

# Healthy Fruit, Vol. 26, No. 6, May 8, 2018

Jon Clements, Author (unless otherwise noted) and Editor

## Contents

Current degree day accumulations Current bud stages Upcoming pest events Upcoming meetings The way I see it New England Tree Fruit Management Guide Insects Diseases Horticulture Hawkeye's corner Guest article Facebook Me Useful links Thank you sponsors...

## Current degree day accumulations

| UMass Cold Spring Orchard,<br>Belchertown, MA | 7-May |
|---|-------|
| Base 43 BE (NEWA)                             | 356   |
| Base 50 BE (NEWA)                             | 187   |

## Current bud stages

Current bud stages. May 7, 2018, UMass Cold Spring Orchard, Belchertown, MA

| McIntosh apple<br>1st king bloom | Honeycrisp<br>apple<br>Pink | Crispie pear<br>Bloom | Redhaven peach<br>Bloom | Rainier sweet<br>cherry<br>Bloom |
|----------------------------------|-----------------------------|-----------------------|-------------------------|----------------------------------|

## Upcoming pest events

| Coming events                             | Degree days<br>(Base 43) | Meaning?   |
|---|--------------------------|--|
| Black stem borer 1st catch                | 249 to 374               | Traps could be made and hung   |
| European red mite egg hatch               | 231 to 337               | Last chance for oil application  |
| Green fruitworm catch subsides            | 269 to 447               | Jump on that petal fall insecticide if GFW is a problem in your orchard  |
| Lesser appleworm first catch              | 276 to 564               | Does anyone know if this pest is a<br>problem in MA orchards, or is it<br>taken care of with petal fall sprays?  |
| Obliquebanded leafroller larvae<br>active | 158 to 314               | Time to start scouting foliage,<br>however, now is not the optimum<br>time to treat or worry about, unless<br>you plan to use Dipel or another <i>B.t.</i> |

| Oriental fruit moth 1st flight peak         | 333 to 536 | Pheromone traps should be hung to<br>establish biofix; petal fall spray<br>likely to resolve                   |
|---|------------|--|
| Redbanded leafroller 1st flight peak        | 230 to 378 | Good question?   |
| Spotted tentiform leafminer 1st flight peak | 269 to 407 | Not a problem at this stage, but<br>traps might give you an indication if<br>it is going to be a later problem |
| McIntosh bloom                              | 344-415    | Later this week  |

## **Upcoming meetings**

**Tuesday, May 8** -- Fruit Twilight Meeting, **Apex Orchards, Shelburne, MA** at 5:30 PM on May 8, 2018. Tim Smith will be our host. We will meet at his new sales room at **225 Peckville Road**. Light dinner will be served. Bloom time disease and insect management, fruit thinning will be topics of discussion. Two pesticide recertification credits. Pre-registration is not required but \$20 meeting fee for individuals getting pesticide credits will be collected at the door.

**Thursday, May 10** -- Fruit Twilight Meeting, **Foppema's Hilltop Orchard, 9 McClellan Road, Wilkinsonville (Sutton), MA** at 5:30 PM on Thursday, May 10, 2018. In cooperation with Rhode Island Fruit Growers' Association. Ken and Evan Foppema will be our hosts. Light dinner will be served. Bloom time disease and insect management, fruit thinning will be topics of discussion. Two pesticide recertification credits. Pre-registration is not required but \$20 meeting fee for individuals getting pesticide credits will be collected at the door.

## The way I see it

#### Jon Clements

**Fruit twilight meetings** this week, see above. Should be good! **Please pay attention to the address were we will be meeting!** Apple fruit thinning will be a major topic of discussion. Not quite in bloom, but things looking really good, In fact, I am not sure I have ever seen so much wild pollinator/bee activity in blooming cherries before, it's truly astounding. You have to see it to believe it. Oh, wait a minute, here it is: <u>https://youtu.be/oBIXGKG9wOU</u>

Significant **apple scab** infection period this past Sunday, hope you were covered with fungicide or went on today with some kickback fungicide. Another BIG one coming this weekend, remember, it always rains around Mother's Day, you can count on that, and you have all week to

get covered up. Fire blight past risk likely minimal, but I know some strep went on open bloom. Risk level will ramp up this week, it's already been warmer today than predicted, and risk will likely be very high when bloom is ongoing. Be prepared, watch the forecast and models. Remember, fire blight needs heat, open bloom, and moisture (rain or heavy dew). Make sure you follow the label directions for whatever make/kind/formulation of antibiotic you use, because they differ somewhat! Isn't it amazing what information you can find on the label!

