PA Fire Blight Watch for 2008

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In 2007, we experienced one of the worst fire blight outbreaks on record in PA. As I pointed out during the winter schools, everything else being equal, we should expect 2008 to be a bad year as well. This is because, however diligently our pruning job, it is likely we missed some cankers containing Erwinia amylovora, the fire blight bacterium. That means we are starting the season with a higher inoculum load than in a typical year. There is some suggestion that apple trees go into remission after a fire blight attack but I have not seen scientific evidence to support this hypothesis. In this article, I attempt a hypothetical sketch of the outlook for this year and list appropriate responses to fire blight outbreaks.

A) What caused the severe outbreaks in 2007? Several factors must be ‘right’ for a fire blight epidemic to occur. These include: presence of inoculum; availability of susceptible host tissue (open blossoms for blossom strikes and wounded tissue for shoot strikes); weather conditions suitable for infection (moisture and temperatures above 65°F); and though less important for shoot strikes, presence of a suitable vector. A unique thing about the 2007 epidemic is that most infections were blossom strikes. Unique because this is the disease phase more dependent on all factors being right for infection to occur. Temperature, and moisture must be optimal during the short period that flowers are open and susceptible (2-4 days for each individual flower). By contrast, only storm rains are necessary for shoot infection; inoculum is assumed to be available, and whenever we have actively growing shoots, temperatures are usually suitable for infection (>70°F).

Based on this premise, I hypothesize that what was unique in 2007 is that the extended bloom period, and a week that was almost a contiguous infection period in early May (May 9 to 18). The figure below illustrates a hypothetical progression of bloom in a typical year and my hypothesis happened in 2007. In a typical year, most cultivars will complete bloom in a short duration whereby most blossoms are pollinated within approximately 10 days as indicated by the sharp curve. By contrast, in a year with an extended bloom period, blossoms are produced over a longer period with a few flowers opening each day thereby becoming susceptible. Moreover, in a typical orchard situation with many cultivars, some may flower early while others flower later further increasing the duration over which susceptible early cultivars appear to be progressing well, helped by the warm and sunny days last week (April 26). So how should we deal with blossom protection? By the time you read this I hope that: 1) you will have made your late dormant copper applications, and 2) applied first streptomycin applications for cultivars that have achieved 10-20% bloom. There was an infection period on Saturday, April 26 (rain on Friday). If nighttime temperatures are about 50°F on Saturday).

I suggest you monitor the situation and make a second streptomycin application 3-5 days later or as soon as warranted by forecasting models (MaryB and Cougar Blight). Further, I recommend that you monitor the progress of bloom on all your cultivars and be prepared to make additional streptomycin applications if you observe delayed or protracted flowering. Most growers do a fine job protecting the cultivars that bloom early. However, blossoms that open later are always at a higher risk of infection and are generally responsible for most infections. This is because they tend to be overlooked, yet open when conditions are ideal for infection. Early in the flowering
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for bacterial multiplication and fire blight development.

C) How about shoot infections? In addition to systemic infections from diseased blossoms, shoot strikes normally result from the fire blight bacteria entering wounded tissue following a rain storm, or in a few cases from systemic infections that arise from previous years' cankers. Assuming successful control of blossom infections, shoot infections can be predicted to follow a major rain storm that causes tissue wounding. For this reason, we recommend protecting wounded tissue with an application of streptomycin. This should be done within 24 hrs after the rain event to be effective. The labels for products containing streptomycin call for what may be interpreted as a regular application during cover sprays to stem shoot infections. I discourage this notion because of resistance issues. As of last year, we have no resistance to streptomycin in our state. This is a credit in part to your judicious use of this product, which we would be well advised to maintain.

D) What if we still get fire blight? Last year, I wrote a brief article in The Fruit Times outlining how to respond to fire blight outbreaks. Nothing has changed since so here I reproduce parts of that article in its entirety in case some of you missed it. Needless to say, the course of action will depend on conditions unique to each orchard (e.g. variety, age and rootstock).

*Cutting: we recommend cutting back infected shoots a minimum of 18 inches from the point of visible symptom. Remove (and where possible destroy) the infected tissues from the orchard because they can still be an inoculum source. Bacteria remain alive as long as you have living plant tissue. Sterilizing the pruning tools between cuts with 10% bleach solution or 70% rubbing alcohol (off the counter 70% isopropanol) is strongly recommended.

*Waiting until later in the fall before removal of diseased tissue: This may be reasonable for large trees on tolerant rootstocks. However, it has to be weighed against the risk that infected tissue poses for example to adjacent young trees on susceptible rootstocks. There is also a good chance that many infected tissues will be missed in the fall thereby allowing more bacteria to overwinter.

