Disease Identification
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1994

TREE FRUIT CROPS

CORNELL COOPERATIVE EXTENSION

IPM Integrated Pest Management

Sooty Blotch

Gloeodes pomigena (Schwein.) Colby

and

Flyspeck

Schizothyrium pomi (Mont. and Fr.) Arx

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Sooty blotch and fly speck are the two most common "summer diseases" of apples in the Northeast; they are also problems on pears. Although caused by two different organisms, the diseases often occur together since both are confined to the fruit surface and are favored by similar environmental and horticultural conditions. Disease incidence and severity can be highly variable among production regions, growing seasons, and even individual orchards. Economic losses result primarily from the diminished appearance and commercial quality of infected fruit.

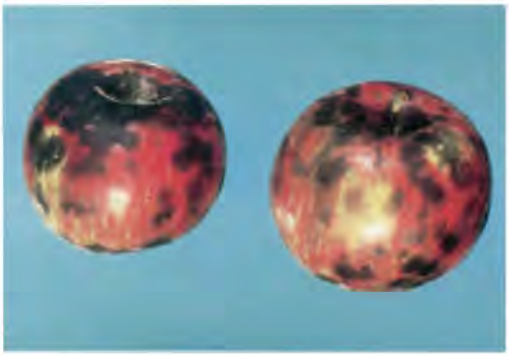


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Symptoms

Sooty blotch appears as dark olive green or sooty-colored fungus colonies on the surface of infected fruit. One to many nearly circular colonies may develop individually (Fig. 1) or large, unshaped colonies may spread out over the fruit (Fig. 2). Symptoms can develop as soon as 3-4 weeks after petal fall, but are usually much more common and severe by late summer or early fall.

Symptoms of flyspeck are well-described by the disease name. Small, circular colonies of up to 50 or more tiny black dots (fungus fruiting bodies) form on the fruit surface (Fig. 3). One to many individual colonies can form per fruit, but flyspeck symptoms are typically less pronounced than are those of sooty blotch (Fig. 4; fruit on left with sooty blotch, fruit on right with flyspeck). The timing of symptom appearance is similar to that for sooty blotch.

Disease Cycle and Causal Organisms

Sooty blotch. Sooty blotch is caused by the fungus *Gloeodes pomigena*. The fungus overwinters as fruiting bodies (pycnidia) or in a vegetative state (mycelium) on infected twigs of apple trees and numerous woody plants in hedgerows and woodlots; these "reservoir hosts" include brambles (blackberries and raspberries), oaks, maples, ash, elm, grape, tulip tree, and many others common to eastern North America. Spores formed within the pycnidia or from sections of the mycelium are spread by rains during the late spring and early summer, and begin causing fruit infections about 2-3 weeks after petal fall.

Typical sooty blotch symptoms are caused by the dark mycelium of fungal colonies that develop on the surface of the fruit cuticle. Because of the superficial nature of this growth, it is extremely sensitive to the microclimate conditions (particularly relative humidity) immediately surrounding the fruit. Growth is optimum at 100 percent relative humidity; good at 95, fair at 92, poor at 90 percent; no growth occurs below 90 percent relative humidity. The effects of temperature vary somewhat among individual isolates, but optimum temperatures are generally about 64-80° F (18-27° C); growth is very limited and slow during periods below 50° F (10° C) or above 86° F (30° C).

The period of time between the beginning of an infection and the appearance of symptoms depends on how often and for how long temperature and humidity conditions allow fungal growth. In the Northeast, this incubation period is often 3-4 weeks under relatively favorable conditions, but can be 2 months or longer otherwise. In warmer regions where the disease occurs regularly (e.g., the Hudson Valley), it is common for infections to be initiated during the early cover spray period, stop development during a hot and dry mid-summer, then finish incubating and finally become apparent when conditions become more favorable towards the end of summer. Once fungal colonies do appear, mycelial fragments can be broken off by raindrops and spread to additional fruit, causing further disease if environmental conditions remain favorable. Thus, disease is generally most severe in years and orchards where conditions favor early disease development followed by extensive secondary spread.

Sooty blotch infections that are not apparent at harvest can sometimes finish their development during long periods of cold storage when relative humidities are near 100 percent.

Flyspeck. Flyspeck is caused by the fungus *Schizothyrium pomi* (formerly *Microthyriella rubi*); when the fungus forms a certain spore type (conidia), it is also called *Zygophiala jamaicensis*. The disease cycle is very similar to that of sooty blotch. The fungus overwinters as fruiting bodies (pseudothecia) on the twigs of infected apple trees and many of the same woody reservoir hosts colonized by the sooty blotch fungus. Bramble canes, however, appear to be a particularly common source of the flyspeck fungus (Fig. 5). Spores within the pseudothecia (ascospores) are released during rains for a 1-2 month period starting around bloom, and are carried moderate distances by wind currents. The spores germinate at a temperature of 61-83° F (16-28° C), and a fungus colony begins developing on the fruit surface. Conditions for fungal growth are similar to those required by the sooty blotch fungus, although humidity requirements are even more restrictive: virtually no flyspeck growth occurs at relative humdities below 95 percent.

As with sooty blotch, the incubation period can be several weeks to several months, depending on the microclimate surrounding the fruit. Typical flyspeck symptoms result from the production of numerous dot-like pseudothecia within the fungus colonies on the fruit. These pseudothecia are connected by fine fungal strands (mycelium), which also bear microscopic secondary fungus spores (conidia). Conidia are then dispersed by wind currents, and are able to cause additional fruit infections throughout the remainder of the growing season whenever conditions are favorable.

