Apple Scab

The updated weather forecast shows an extended period of rain Saturday – Thursday, May 14-19, creating a major apple scab infection period. The length and amount of rain (well over 2 inches) expected during this rainy period will make maintaining fungicide protection difficult or impossible. The extended outlook shows more rain on May 20-21. The current wind forecast looks good making applications Thursday night or Friday morning. Even Friday afternoon has forecast wind speeds below the 10 mph limit for effective use of airblast sprayers.

Apple scab protection is more effective and less expensive than cure. The best protection would be to apply a full-dose protectant fungicide (i.e. captan, Syllit, mancozeb etc.) or a strobilurin (Flint, Sovran, Pristine) on Friday or Saturday May 13-14. Given the amount of rain expected, the ability of Flint and Sovran to penetrate into the leaf and away from rain removal is a useful characteristic for this situation.

Adjusting Fungicide Rates to Maximize Control of Apple Scab

by Dr. Dave Rosenberger, Hudson Valley Lab, Highland NY. From the May 9, 2011 issue of the Cornell Scaffolds newsletter.

“Frequent rains and windy conditions between rains have made this a challenging season for applying prebloom fungicides on apples. Where fungicide coverage and timing were less than ideal during the early part of the season, apple scab lesions may have already appeared in trees, or scab lesions may appear within the next week or two. New scab lesions on leaves can produce conidia in such abundance that concerns about remaining ascospores in the leaf litter become irrelevant. Keeping scab off of fruit and terminal leaves can be especially challenging in years when scab lesions appear on cluster leaves before trees reach petal fall because new leaves on terminal shoots unfold rapidly between petal fall and second cover, and because fruit are highly susceptible to scab infections for the first few weeks after petal fall. Achieving good scab control is dependent not only on applying effective fungicides at the right times, but also on using appropriate rates. Following are some guidelines on rates for specific products.
**Mancozeb fungicides (Dithane, Manzate, Penncozeb):** Current labels allow these products to be applied in either four applications at rates of 6 lb/A with the last application at petal fall, or in seven applications at 3 lb/A with a 77-day preharvest interval. Where rust diseases are a concern, most growers will opt for the 3 lb/A option so that they can continue using mancozeb for rust control after petal fall. When applied at only 3 lb/A on a 7-day interval, mancozeb fungicides (by themselves, with no mixing partner) will usually control scab in low inoculum orchards so long as rainfall between applications is less than 1.5 inches. When the 7-day weather forecast suggests that heavy rains are likely during the week following an anticipated spray date, then mancozeb used alone at 3 lb/A may fail to provide effective scab control. Under these circumstances, options are to increase the potential residual activity of the spray by using 6 lb/A of mancozeb (if the spray is applied before petal fall) or to tank-mix 3 lb/A with either Captan or some other fungicide. If scab lesions are already visible on new foliage, then the orchard is no longer a "low inoculum" orchard and using mancozeb alone at 3 lb/A will not provide effective control of secondary scab.

**Inspire Super** may be the best option for stopping the spread of scab where protectant sprays early in the season failed to provide complete scab control. The new liquid premixed formulation of Inspire Super must be used at the full label rate of 12 fl oz/A to be effective against scab. The original Inspire Super MP (MP= multi-pack) consisted of two separate products that were packaged together and which had to be individually measured into to the tank. Inspire Super MP has only a single rate on the label for apple scab. The newer premixed liquid formulation is labeled for apple scab at 8.5 to 12 fl oz/A, but anything less than the full label rate is likely to prove disappointing. Always use Inspire Super in combination with either captan or the 3 lb/A rate of a mancozeb fungicide to further guard against control failures due to and/or selection pressure for DMI-resistant scab.

Inspire Super has more intrinsic activity against apple scab than other DMI fungicides, so it will have more activity than other DMIs against scab populations that are shifted toward resistance to DMI fungicides. Furthermore, the Vangard component of Inspire Super provides 48 to 72 hr of post-infection activity against scab on leaves, so Inspire Super provides two modes of action for arresting infections that are less than 48–72 hr old. That dual activity can be a significant advantage where sprays can be applied shortly after an infection period. As is the case for all DMIs, Inspire Super will do a better job if it is applied BEFORE lesions become visible, because it will arrest fungal development within the leaf before conidia can be produced. However, this presymptom capability may be compromised by the presence of DMI-resistant strains within the population, especially for apple cultivars such as McIntosh that are highly susceptible to apple scab.

