publications#TREEFRUIT

Management Guides

- Commercial Fruit Pest Management Guide (ID-232)
https://plantpathology.ca.uky.edu/files/id-232.pdf
- Disease and Insect Control Program for Homegrown Fruit in Kentucky including Organic Alternatives (ID-21)
http://www2.ca.uky.edu/agcomm/pubs/id/id21/id21.pdf
- Simplified Backyard Apple and Pear Spray Guides (PPFS-FR-T-18)
https://plantpathology.ca.uky.edu/files/ppfs-fr-t-18.pdf

Bagging Fruit

- Apple Bagging (video)
https://www.youtube.com/watch?v=sbbmgJ5F1wc
- Bagging Apples: Alternative Pest Management for Hobbyist (ENTFACT-218)
http://entomology.ca.uky.edu/ef218
- Evaluation of Assorted Bags for Insect and Disease Control in Apple 2018 (pg 12 in *Fruit and Vegetable Research Report, 2018, PR-757*)
http://www2.ca.uky.edu/agcomm/pubs/PR/PR757/PR757.pdf

Predictive Models

- Plant Disease and Insect Prediction Models for Kentucky Counties
http://wwwagwx.ca.uky.edu/plant_disease.html
- Using Prediction Models to Manage Diseases in Fruit (PPFS-FR-T-07)
https://plantpathology.ca.uky.edu/files/ppfs-fr-t-07.pdf

Other

- Fruit, Orchard, Vineyard Sanitation (PPFS-GEN-05)
https://plantpathology.ca.uky.edu/files/ppfs-gen-05.pdf
- Post-harvest Disease Losses in Fruit & Vegetable Crops (PPFS-GEN-24)
https://plantpathology.ca.uky.edu/files/ppfs-gen-24.pdf

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