Jaime Pinero reports **plum curculio** have already moved into the UMass orchard, and migration will be ongoing during bloom. Expect a banner year -- and I don't mean that in a good way!! -- for insect activity. We caught the first Oriental fruit moth in pheromone traps at the UMass Orchard, although I have not declared a first sustained trap catch yet. Mating disruption for OFM should go up ASAP if you are doing that.

When it comes to **apple fruit thinning**, use the nibble approach but be patient -- hormone thinning applications during cool weather are next to useless, wait for a period of warmer, cloudy weather, you will get much better results. Carbaryl being the only exception to that guidance. Also consider that my friend Phil Schwallier of Michigan has performed many chemical thinning experiments over the years, and he says he has consistently got the best thinning results (aka more thinning) when fruits are centered around 10 mm in diameter. Not petal fall. Not 5 mm. Not 7 mm. **Yes 8 to 12 mm.** Not 15 mm. OK? The other big factor for thinning success is to apply chemical thinner(s) when the trees are under a carbohydrate deficit, but I already said this -- when it is cloudy and warm, NOT sunny and seasonal.

THIS JUST IN: Oriental fruit moth trap catch overnight at UMass Orchard.



What does it mean? According to NEWA, not much. But take it under advisement. **!!!** AND NO INSECTICIDES DURING BLOOM **!!!** 

#### **NEWA Apple Insect Models**

| Select a pest:         |                                  | T           |   |                           |              |                 |                |               |              |
|------------------------|----------------------------------|-------------|---|---------------------------|--------------|-----------------|----------------|---------------|--------------|
| Oriental Fruit Moth    | Map Results                      | More in     | nto   |                           |              |                 |                |               |              |
| State:                 |                                  | Orien       | tal Fruit   | Moth Re                   | sults for    | Belcher         | town-2         |               |              |
| Massachusetts 📀        |                                  |             |   |                           |              |                 |                |               |              |
| Waathar station:       |                                  | Fi          | rst Trap (  | Catch: 5/7/               | 2018         |                 |                |               |              |
| Peleberteure 2         | First Trap Catch date a          | bove is est | imated bas  | ed on degree              | day accun    | nulations or u  | user input. E  | Enter the act | tual date fo |
| Beichertown-2          | blocks of interes                | t and the m | odel will ca  | lculate the pri           | otection pe  | riod after firs | t trap catch   | more accur    | ately.       |
| Accumulation End Date: | Accumulated d                    | egree day   | s (base 43  | °F) first tra             | p catch t    | hrough 5/7      | /2018: 17      | (0 days mi    | ssing)       |
| 5/8/2018               |                                  |             |   |                           |              | •               |                |               |              |
| Calculate              |                                  | Past        | Past  | Current                   | 5-I          | Day Foreca      | st <u>Fore</u> | ecast Deta    | tils         |
|                        | Date                             | May 6       | May 7   | May 8                     | May 9        | May 10          | May 11         | May 12        | May 13       |
|                        | Daily Degree Days<br>(Base 43BE) | 14          | 17  | 17                        | 18           | 17              | 14             | 12            | 20           |
|                        | Accumulation<br>since January 1  | 342         | 359   | 377                       | 395          | 411             | 425            | 437           | 456          |
|                        | Show Degree Day Graph            |             |   |                           |              |                 |                |               |              |
|                        | Pest                             | stage: N    | Aoths flvir   | og and first              | ega hato     | sh.             |                |               |              |
|                        | 1 65                             | stage.      | notino nyi  | Tynig and mist ogg natori |              |                 |                |               |              |
|                        |                                  | Th          | e pest stag   | e above is es             | stimated. S  | elect the act   | ual            |               |              |
|                        |                                  | Stag        | ge and the i  | nodel will red            | alculate re  | commendati      | ons.           |               |              |
|                        | Pest Status                      |             |   | Pest Management           |              |                 |                |               |              |
|                        | OFM eggs usually b               | tch at      | The normal petal fall spray should control OFM larvae |                           |              |                 |                |               |              |
|                        | petal fall.                      |             |   | hatching e                | early in th  | e season. P     | C is also ad   | ctive at PF,  | so broad     |
|                        |                                  |             |   | spectrum                  | materials    | will be nee     | ded at this    | time to con   | oFM in       |
|                        |                                  |             |   | an orchar                 | d and if tra | ap catches a    | are high (>    | 10/trap/we    | ek), it is   |
|                        |                                  |             |   | possible t                | hat local (  | OFM popula      | ations are r   | resistant to  |              |
|                        |                                  |             |   | organoph                  | osphates a   | ind/or pyret    | hroids. Th     | erefore, yo   | u may        |
|                        |                                  |             |   | control A                 | lthough fi   | class of ch     | ion OFM I      | etal Iali Io  | TOFM         |
|                        |                                  |             |   | fruit, part               | icularly in  | orchards w      | vith high p    | est populat   | ion          |
|                        |                                  |             |   | densities,                | most larv    | ae from this    | s generatio    | n in apples   | will         |
|                        |                                  |             |   | infest only               | y apple sh   | oots. There     | fore, the p    | rimary reas   | son to       |

