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report on
PLANT
DISEASE

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SOOTY BLOTCH AND FLYSPECK OF APPLE

Sooty blotch and flyspeck are two of the most common diseases of apple that often occur on fruit at the same time. Sooty blotch is a disease complex caused by several fungi, including *Peltaster fructicola, Geastrumia polystigmatis, and Leptodontium elatius.* More fungi are being identified as the causal of sooty blotch. Flyspeck is caused by the fungus *Zygophiala jamaicensis.* These diseases are wide spread in the Midwest. Since both diseases are controlled in the same way, they are usually considered together.

Because the fungi causing sooty blotch and flyspeck grow superficially on the surface of the fruit, losses are primarily through lowered fruit quality. These diseases are more important in late-maturing cultivars. Golden Delicious and Grimes Golden apples are quite susceptible to these diseases although all fruit varieties become infected. Infections are much more obvious on light-skinned apple cultivars.

Figure 1. Apple sooty blotch and flyspeck diseases.

Symptoms

Sooty Blotch. Sooty blotch appears as sooty or cloudy blotches on the surface of the fruit. The blotches are olive green with an indefinite outline (Figure 1). The blotches are frequently a fourth of an inch in diameter or larger, and may coalesce to cover much of the fruit. The "smudge" appearance results from the presence of hundreds of minute, dark pycnidia that are interconnected by a mass of loose, interwoven dark hyphae. The sooty blotch fungus is generally restricted to the outer surface of the cuticle and can be removed by vigorous rubbing or bleaching. In rare cases, the hyphae penetrate between the epidermal cell walls and the cuticle.

Flyspeck. Flyspeck appears on fruit as sharply defined, black, shiny dots in groups of a few to nearly 100 (Figure 1). The dots or specks are sexual fruiting structures called pseudothecia. They are much larger than the picnidia associated with the most common types of sooty blotch colonies.. The blemishes can be removed by vigorous rubbing or bleaching.

For further information contact ***Mohammad Babadoost,*** *Extension Specialist in Fruit and Vegetable Pathology, Department of Crop Sciences, University of Illinois at Urbana-Champaign. (Phone:* ***217-333-1523****; email:* ***babadoos@illinois.edu****).*

Disease Cycle

Both fungi overwinter on the twigs of many woody plants (Tables 1 and 2). The disease cycles, as well as the temperature and moisture conditions necessary for infection, are much the same for both diseases.

Sooty Blotch. The pycnidia on host plants produce large numbers of spores (conidia) that ooze out of infections and collect in a gelatinous mass. The conidia are carried by air currents and windblown rain through orchards from late May or early June until autumn. The thick-walled, dark hyphae formed on apple and other twigs often break up into cell-like fragments. These fragments may be washed from twigs onto the developing fruit, where they initiate infections. After spread and enlargement, secondary infections occur on fruits. Current-season twig growth is also infected during the summer and early autumn.

The fungi grow in a wide range of temperatures, 64°to 80°F (18° to 27°C). Humid weather is essential for infection and disease development. When May and June are cool and moist and are followed by a hot July and August, sooty blotch often does not appear on the fruit until close to harvest. Disease outbreaks are most severe when cool, rainy weather in the spring is coupled with late-summer rains and cool fall temperatures prior to harvest.

Flyspeck. The two-celled ascospores of *Z. jamaicensis* can be found in the pseudothecia in the late spring and early summer. Fruit infection can occur any time after petal fall but is more prevalent in mid- to late-summer. The incubation period in cool weather (65°F or 18°C) is about 15 days.

Disease Management

Sooty blotch and flyspeck are most prevalent in the damp, shaded areas of an orchard. Any practice that improves air movement and promotes rapid drying greatly improves control. To manage these diseases, fungicides must be applied, starting shortly after petal fall and continued until two weeks to harvest.

1. **Prune apple trees annually to open the tree for maximum air circulation**. Fence rows and wood lots next to an orchard should be kept free of shrubs and brush. These wood lots provide inoculum which infects fruit.

2. **Follow an apple spray program**. Several apple fungicides control sooty blotch and flyspeck satisfactorily when applied in a regular program. For the updates on fungicide applications for management of sooty blotch and flyspeck, refer to the "Midwest Fruit Pest Management Guide" (https://ag.purdue.edu/hla/Hort/Documents/ID-465.pdf). **Always read and follow label directions when using any fungicide.**

3. Fungicide application can be based on the number of hours of leaf wetting that have accumulated since the first-cover spray (10 days after petal fall). In Illinois, the first fungicide treatment is applied approximately 10 days after petal fall and the second fungicide application can be applied after accumulation of 175 hours of leaf wetting of 4 hours' duration or longer.

Table 1. Plants that are hosts to the sooty blotch fungi

ash	magnolia	prickly-ash
blackberry	maple	raspberry
bladdernut	mountain-ash	redbud
Citrus	oak	sassafras
crabapple	orchids	spicebush
dogwood	Oriental bittersweet	sumac
grape	paw paw	sycamore
hawthorn	peach	trifoliage orange
Kentucky coffee-tree	pear	tuliptree
leatherwood	persimmon	willow
		wintergreen

Table 2. Plants that are hosts to the flyspeck fungi

American elderberry	manzanita	quince
banana	maple	raspberry
blackberry	orchids	sassafras
camphor-tree	pear	sumac
carnation	persimmon,	trifoliate orange
Citrus	Japanese and Texas	wild-goose plum
crabapple	plum	willow
grape	prickly-ash	wintergreen