Control

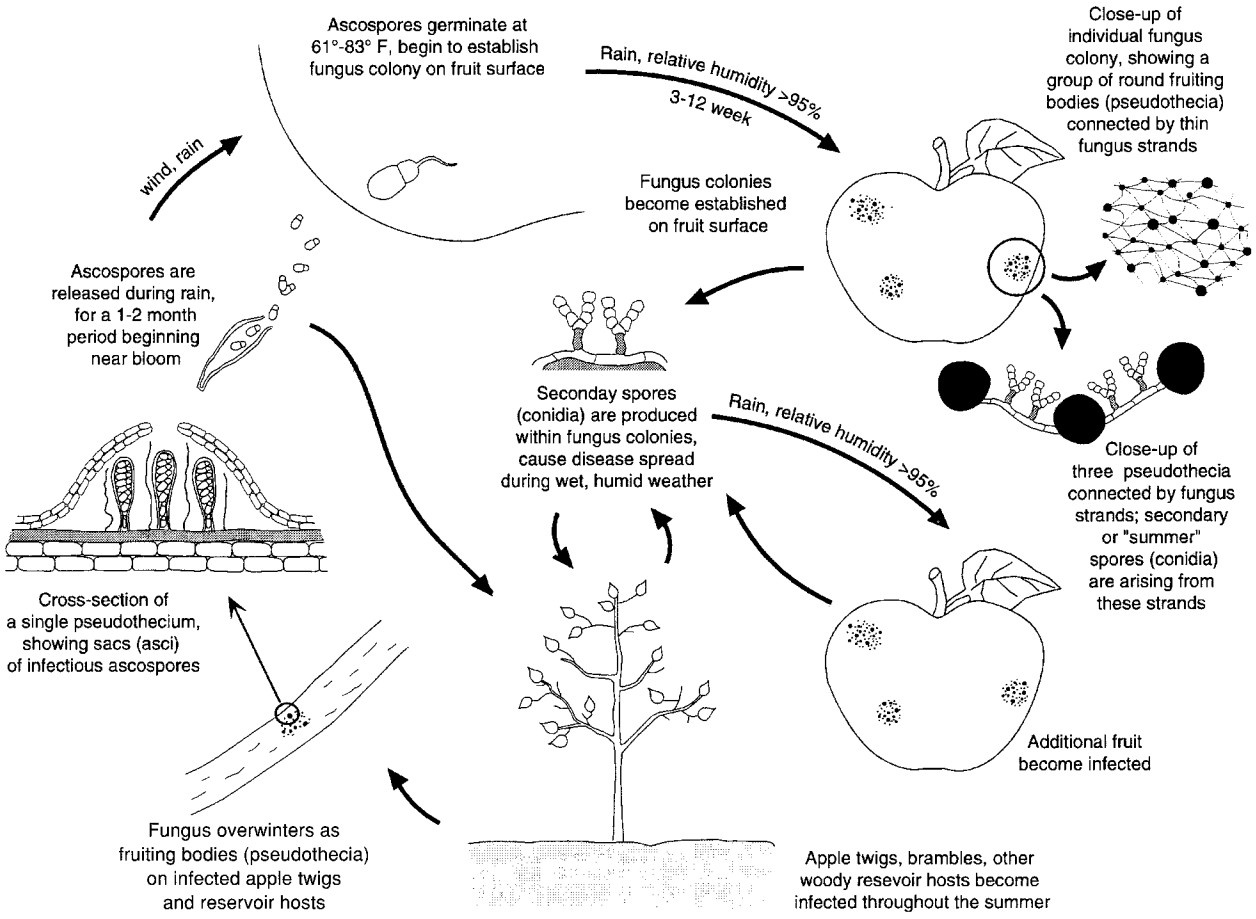
Control of sooty blotch and flyspeck should integrate horticultural practices designed to reduce the chances of disease development together with fungicide sprays to protect against infection when necessary.

Because both diseases are so dependent on long periods of extreme humidity around the fruit, annual pruning to open tree canopies and promote air circulation will minimize the periods favorable for their development. Supplemental summer pruning in dense-canopied trees can provide significant additional benfits in some years. Proper fruit thinning is also important for reducing the development of high-humidity microclimates around clustered fruit; like good pruning, thinning will furthermore improve the spray coverage for any fungicides that may be applied. Mowing of grass middles and good within-row weed control will provide additional help in reducing overall humidity levels within orchards during the summer.

The removal of hedgerows or surrounding woodlots is not always practical, but can substantially improve airflow and reduce humidities within the orchard. Destruction of the many woody reservoir hosts in these sites will also reduce some of the inoculum that initiates fruit infections. Because of their importance as an inoculum source, it is particularly important to eliminate brambles in hedgerows and within the orchard itself should they occur there.

The need for and timing of fungicide sprays to control these diseases is variable among orchards and years. In regions where they occur regularly, sprays should start around first cover and be repeated as necessary according to the prevailing weather conditions and material being used. Where the diseases occur more sporadically, fungicide programs should be initiated and continued on the basis of weather conditions, specific orchard factors, and previous experience. In general, fungicide programs will need to be most intense for orchards in low fog pockets, surrounded by woods, or with dense tree canopies. Minimizing these factors at the time of planting will help reduce the intensity of sooty blotch and flyspeck control programs required in subsequent years.

FLYSPECK DISEASE CYCLE



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