## New England Tree Fruit Management Guide available online

• The New England Extension tree fruit specialists -- which include myself and Dan Cooley at UMass, Mary Concklin at UConn, Heather Faubert at URI, Terry Bradshaw at UVM, George Hamilton and Alan Eaton at UNH, and Glen Koehler and Renae Moran at UMaine -- have officially launched an online edition of the New England Tree Fruit Management Guide. Note that is it easy to print any of the sections, if you want to have old-school reference, for example, to hang on your spray shed wall. Also, it is quite mobile-friendly so make a home screen shortcut to here: <a href="http://netreefruit.org">http://netreefruit.org</a>. Finally, if you really, really want a printed version, and especially if you have Amazon Prime, search 'New England Tree Fruit Management Guide' on amazon.com. Your comments/feedback on this work in progress would be appreciated. How do you get your spray/pesticide information these days?

control the first brood is to cut down on resident populations in the orchard that could lead to more severe infestations

later in the season. Pesticide information

#### Insects

Jaime Pinero

## It's plum curculio showtime!

At the UMass Cold Spring Orchard, plum curculios (PCs) became active on May 2<sup>nd</sup> (McIntosh trees were at tight cluster). This was determined by means of **odor-baited** Tangletrap-coated panel and black pyramid traps (see picture on the right). <u>One PC</u> adult was captured on that day.

Over the subsequent days of relatively warm weather (May 3-5), <u>17</u> more PCs were captured by three traps, for an average of <u>1.9 PCs per trap, per day</u>. On May 6<sup>th</sup>, <u>9</u> PCs were captured in three traps, for an average of <u>3</u> <u>PCs per trap, per day</u>. So, PC numbers are gradually increasing.

The onset of PC immigration closely matches the average (2000-2004 data) DD accumulation of **228 DD** (base 43°F) reported in a research article published by Piñero and Prokopy (2006). **In 2018, the first PC showed up at 220 DD** (base 43°F). Really close to the average! The graph below provides, for 2000-2004 and 2018, the cumulative DD per day, per year. DD were calculated starting on January 1st, but are presented



starting on March 1st. Colored circles indicate the date at which the <u>first PC</u> was captured by traps. Note the closeness in terms of cumulative DD days.



According to the NEWA PC model, Belchertown is approximately 116 DD from petal fall - *the critical period for protection against PC*. Note that NEWA uses base 50°F for its calculations.

http://newa.cornell.edu/index.php?page=apple-insects

| You are appr<br>Accumulated      | Plu<br>roximately<br>I degree d | m Curcu<br>/ 116 degre<br>lays (base | ulio Resul<br>ee days fron<br>50°F) 1/1/2 | ts for Be<br>n petal fall<br>018 throu | elchertow<br>l - the critia<br>1gh 5/7/201 | 7 <b>n-2</b><br>1 period fo<br>8: 187 (0 d | r protection<br>days missir | 1.<br>1g) |
|----------------------------------|---------------------------------|--------------------------------------|---|--|--|--|-----------------------------|-----------|
|                                  | Past                            | Past                                 | Current                                   | 5-I                                    | )ay Foreca                                 | ast Details                                |                             |           |
| Date                             | May 6                           | May 7                                | May 8                                     | May 9                                  | May 10                                     | May 11                                     | May 12                      | May 13    |
| Daily Degree Days<br>(Base 50BE) | 7                               | 10                                   | 11  | 12                                     | 10   | 7  | 7                           | 13        |
|                                  |                                 |                                      |   |  |  |  |                             |           |

Based on the weather forecast for the next 10 days in Belchertown, the <u>highest</u> temperature for the 10-day period will be around 77°F (on May 16<sup>th</sup>). This means that PCs will continue to colonize orchards but likely this will happen at a <u>slower rate</u>. This makes me think that a petal fall spray against PC that is delayed by a couple of days could be a possibility, to ensure that as many PCs as possible are killed. *We want to minimize the chances that some PCs move into the orchard interior after the petal fall spray residue becomes ineffective.* 

#### Do you have any suggestions for articles on arthropod IPM? Please let me know!

Contact info: jpinero@umass.edu; (413) 545-1031 (campus office); (808) 756-2019 (cell).