*Spraying: We do not recommend applying streptomycin except within 24 hrs following hail damage or a severe rain storm. Streptomycin is not systemic and will not move within plant tissue. Label recommendations apply.

*Application of Apogee: Apogee is effective at "shutting down" young succulent vegetative tissue that is the fuel on which fire blight epidemics thrive. Depending on the time of application, Apogee will substantially reduce tree growth. However, when dealing with fire blight, I have always counseled saving the trees now and growing them next year.

*As you are all aware, there is a very strong association between tree vigor and incidence of shoot blight. Anything you can do to reduce tree vigor will slow the pace of a fire blight epidemic. Please note that the effectiveness of these recommendations also depends a lot on how early the disease is diagnosed. The need for regular scouting of orchard blocks therefore cannot be overemphasized. Let us hope we get a good season and see no fire blight---well, all of you except me.
Plant Pathology  Dr. Jim Travis  PSU  FREE Plant Pathologist

APPLE SCAB: Risk for infection has been high this spring. Infection periods occurred in March soon after bud break and several times between tight cluster and bloom. The most recent infection event that occurred over the weekend of April 26 and 27 was severe due to an extended period of wetting, warm temperatures and high primary spore release from over-wintering leaves. Spore release has been exceptionally high this season from green tip through the bloom period.

However, the risk for apple scab infection is also dependent on the level of apple scab in the orchard the previous season. If little or no scab was present last season, then the risk for infection this season is lower, but NOT ZERO. There is always a risk for scab infection on susceptible apple varieties when young tissue is present and leaves are wet.

Spray coverage is an important component to successful apple scab management. Remember the basics: sprayer calibration each spring and mid-summer; apply enough water volume to cover the trees and foliage as it expands (50 gallons per acre is normally considered a minimum); avoid windy conditions; reduce speed to 2 to 2 ½ miles per hour and keep spray intervals short (5 days- alternate sides, 10 days-complete) through mid-June to protect the new foliage and fruit. Plan to attend the sprayer field day at the Fruit Research and Extension Center in Biglerville in the afternoon of June 25, 2008.

Measure rainfall amounts at your farm and adjust spray intervals down especially when you are applying a protectant fungicide alone or with a systemic material when rainfall amounts exceed one inch since the last spray.

And it’s not over yet. PA apple orchards are in the middle of the highest scab risk period of the season. Primary scab will continue through bloom and early cover sprays until mid-June. We’ll continue to check on ascospore maturity and potential for release from fallen leaves at the Fruit Center in Biglerville and keep you posted through the Fruit Times newsletter.

POWDERY MILDEW: As growers look for alternatives or plan for the reduced use of the sterol inhibitor (Rally [Nova], Indar, Procure) and strobilurin (Sovran, Flint, Pristine) fungicides to delay apple scab resistance, remember that alternatives are not as effective in controlling powdery mildew. Include effective materials through mid-June as growth of shoots continues to prevent powdery mildew infection.

CEDAR APPLE RUST: Infections may have occurred as early as pink on apples this season. Cedar galls were observed sporulating very early this season. Include effective fungicides for this disease through 1st cover.

BROWN ROT BLOSSOM BLIGHT OF STONE FRUIT: Infection conditions were met this spring during stone fruit bloom for brown rot blossom blight infection. Wilted, brown infected blossoms may appear within 7 days to 2 weeks if fungicide protection was not provided. Infected flowers from blossom blight serve to increase brown rot inoculum in the orchard and increase the potential for fruit rot at harvest. Whether or not blighted blossoms are observed, be alert for an increase in brown rot risk a few weeks before harvest and through harvest. Provide effective fungicides during this period especially if weather conditions are warm and wet.
Protracted bloom puts more ore flowers at risk of infection
Protracted blooming greatly increases the risk of blossom blight

<table>
<thead>
<tr>
<th>Type of bloom</th>
<th>Flowers at risk (%)&lt;sup&gt;x&lt;/sup&gt;</th>
<th>Total flowers at risk&lt;sup&gt;y&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>2.52</td>
<td>25</td>
</tr>
<tr>
<td>Protracted</td>
<td>27.75</td>
<td>278</td>
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<sup>x</sup>Assuming a 2.5 (i.e. 10% cumm.) bloom threshold  
<sup>y</sup>For a dwarf tree with 1000 flowers

Flowers are at risk are those open before the first application of streptomycin, and those left unprotected after the antibiotic wares off following the second application.

It may be prudent to consider additional streptomycin in a year with protracted bloom.