Apple Sooty Blotch and Flyspeck

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After a sluggish start, it feels like summer might be here! For apple growers, hot weather means the threat of scab is lessening, but the so-called summer diseases—sooty blotch, flyspeck, and fruit rots—are ramping up. Here I will review using the Network for Environmental Weather Applications model for timing fungicide sprays for sooty blotch and flyspeck management. For information on fruit rots, see articles in previous issues of Wisconsin Fruit News (2018, Vol. 3, Issue 9; and 2017, Vol. 2, Issue 8).

Sooty blotch and flyspeck (SBFS) are caused by a complex of several fungi that live in and feed on waxes in the apple fruit cuticle and the waxy cuticles of other plants in woodlots and hedgerows, such as wild grapes and raspberries. At about apple petal fall, at least some of the fungi in the SBFS complex start to produce spores on unsprayed plants in woodlots. Thus, at petal fall and shortly after is when you get the first influx of spores into the orchard from surrounding areas. But at that time, if you are using fungicides to control scab, powdery mildew, and/or rust, you will also protect the young apple fruit from infection by SBFS fungi. Meanwhile, however, out in the unprotected woodlots and hedgerows, SBFS infections develop, and with several weeks and several hours of wetness (just how many hours is covered below), the primary infections in the woodlots produce a second round of spores that blow into the orchard. This is where the trouble starts—this second influx of spores is bigger than the first, and at this point in time (early to mid July in most years), you've probably backed off your scab spray program, so the fruit are left vulnerable to infection by SBFS pathogens.

Apple sooty blotch and flyspeck blemishes.

NEWA has a model to predict when there is a risk of infection of fruit by SBFS, which can help guide the timing of your first SBFS spray. Over the years, various thresholds for how many hours of leaf wetness are required for infection have been proposed. Some research, including work that I was involved in with Mark Gleason of Iowa State University about 10 years ago, propose 175 hours as the threshold, but only counting hours if they occur in blocks of 4 hours or more. Other researchers have used 185-270 hours, counting all hours of wetness. But 175-270 is a huge range—so what's going on? Old research was based on string recorders that are slower to dry than modern electronic instruments, so 270 was the threshold. 270 hours on a string recorder translates to about 175-185 hours on the faster-drying electronic plate sensors that we used in our research and that are used by NEWA.

If you do not have a station directly used by NEWA, you can still benefit from the network. Log in to newa.cornell.edu; choose "Pest Forecasts" and then "Apple Diseases." Then, at the left of the page where there are drop down menus, click "select disease" and choose "Sooty Blotch/Flyspeck." For state, select Wisconsin and then choose the location that is nearest you. If your orchard is close to Illinois, Minnesota, or Michigan, you might want to check the available stations in those states as well. The “Date of Interest” should automatically show the current date; leave that as is, and then click on the “Calculate” button. A table will show up, but before looking too closely at it, look above the table at the date entered for “Petal fall date for McIntosh.” If this is not accurate for your orchard, enter the correct date for your orchard, even if you are using weather data from a nearby orchard. There is also an option to enter the date of your last fungicide application after petal fall. Leave this blank if you have not sprayed a fungicide since petal fall, or fill in the date if you have sprayed since petal fall.

Now the table will show the date, number of days since petal fall, accumulated leaf wetness hours (ALWH), risk level for SBFS infection, daily rain, and a rain forecast for the next few days. Depending on how much ALWH there is, the table entries will be colored green (low risk, less than 100 ALWH), yellow (moderate risk, 100-169 ALWH), or red (high risk, 170 or more ALWH). Below the table there are some brief descriptions of actions that should be taken for moderate and high risk, as well as suggestions for fungicides to use. Keep in mind, however, that the amount of leaf hours can vary tremendously among neighboring orchards. If you’re using an ALWH estimate from a neighboring orchard, but you do happen to have your own rain data, you might do a reality check to see if your orchard has received about the same amount of rain as the neighboring orchard. For this, click on “Weather Data” among the menu options near the top of the page, then “Daily Summary” to see how much rain has been measured at the site. However, later in the summer, when ALWH can be more from dew than rain, such a comparison is less valuable.

The primary benefit of the model is to time your first SBFS spray during early to mid summer. But another potential use is to guide you on when you can quit spraying for SBFS. If a fruit is infected, it will take about 175 hours of wetness for SBFS colonies to become visible on the surface. So if fruit was protected continually all summer long, you could leave it unprotected for 175 hours of wetness before harvest. That would be about 7 days of continual wetness, or about 14 days with 12 hr of wetness, or about 28 days with 6 hr wetness. It’s impossible to know just what you’re going to get from day to day, but I think we can say that 14 straight days with 12 or more hours of wetness is not likely in late August and early September. But, if you have gaps in protection earlier in the summer, then you won’t have that 175-hour buffer leading up to harvest. You would have to count any hours accumulated during that unprotected gap and subtract the total from your 175-hour pre-harvest buffer. An unprotected gap according to Dave Rosenberger’s research at Cornell University is either 2 inches of accumulated rain or 21 days since the last SBFS spray.

The safest approach is to keep things covered during summer and then spend your 175 hours in the few weeks leading up to harvest. There are several fungicide options for SBFS control in conventional orchards. For organic growers, there are fewer options, and they are generally not as effective as conventional fungicides under high disease pressure. Of course, you need to consider how many sprays and how much product you used earlier in the year, and do not exceed maxima list on labels. Some options:

- Captan alone is effective on SBFS and the summer fruit rots if a higher rate is used, spray intervals are no more than 2 weeks, and you reapply after 2 or more inches of rain.
- Topsin-M + captan is very effective, and you could get away with a lower rate of captan if mixed with Topsin. The addition of Topsin would also help with fruit rot control.
- Captan + phosphorous acid is good for SBFS, but phosphorous acids are not effective on fruit rots.
- Strobilurins (e.g., Flint, Sovran, Pristine) are effective alone, but mixing with a low rate of captan is even better.
- Fontelis and other SDHI (group 7) fungicides alone are not recommended for SBFS, white rot, or black rot control, but they are effective on bitter rot.

- Indar and Inspire Super are effective against SBFS, but you should not use these sterol inhibitor (Group 3) fungicides if apple scab is seen in the orchard, because you could select for an SI resistant scab population that will haunt you in future years.
- For organic growers, liquid lime sulfur or elemental sulfur control SBFS, but there is a risk of injury to fruit. Serenade, Oxidate, Kaligreen (and probably other forms of potassium bicarbonate), and Regalia have shown suppression of SBFS in some trials but have failed in other trials. These options might provide adequate control under lower disease pressure (e.g., relatively cool, dry weather, good air circulation in tree canopy) but might need to be reapplied every few days under higher disease pressure.

Coverage matters. Work that Mark Gleason and I did in collaboration with growers in Iowa and Wisconsin showed that a spray volume of at least 100 gallons/acre was more effective than lower volumes on semi-dwarf trees (M.7 rootstocks). Semi-dwarfing rootstocks are increasingly rare, making that study less relevant today than it once was, but the point is, you need good coverage. Our work also showed that pruning improved the success of using prediction systems, and was especially important in semi-dwarf blocks compared to dwarf rootstock blocks.

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