#### Diseases

Dan Cooley

#### Not a Time to Snooze

Warm weather has moved fruit tree development rapidly, and along with it, disease pressure. As trees bloom, it is the highest risk period for apple scab and fire blight, and brown rot blossom blight. Now is the time to watch the disease and weather forecasts, and take action. Being protected is better than trying to clean up after an infection, so look ahead.

The **apple scab** models are all showing a lot of inoculum available, but for the next four or five days, no weather that will cause infection. The weekend brought an intense infection. Infected leaves should start showing symptoms in about 10 to 14 days.

**Fire blight** depends on open blossoms. With bloom, and warmer weather than last year, there has been and will continue to be risk of fire blight through bloom whenever there is wetting. Remember that includes a heavy dew or short shower. Be ready to apply streptomycin as needed.

**Brown rot** also needs some wetting to infect. There are a lot of fungicides available for brown rot on peaches and other stone fruit. Keep in mind that some are limited to early season use, during bloom, and that it's important to rotate fungicides to maintain their effectiveness. Don't keep pounding with one or two materials all season long! And take the time to get rid of those old peach mummies in trees – they're a major inoculum source.

## Horticulture

#### Jon Clements

Most action focusing on disease and soon insect, management. But:

- 1. Prohexadione-calcium (Apogee, Kudos) can be applied anytime now when shoot growth gets going
- 2. Foliar nutrients, in particular some nitrogen, boron, zinc, and calcium can be applied preor post-bloom (preferably not right during bloom) to strengthen flower buds and fruit set; calcium and boron applications are real important at this time
- 3. Ground applied fertilizer, most notably nitrogen (use judiciously) and potassium should be done soon
- 4. Weed control by herbicide applications should be ongoing (don't spray 2,4-D during bloom); young tree trunks should ALWAYS be shielded using paint or wraps from direct contact herbicide spray
- 5. Mow orchard middles frequently to keep dandelions down
- 6. Finish planting young trees and fertilize with calcium nitrate as soon as buds break
- 7. Finish pruning!!!
- 8. And then there's thinning...see Duane Greene's comments below. Pay no attention to what I said above in "The way I see it!"

#### Thinning Options (Duane Greene)

Warm weather arrived last week to rapid development of bloom. The stage of bloom may vary from pink to full bloom and in some cases petal fall. Regardless of the bloom stage, this is a very important time to start chemical thinning of apples. The weather forecast for the coming week appea generally favorable for thinning. I urge all to take advantage of this opportunity. This could

be one of the best opportunities to thin that you will have this year. Suggested thinner rates should be modified depending on how difficult it is to thin the variety in question.

#### Bloom

Bloom is a good time to start thinning. The earlier you start to adjust crop load the more influence you will have on return bloom. At this time you have at least two good options and two that are less popular.

- NAA -- I suggest applying NAA at 8 to 12 ppm. This is not a strong thinning treatment and based upon many years of experience it will not over thin, and in most years additional thinning will be needed.
- Amid-Thin -- Apply at 8 oz/100 gal. This is the highest rate allowed by the label. Do not apply less because you will be disappointed in the results. I am also suggesting using a good nonionic surfactant with this spray. This application will probably be insufficient by itself so a follow up thinner application will be necessary. Often carbaryl is applied a petal fall on trees treated with Amid-Thin a bloom.
- 6-BA (MaxCel, Exilis Plus) -- Apply 6-BA at 64 oz/100 gal. While there is minimal information to support good thinning with this treatment there are a number of good growers and some researchers that suggest this is a good spray to help improve fruit size. If temperatures are below 70° F I would suggest not to make this application.
- Caustic thinners -- Apply ATS (ammonium thiosulfate) or oil and lime sulfur at 80% bloom. While I expect few growers will not choose this option, the pollen tube growth model will be on the NEWA site next year. This will allow you to determine the optimum time to apply a thinner. I am very excited about this blossom thinning option, especially with oil and lime sulfur. It will be explained in detail in the off season. This will allow growers to be more precise when blossom thinning.

