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Fruit ICM News

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In This Issue:

Sooty Blotch & Flyspeck Revisited

Source: Bill Turechek and Dave Rosenberger, Plant Pathology, Geneva and Highland, NY

Sooty blotch and flyspeck (SBFS) are two of the most important summer diseases of apple in New York. The diseases do not result in direct losses in yield, but rather they cause a reduction in fruit quality, which can lead to economic loss due to downgrading in fresh market fruit. Losses can exceed 25%, especially in warm humid climates such as those experienced in southeastern NY, southern New England, and the mid-Atlantic and southern states. Until recently, sooty blotch was thought to be caused by the fungus Gloeodes pomigena. However, recent studies have shown that sooty blotch is a disease complex caused by at least three different fungi: *Peltaster fruticola, Leptodontium elatius*, and *Geastrumia polystigmatis*. All three fungi are not necessarily present in all sooty blotch lesions. Flyspeck is caused by the fungus *Schizothyrium pomi* (= *Zygophiala jamaicensis*).

Symptoms

Sooty blotch appears as various shades of olive-green on the surface of the fruit. Colonies range in shape from nearly circular with distinct margins to rather large, amorphous blotches with diffuse margins. The variation in shapes and color can be attributed to the differences among the three fungi causing the disease and environmental conditions, specifically temperature and relative humidity. Fruit infection typically occurs in June and the first symptoms are generally apparent 20 to 25 days after infection, but can be visible as soon as 8 to 12 days after infection if conditions are warm and wet.

Flyspeck appears as distinct groupings of shiny, black fungal bodies (called thyriothecia) on the surface of the fruit. The number of thyriothecia associated with a single infection ranges from a few to over fifty. Although flyspeck thyriothecia appear to exist individually, close examination reveals mycelium connecting the individual structures. The primary spores are discharged starting around 2 weeks after petal fall and symptoms may be visible 10-12 days after infection under optimal conditions, but may not be visible for 1 month under less than ideal conditions. These primary infections will give rise to

conidia, which initiate secondary cycles of infection throughout the remainder of the season. Numerous observations in the field have shown that warm and wet or humid conditions are needed for the development of disease. For both flyspeck and sooty blotch, the causal fungi grow only within the wax cuticle of the fruit and are quite superficial. Rubbing the fruit with a cloth will often be enough to "clean-up" an apple that is only lightly affected.

Disease Management

Proper pruning and fruit thinning can have a huge impact on the effectiveness of fungicides used to control SBFS. In a 2-year study conducted in Massachusetts, Cooley et al. (1997) showed that summer pruning could reduce the incidence of flyspeck by nearly 50% in an unsprayed orchard. In the same study, they showed that the number of fruit downgraded from USDA Extra Fancy was reduced when summer pruning was done in commercial orchards. They concluded that summer pruning helped to decrease the incidence of flyspeck by reducing the number of hours of relative humidity >95% and allowing increased penetration of pesticides to the upper two-thirds of the canopy when applications were made with an airblast sprayer.

Effective fruit thinning is also important for effective control of SBFS. When fruit are clustered together in groups of three or more, fruit surfaces in the middle of the cluster are slow to dry and become almost inaccessible to spray droplets as the fruit increase in size. Where necessary, hand thinning to break up fruit clusters will help to reduce the incidence of sooty blotch and flyspeck at harvest.

The primary means of managing sooty blotch and flyspeck is via fungicide applications during July and August. Four or five summer fungicide applications may be needed to control these diseases in wet years, whereas only two or three well-timed applications are needed in dry years. Fungicides applied to control scab and mildew at petal fall and first cover are usually adequate for protecting apples from flyspeck ascospores. In the northeast, the fungi causing sooty blotch are generally more sensitive to fungicides than is the flyspeck fungus, so flyspeck almost always appears first in orchards with marginal fungicide protection. Summer fungicides timed to control flyspeck will almost always provide adequate control of sooty blotch.