**Indar** also has more activity against apple scab than the older DMI fungicides, but Indar is relatively insoluble and therefore should be applied with a non-ionic surfactant to enhance uptake in leaves. Non-ionic surfactants are often used at low rates when a "spreader" is needed to reduce surface tension of the spray solution and improve spray coverage on the leaf. Higher rates of non-ionic surfactants are required if they are specifically meant to enhance penetration of the leaf, as is the case with Indar on apples. Thus, non-ionic surfactants used with Indar on apples should be used in the mid to upper parts of the rate ranges indicated on the surfactant labels.
**Rally and Vintage** (formerly Nova and Rubigan, respectively) can also provide effective suppression of incubating scab lesions if the populations are still fully sensitive to DMI fungicides. However, for post-infection activity, Rally should be used at no less than 6 oz/A and Vintage should be used at 12 fl oz/A.

As indicated for Inspire Super, the other DMI fungicides (i.e., Indar, Rally, and Vintage) must also be combined with a contact fungicide whenever they are used. Where rust is not an issue and there are no complications due to oil applications, combining these fungicides with captan will likely provide the strongest scab-control program. Captan should not be used within 7–10 days of an oil spray, and injury can sometimes occur even when captan and oil are separated by more than 10 days if cool cloudy weather persists during the interval between the two sprays.

**Syllit** (dodine) is also an effective tool for arresting scab epidemics, but it has no activity on mildew or rust diseases. Syllit should always be applied in combination with either captan or mancozeb because Syllit performance can be compromised by the unexpected presence of dodine-resistance. The combination of 2 pt/A of Syllit plus 3 lb/A of a mancozeb fungicide is probably appropriate for preventive scab sprays, but the Syllit rate should be increased to the full label rate of 3 pt/A where post-infection and/or antisporelant activity is desired. The old literature on dodine suggests that Syllit used at 2 pt/A will gradually arrest spore production from existing scab lesions, but the effect is more immediate with higher rates.

Anyone thinking of using Syllit should note that if apples are sprayed with Syllit, pomace from any part of the crop that is used for juice cannot be fed to cattle. This is a significant deterrent for anyone who sells packing line cull fruit to large juice processors, and it could also create problems if hail storms or other unforeseen events (e.g., stink bug?) should cause higher than expected rates of cull fruit in Syllit-treated blocks.

**Flint and Sovran** are NOT recommended for stopping scab epidemics after scab lesions become visible on foliage. These products can reduce sporulation from visible lesions, but they do not have the presymptom activity that is almost always needed in such situations. (Presymptom activity is needed because the scab infections are never synchronized and non-visible incubating infections are almost always present along with visible lesions on leaves). Flint and Sovran can still be used where visible lesions are present, but they should only be used in combinations with the maximum label rates of captan and they cannot be expected to arrest an epidemic in the same way that DMI fungicides and Syllit are capable of doing in the absence of resistance.

Other considerations: When rescue treatments are needed to stop the spread of scab that is already visible on leaves, the first spray should always be followed by at least one and often by two more sprays of products/rates designated as appropriate for the situation. Also, while other experts may disagree, I believe that it is unwise to apply tree-row volume calculations when rescue treatments are needed for apple scab. Instead, the maximum labeled rates of fungicides should always be used until one is certain that the scab epidemic has been arrested.”
These two charts show how weather forecast accuracy has evolved since 1976. Mean absolute error (MAE) for temperature forecasts is the number of degrees difference, positive or negative, between the forecast daily high temperatures and the actual observed values.

The Brier score used for rain forecasts is more difficult to summarize. The only way to get a zero average Brier score is to forecast 100% chance of rain for every day that actually does have > 0.01 inch, and forecast 0% chance of rain for every day that ends up with no rain. It takes a smaller proportional reduction in Brier score to represent the same degree of forecast improvement as a change in MAE, though that’s comparing apples and oranges. An average Brier score of 0.05 would represent extremely accurate rain forecasts.
Pesticide Recordkeeping

Evaluation is a critically important part of any management system, including integrated pest management (IPM). Evaluation requires good records. Here is some more information of the TracApple pesticide recordkeeping program offered by Cornell University.

Find out how to obtain Trac Software at http://www.cctec.cornell.edu/expresslicensing/software/tracsoftware/index.php

Trac software now has an open ChemTable (no password). This means the software never goes out-of-date, because you update the ChemTable. Complete instructions on how to do this are included in the Trac Software Manual and in the software itself, along with a sample 2010 ChemTable.

Make sure you obtain the correct Trac Software release for your Excel version:

Tech support is available at jec3@cornell.edu

Closing Words

All those who believe in psychokinesis raise my hand.

I almost had a psychic girlfriend but she left me before we met.

Why do psychics have to ask you for your name?
- Steven Wright

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