#### Petal Fall

There are a number of options available at petal fall. If you did not apply a bloom spray **make certain** that you do apply one at PF. In some instances application at both times may be appropriate.

- Carbaryl -- This is the most popular and most often-used thinner treatment at this time. Rates between 1 pint and 1 quart per 100 gal are generally used. In the majority of situations this spray alone will not be sufficient to thin most varieties. You will need to combine carbaryl with another thinner.
- Amid-Thin plus carbaryl -- Since Amid-Thin is a weak thinner it should be combined with another thinner, most frequently carbaryl. I recommend Amid-Thin at 8 oz per 100 gal with a surfactant plus 1 pint to 1 quart of carbaryl per 100 gal.
- NAA or NAA plus carbaryl -- NAA may be applied at petal fall at rates between 8-12 ppm. NAA at these recommended rates is not a strong thinner when use at this time. I also

recommend that addition of carbaryl with NAA to improve thinner efficacy. A petal fall spray of 12 ppm NAA plus 1 quart of carbaryl is an effective combination and is one of my favorite PF combinations. If the weather forecast holds as it is now, the weather will be favorable to achieve some useful thinning without the fear of over thinning.

• MaxCel -- This is not the ideal time to apply MaxCel. It is much more effective as a thinner when applied later (8-15 mm stage). See comments for bloom use.

The threat of rain is always present during chemical thinning season. If rain does occur after a thinner application has been made the question that is frequently asked is how much activity was lost? A rule-of-thumb that I use in circumstances such as this is "If the spray had an opportunity to completely dry then at least 80% of the potential thinning activity can be expected compared with a tree that did not receive the rain".

## Hawkeye's corner (notes from the field)

Liz Garofalo

**Pear psylla** are in a small lull for now. Eggs will begin hatching soon, scouting for early instar nymphs will aid you in making an effective insecticide application *if warranted*. Recall the "hardshell" stage is far more difficult to control, you are targeting young nymphs. Continue to keep your eyes peeled for adults in flight, oil is a viable egg laying deterrent all summer long (temperature dependent, of course).



Target psylla nymph stage, early instar (pictured above, note this nymph is *not* from this year and is only intended as an ID reference).

#### Winter moth update from Heather Faubert:

Eggs have all hatched! As usual, Heather has done a great job letting us know what is happening on this front. Click on the <u>link</u> for Heather's report which contains some exceptionally helpful pictures this week!

**Gypsy moth** are hatching, at least in Belchertown, where two ballooned their way down from the tops of the trees onto me. Not my favorite type of hitchhiker. But, they are still quite small and highly susceptible to Dipel or any other *Bacillus thuringiensis* material. Protecting young trees (and small fruits) from this voracious leaf and bud muncher is important, especially with the dry forecast we are looking at.



Gypsy moth aren't the only lepidopteran larvae rearing their ugly heads. **Oblique banded leafroller** (larvae pictured above) are beginning to chew on leaves. Adult flight will begin after this overwintering larval population has pupated. This will occur somewhere around 887 DD base 43°F.

**Apple scab** and **fire blight** forecast looks pretty tame for the rest of the week (phew!). There's about a 30% chance, according to <u>NOAA</u>, that we will see some rain over the weekend, but, we all know that this far out that's as reliable as... Well, I can't think of a comparison fit for print, so, fill in the blank as you see fit.

Weather for Belchertown, MA



More at Dark Sky

As far as apple scab goes this season, you'll have to admit, I have shown remarkable restraint in the amount of spore information I have included, so, I feel like I can get away with just this one... Each of the red arrows indicates an ungerminated apple scab ascospore. The red circle shows three that have germinated, literally overnight.



## **Guest article - 2017 Fire Blight Season Recap**

Kerik Cox, Plant Pathology and Plant-Microbe Biology & Juliet Carroll, NYS IPM Program, New York State Agriculture Experiment Station at Geneva Reprinted from <u>Scaffolds Fruit Journal</u>, Vol. 27, No. 7, May 7, 2018

The number and magnitude of fire blight outbreaks in NY was a little lighter than the previous years, but some growers still experienced losses due to fire blight. There were only two critical risk periods for blossom blight and these occurred around the 1st and 18th of May. In western NY, the risk period around the 1st of the May was of less concern given the cool weather at that time, but temperatures were warmer in eastern NY, increasing risks. While the period around the 18th of May represented "extreme risk for blossom blight", many sites were at or beyond petal fall, reducing the overall risk for some locations with early flowering cultivars.