Following discharge of flyspeck ascospores during the 2-3 weeks after petal fall, the risk of flyspeck infection is relatively low until the time when ascospore-initiated infections in hedgerows and woodlots begin producing conidia for secondary spread of the flyspeck fungus. This seems to occur after about 250-280 hours of accumulated wetting after petal fall (AW-PF) on apples. During this interval from 3 weeks after PF until 250 hours AW-PF, the risk of SBFS infection on apples is relatively low and fungicide coverage can usually be relaxed (provided, of course, that primary scab has been completely controlled). Beginning at 250 hours AW-PF, however, the risk of secondary flyspeck infections gradually increases until harvest.

Research has shown that Topsin M, Sovran, and Flint provide post-infection activity against sooty blotch and flyspeck. Their post-infection activity decreases as the time between infection and fungicide application increases. Although there are still some data gaps with Sovran and Flint, tests completed to date suggest that all three of these fungicides have reasonable activity against flyspeck infections if the fungicides are applied before infections are exposed to 100 hours of accumulated wetting. Working in North Carolina, Brown and Sutton (1995) showed that sooty blotch and flyspeck appear on fruit only after fruit are exposed to 275-300 hours of accumulated wetting following infection. Thus, it appears that Topsin M, Sovran, or Flint will provide post-infection control of flyspeck and sooty blotch so long as the infections are less than one-third of the way through the incubation period.

When Topsin M, Sovran, or Flint are used for July-August sprays, the period of relaxed fungicide coverage in June and early July can probably be extended until 350 hours AW-PF (250 hours for development of flyspeck conidia plus 100 hours of post-infection activity). Even in dry years, however, trees should probably be protected with fungicides during the latter half of July because fungicide spray coverage later in the season may be compromised as apple size increases (thereby increasing contact surface areas between adjoining fruit) and as limbs bend down under crop load. Should a dry summer suddenly turn wet in August, SBFS could cause huge losses in orchards that were not protected prior to the rains.

Pre-determining the timing for the last SBFS spray in August or September is impossible because the need for additional sprays during that period is based on the weather. Last year at the Hudson Valley Lab, we recorded nearly 3.5 inches of rain in the first two days of September and then accumulated 270 hours of wetting by September 30. Growers who did not re-apply a fungicide after the rains of September 1-2 noted that flyspeck seemed to appear overnight at the end of September on fruit that were not yet harvested. The trick to correctly timing the last fungicide spray in 2003 was to correctly guess how many hours of wetting would accumulate after the rains of September 1-2 and before fruit would be harvested. (Remember that 270 hours of wetting are required to complete the incubation period.)

Growers who gambled on a dry or even a "normal" September lost that bet in 2003. Those who applied fungicide during the first week of September (on the assumption that September would be wet) were the winners in 2003. Although an early September spray may be needed in exceptionally wet years, sprays applied during late August and September will not compensate for coverage gaps during July and August because none of our fungicides can completely eradicate SBFS after infections on fruit are older then 100 hours of accumulated wetting. Therefore, sprays between early July and mid-August remain the most critical timing for controlling SBFS under NY conditions in most years. Earlier and later sprays are needed in wet years, but two or three applications between July 15 and August 15 are almost always essential.

Degree Day Accumulations for Ohio Sites June 30, 2004

Ohio Location	**Degree Day Accumulations Base 50**	
	Actual	**Normal***
Akron-Canton	1030	995
Cincinnati	1441	1381
Cleveland	1055	974
Columbus	1366	1195
Dayton	1309	1343
Kingsville	952	843
Mansfield	1043	983
Norwalk	1116	954
Piketon	1433	1230
Toledo	1073	987
Wooster	1126	941
Youngstown	976	905

Pest Phenology

Coming Events	Degree Day Accum. Base 50F
Apple maggot 1st catch	749 - 1033
Oriental fruit moth 2nd flight begins	784 - 1022

Thanks to Art Agnello, Cornell Entomologist

Fruit Observations & Trap Reports

Insect Key
AM: apple maggot
CM: codling moth
ESBM: eye-spotted budmoth
LAW: lesser apple worm
LPTB: lesser peachtree borer
OBLR: obliquebanded leafroller
OFM: oriental fruit moth
PTB: peachtree borer
RBLR: redbanded leafroller
SJS: San Jose scale
STLM: spotted tentiform leafminer
TABM: tufted apple budmoth
VLR: variegated leafroller