In 2017, we received many fire blight samples for antibiotic resistance testing from the western NY and the Lake Champlain regions. Fortunately, no resistance to any antibiotics was observed in any of the samples. Shoot blight was the predominant type of sample received, and no places even reported blossom blight. It's important to note that low or even unnoticeable levels of blossom blight could have still been the source of the late season shoot blight outbreaks in 2017. As bloom is upon us in 2018, it will be important to keep track of the fire blight history in apple blocks, and, where fire blight history and scion / rootstock susceptibility warrant, to protect apples during high risk weather conditions during petal fall and shoot elongation.

#### **Present Season**

Currently, only orchards in the Hudson Valley have reached bloom with the sudden warm weather. Unfortunately, these experienced a period of high to extreme risk over the weekend with the first open flowers. Orchards in western NY may only begin to reach king bloom this week and may only be at low to moderate risk of infection when the weather warms on Thursday. Orchards in the Lake Champlain region are unlikely to reach king bloom this week. While there is risk of infection on Wednesday/Thursday with the high temperatures and rain, the risk should be somewhat tempered by the low numbers of open flowers. While regional extension specialists in the Hudson Valley are rightfully concerned about the risk of blossom blight infection over the weekend, the situation seems less dire in the other production regions of the state.

The warm in the middle of the week could boost inoculum levels, but several days in the mid-60s toward the end of the week will slow bacterial reproduction and reduce risk. However, the risk of fire blight may increase following week as temperatures are forecast to be in the 70s. In this regard, it will be important to watch forecasts, check the models, and follow extension specialists' alerts.

As you consider model outputs from NEWA or other forecasting models, here are some things to consider before making applications of antibiotics or other costly materials for blossom blight:

- Predictions and forecasts are theoretical. The theoretical models predicting disease risk use the weather data collected (or forecasted) from the weather station location. These results should not be substituted for actual observations of plant growth stage and disease occurrence determined through scouting or monitoring.
- 2. **Consider the history of fire blight in the planting.** If there was not fire blight the previous season or if you have never had fire blight, do not let excessive model predictions or extension alerts (including this article) "intimidate you" into applying unnecessary antibiotics each time an alert is released. Consider the timing of the last application and potential for material depletion as well.
- 3. Consider the age of the planting and the susceptibility of variety and rootstock. These factors play a large role in the development of fire blight. None of the models consider these factors. If you have a young planting of a highly susceptible variety, it may be more important to protect these blocks based on model predictions than a 15-year-old 'McIntosh' planting on resistant rootstocks, which may not warrant the same level of protection during bloom. A listing of susceptible cultivars and rootstocks is linked from the NEWA model page for fire blight.
- 4. The models only identify periods of weather that are favorable for infection. All wetting events are now color-coded light blue in NEWA to draw attention to the weather factors that promote bacterial ingress into the flowers. Despite words like "extreme" and "infection" colored in vibrant red, the models only predict favorable weather conditions. If favorable weather for infection is not predicted in the current forecast, if the apple variety is not highly susceptible, if there is no prior history of fire blight, and if the trees aren't being pushed into high vigor with nitrogen, the actual risk of fire blight infection may be low to non-existent.
- 5. Weather forecasts can vary and change daily. When this happens, the model predictions will change drastically, and the risk will change as well. Bacteria double about once every 20 minutes under optimal conditions; for fire blight bacteria this is warm (>60°F) wet conditions. The models use degree hours, not degree days, to accommodate the rapid growth rate of these pathogens. Check the fire blight predictions, especially those in the forecasts, frequently. The 1- and 2-day forecasts are the most reliable; those at 3-, 4- and 5-days are less reliable as predictors. NEWA uses the National Weather Service forecasts. Compare these to your favorite local weather forecast provider.

#### Status of antibiotic resistance in 2018

Despite extensive screening, streptomycin resistance has not been detected in NY for the last four years. If we keep practicing resistance management by rotating bactericides and antibiotics with limited use of streptomycin application after bloom, we may never experience outbreaks of streptomycin resistance as we had in 2011 to 2013. However, sending blossom blight or trauma blight samples for screening, when they occur after streptomycin applications, is the best approach for assessing the occurrence of streptomycin resistance in your operation.

Even in the absence of streptomycin resistance, fire blight can still be difficult to control if weather favors the pathogen. Moreover, the shoot blight phase of the disease can still present a considerable problem following an apparent success in blossom blight management. In this regard, we have continued to refine and update our guidelines for managing fire blight in NY with an emphasis on young plantings. The guidelines are broken up into three sections: general guidelines for season-long management, additional guidelines for new plantings, and guidelines for on-farm nursery production. Tables of fire blight susceptibility for popular cultivars and rootstocks are linked from the NEWA model page for fire blight.

#### General guidelines for season-long management.

- All fire blight strikes and shoots with larger cankers should be removed during winter pruning. Remove any trees where the central leader or main trunk has become infected. Infected wood should be removed from the orchard and either burned or placed where it will dry out rapidly. The fire blight pathogen can withstand cold temperatures, but is intolerant to drying.
- 2. Copper sprays should be applied at green tip. Processing varieties can be protected with copper as late as 1/2-inch green, depending on requirements of the label.
- 3. Although we've previously mentioned the new 2ee label for the use of Apogee at pink to mitigate spread of blossom blight into the shoot tissues, we are not recommending this use pattern as a standard practice for managing fire blight until we have a greater appreciation of the potential benefits and impacts on crop physiology. Growers using prohexadione Ca at pink for the purposes of training narrow fruiting wall plantings may have reduced risk of fire blight development following such applications.
- 4. During bloom, follow a blossom blight forecasting modeling system such as the ones offered in NEWA (<u>newa.cornell.edu/index.php?page=apple-diseases</u>), Maryblyt<sup>™</sup> 7.1 (<u>http://grapepathology.org/maryblyt</u>), or RIMpro (<u>http://www.rimpro.eu/</u>). Time applications during high risk weather only. If the operation rarely or has never had fire blight, it may not be necessary to apply antibiotic each time a high-risk period is forecast. Regardless of model predictions, it is rarely necessary to make more than three applications for blossom blight.
- 5. Begin antibiotic applications for blossom blight with a single application of streptomycin at 24 oz/acre. Consider including the penetrating surfactant Regulaid (1 pt/100 gal of application volume) in the first application to enhance the effectiveness of streptomycin. Regulaid would be especially beneficial when applied under rapid drying conditions. Regulaid can be omitted from subsequent applications so as to minimize the leaf yellowing that is sometimes associated with repeated applications of streptomycin. If later antibiotic applications are needed, streptomycin or kasugamycin (Kasumin 2L, 64 fl oz/A in 100 gallons of water) should be used. Consider making at least one application of Kasumin 2L for resistance the effectiveness of streptomycin or kasugamycin, contact the authors of this article to discuss the product failure and determine if it would be necessary to submit a sample for antibiotic resistance testing. The presence of shoot blight later in

the season isn't necessarily an indication that antibiotics applied during bloom failed due to resistance.

- 6. In the two weeks following bloom, scout for and prune out fire blight strikes promptly. Destroy pruned strikes by burning or leaving them out to dry. It is best to prune well back into healthy wood, at least 12 inches behind the water-soaked margin. Take care, as summer pruning may stimulate active shoot growth, leading to new susceptible tissues that could later become infected. If fire blight reaches the central leader, the tree should be removed. However, the spot in the orchard may be safely re-planted.
- 7. Preventive applications of prohexadione-calcium (Apogee or Kudos) for shoot blight should be seriously considered, especially on highly-susceptible apple varieties during shoot elongation beginning in late bloom.
  - Best results with prohexadione-calcium are often achieved by applying 6-12 oz/100 gal (3-6 oz/100 gal for tree <5 years) when trees have 1-2" of shoot growth. A second application should be made 14-21 days later.</li>
  - b. Programs where prohexadione-calcium is applied at low rates slowly over the period of active shoot growth are gaining popularity as a means of providing disease control and reducing impacts on tree productivity. Specific programs may vary slightly, but generally consist of three applications at 1-2 oz/100 gal on a 14-day schedule, beginning with early shoot growth in mid to late bloom. Take caution, as such programs have not been widely validated over many seasons and locations.
- 8. Preventive applications of copper can be used post-bloom and during the summer to protect against shoot blight infections. Copper must be applied before infection occurs, as it will only reduce bacteria on the surface of tissues. Copper will have no effect on existing shoot blight infections. Copper may cause fruit russet in young developing fruit. Apply with adequate drying time and use hydrated lime to "saften" copper. Terminal shoots can outgrow protective residues of copper. Hence, a low-rate fixed copper program consists of applications on a 7-10 day schedule during high risk weather until terminal bud set.
- 9. It may be possible to save plantings on resistant rootstocks that have a moderate amount of shoot blight. Apply a rescue treatment of prohexadione-calcium at the highest rate to the planting (6-12 oz/100 gal) and allow 5 days for the product to affect the tree. Afterwards, prune out existing and newly developing shoot blight every two weeks for the rest of the season. Remove any trees where fire blight has reached the central leader. If pruning seems to stimulate additional shoot growth, a second application of prohexadione-calcium could be warranted.
- 10. If you need to interplant apple trees in existing orchards where fire blight was observed, replant in late fall to better synchronize bloom with the established trees in the following season.