Site: Waterman Lab, Columbus
Dr. Celeste Welty, OSU Extension Entomologist

Apple 6/23 to 6/30/04	
Redbanded leafroller	2 down from 19
Spotted tentiform leafminer	814 up from 116
San Jose scale	27 up from 0
Codling moth	2.3 down from 8.7
Lesser appleworm	2 down from 6
Tufted apple budmoth	0 same as last wk
Variegated leafroller	0 same as last wk
Obliquebanded leafroller	0 same as last wk

Apple maggot (3 trap sum)	5 down from 13

Site: West District; Huron, Ottawa, Richland, and Sandusky Counties
Lowell Kreager, IPM Scout/Technician

Apple 6/22 to 6/30/04	
Apple maggot (3 trap sum)	0.0 first report
Codling moth	0.5 down from 1.3
Lesser appleworm	1.7 down from 2.1
Oriental fruit moth	0.5 up from 0.1
Redbanded leafroller	37.2 down from 51.5
San Jose scale	0.0 same as last wk
Spotted tentiform leafminer	791 up from 783
Peach 6/22 to 6/30/04	
Lesser peachtree borer	1.3 down from 4.0
Oriental fruit moth	0.2 down from 0.3
Peachtree borer	0.7 up from 0.0
Redbanded leafroller	40.4 up from 33.8

Beneficials include native lady beetles and lacewings. Other observations include lilac borers.

Site: East District; Erie and Lorain Counties
Jim Mutchler, IPM Scout/Technician

Apple 6/22 to 6/29/04	
Apple maggot (3 trap sum)	0.0 first report
Codling moth	1.5 down from 2.5
Lesser appleworm	3.1 down from 12.3
Oriental fruit moth	1.5 down from 1.7
Redbanded leafroller	12.9 up from 12.8
San Jose scale	0.0 same as last week
Spotted tentiform leafminer	906 up from 567
Peach 6/22 to 6/29/04	
Lesser peachtree borer	3.8 down from 5.8
Oriental fruit moth	0.3 down from 2.3
Peachtree borer	2.2 up from 1.2
Redbanded leafroller	7.0 down from 12.3

Beneficials include native lady beetles and lacewings.

Other observations include apple scab, fire blight, plum curculio strikes, oblique banded leafroller, white apple leafhopper, and Japanese beetle.

Preliminary Monthly Climatological Data for Selected Ohio Locations, June, 2004

Weather Station Location	Monthly Precip	Normal Monthly Precip	Year-to-Date Precip	Normal Year-to-Date Precip	Avg High	Normal High	Avg Low	Normal Low	Mean Temp.	Normal Mean
Akron-Canton	6.62	3.55	24.50	18.82	74.7	78.2	55.733	56.8	65.6	67.5
Cincinnati	2.93	4.42	23.05	22.54	80.4	82.4	61.6	61.6	71.02	72.0
Cleveland	2.87	3.89	20.78	18.47	81.0	80	59.0	61.0	66.67	67.6
Columbus	5.34	4.07	25.60	18.82	79.5	81.6	60.6	60.7	70.08	71.1
Dayton	5.13	4.21	25.55	20.59	78.3	80.1	60.3	60.2	69.21	70.1
Kingsville	2.82	4.20	24.08	16.90	75.0	76.5	55.2	56.5	65.09	66.5
Mansfield	6.87	4.52	25.84	21.27	75.5	77.8	55.9	55.8	65.72	66.8
Norwalk	4.48	3.89	21.41	16.97	78.5	78.5	56.6	57.4	67.55	68.0
Piketon	1.37	3.70	15.34	22.30	81.2	81.2	59.3	58.5	70.28	69.9
Toledo	3.89	3.80	13.62	16.61	77.9	79.5	56.8	58.2	67.37	68.8
Wooster	6.36	3.47	27.24	17.38	77.4	79.5	55.9	55.6	66.65	67.5
Youngstown	3.46	3.91	22.14	18.11	74.9	77.1	54.2	54.6	64.6	65.9

Temperatures in degrees F, Precipitation in inches

Table Created by Ted W. Gastier, OSU Extension, from National Weather Service, OARDC & Local Data

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information that is complete, timely, and accurate, the pesticide user bears responsibility of consulting the pesticide label and adhering to those directions.

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension.

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| Back |