#### Additional guidelines for new plantings (1-2 years)

1. If possible, plant varieties grafted on fire blight-resistant rootstocks.

- 2. Trees should be carefully examined for fire blight infections before planting. Any infected trees should be discarded.
- 3. Immediately after planting, and 14 days later, a copper application should be made using the lower copper rates that are labeled for use after
- 4. green tip. Ensure that soil has settled to avoid phytotoxicity to roots.
- 5. Until we better understand the use pattern, it is not advisable to apply prohexadione Ca to young plantings.
- 6. Trees should be scouted at 7-day intervals for fire blight strikes until July 31st. Infected trees should be removed as described above. Plantings also need to be scouted 7-10 days after hail or severe summer storms. The NEWA fire blight disease forecast tool (newa.cornell.edu/index.php?page=apple-diseases) can assist by providing an estimate of symptom emergence following a storm or other trauma event. Also, scout the planting at the end of the season (mid-September).
- 7. If possible, remove flowers before they open. New plantings may have considerable numbers of flowers the first year, and blossom removal may not be practical. If practiced, the blossoms should be removed during dry weather and before a lot of heat units have been accumulated, because both factors contribute to higher risk of fire blight infection.
- 8. Trees should receive an application of copper at a stage equivalent to bloom. Observe the labeled REI before blossom removal.
- 9. To protect any remaining bloom, follow the chemical management program for your regions of streptomycin resistance risk.

#### Guidelines for on-farm nursery production

- 1. Collect budwood from orchards where fire blight is not established or from a neighboring farm without fire blight.
- 2. Limit streptomycin and kasugamycin applications to 2-3 per season. These should be timed according to a disease forecast prediction or CCE alert.
- 3. When fire blight pressure is high and shoots are actively growing, apply copper at the lowest labeled rate to prevent shoot blight.
- 4. Before conducting tree management tasks in the nursery, apply a copper product at the lowest labeled rate and observe the labeled REI.
- 5. Any pinching or leaf twisting should be practiced on dry sunny days with low relative humidity, after the REI of a copper application has expired.
- 6. When working in the nursery, field workers must wear clean clothing, and should wash hands and disinfect working tools often.
- 7. If fire blight is found in the nursery, completely remove the infected trees including the root system, and place them in trash bags between rows. Subsequently, remove the culled trees from between the rows and discard them. Under no circumstances should infected trees be pulled between nursery rows when trees are wet, otherwise fire blight may be spread down the rows.

- 8. Maintain weed control through cultivation. Apply registered post-emergence herbicides using a shielded boom. There are some residual herbicides registered for use in nurseries.
- 9. When trees have reached the desired height, consider applying the lowest labeled rate of Apogee (1-2 oz/100 gal) to slow growth and reduce susceptibility to shoot blight.
- 10. Manage nitrogen levels to balance tree growth and fire blight susceptibility.

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Bear Swamp Orchard & Cidery Yesterday at 7:54am · @ •••

Still snow in the orchard a week and a half ago, but with this warm weather things are starting to pop! Plum blossoms opening, and tight cluster on Williams Pride apple. We also got in the last of this years plantings in.



Peter Mitchell and 22 others

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## **Useful links**

UMass Fruit Advisor: http://umassfruit.com

Scaffolds Fruit Journal: http://www.nysaes.cornell.edu/ent/scafolds/

Network for Environment and Weather Applications (NEWA): <u>http://newa.cornell.edu</u>

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Acimovic Lab at Hudson Valley

#### Peter Jentsch's Blog

The next Healthy Fruit will be published on or about May 15, 2018. In the meantime, feel free to contact any of the UMass Fruit Team if you have any fruit-related production questions.

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