



Healthy Fruit, Vol. 27, No. 6, May 14, 2019

Jon Clements, Author (unless otherwise noted) and Editor



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CURRENT DEGREE DAY ACCUMULATIONS

UMass Cold Spring Orchard, Belchertown, MA	13-May
Base 43 (NEWA, since March 1)	348
Base 50 (NEWA, since March 1)	142



CURRENT BUD STAGES

Current bud stages. May 13, 2019, UMass Cold Spring Orchard, Belchertown, MA

				
McIntosh apple Bloom +	Honeycrisp Bloom	Bartlett pear Bloom to petal fall	Redhaven peach Petal fall	Regina sweet cherry Bloom

More 2019 bud stages [here...](#)



UPCOMING PEST EVENTS

Coming events	Degree days (Base 43)
European red mite egg hatch complete	368 to 470
Green fruitworm flight subsides	267 to 499
Lesser appleworm 1st catch	276 to 564
Lesser appleworm 1st flight peak	364 to 775
Oriental fruit moth 1st flight peak	331 to 533
Pear psylla 1st egg hatch	174 to 328

Redbanded leafroller 1st flight peak	232 to 382
Spotted tentiform leafminer 1st flight peak	267 to 405
Spotted tentiform LM sapfeeding larvae present	343 to 601
Spotted tentiform leafminer mines forming	367 to 641
White apple leafhopper nymphs on apple	302 to 560
McIntosh bloom	344 to 415



UPCOMING MEETINGS

May 15 (Wednesday). Fruit Twilight Meeting, Red Apple Farm, 455 Highland Ave., Phillipston, MA. 5:30 PM. Light supper will be served. 1 Pesticide recertification credit. No pre-registration necessary, however, \$20 meeting fee for pesticide credit will be collected.

May 16 (Thursday). Fruit Twilight Meeting, Sweet Berry Farm, 915 Mitchell's Lane, Middletown, RI. 5:30 PM. Light supper will be served. No pre-registration necessary, however, \$20 meeting fee (except for RI and MA Fruit Growers' Assoc. members) will be collected. In cooperation with RI Fruit Growers' Assoc. And URI Extension.



THE WAY I SEE IT

Wash. Rinse. Repeat. (Should I add shiver? Turn the heat on?) Have we had enough yet? Not really sure what to say except this has been one of the most frustrating springs. Best laid plans out the door? Pollen Tube Growth Model? They aren't growing fast. Bloom thinning? Sounded like a good idea back in March. Insect problems? What insects? (Although Oriental fruit moth have been caught in pheromone traps in fair abundance.) Why don't we check in next week when -- dare I say it? -- the forecast calls for much warmer temperatures. Maybe something will actually be happening by then? In the meantime, we are having FRUIT TWILIGHT MEETINGS this week! I expect Duane Greene will address post-bloom thinning at Red Apple Farm on Wednesday evening, May 15. Al Rose has also promised a good feed and maybe a keg? At

Sweet Berry Farm in RI on Thursday, May 16, Massachusetts growers are invited to join Rhode Island growers. Hope to see many of you at one of the twilight meetings.



NEW ENGLAND TREE FRUIT MANAGEMENT GUIDE

The New England Extension tree fruit specialists -- which include myself, Dan Cooley, Jaime Pinero, and Elizabeth Garofalo at UMass. Mary Concklin at UConn, Heather Faubert at URI, Terry Bradshaw at UVM, George Hamilton and Anna Wallingford at UNH, and Glen Koehler and Renae Moran at UMaine -- have officially launched, and updated for 2019 -- an online edition of the **New England Tree Fruit Management Guide**. Note that it is 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:

<http://netreefruit.org>. Finally, if you really, really want a printed version, order here:

<https://www.umassextensionbookstore.com/products/29>.



INSECTS

Jaime Pinero

Plum curculio (PC) activity update.

Two experiments are currently underway at the UMass CSO. The first one involves screening of plant volatiles for attractiveness to PC using black pyramid traps. Similar to what was reported last week, PC captures have been very low.

The second field study involves validation of the trap tree approach for direct PC management. On 13 May, 12 trap trees were baited with benzaldehyde and grandisoic acid (PC aggregation pheromone) in a 2.5-acre block. A full-block insecticide spray will be applied by the time of petal fall. Subsequent sprays targeting PC will be restricted to trap trees only. For 2019, we will conduct these evaluations in 5 blocks (3 in MA and 2 in NH).

Oriental Fruit Moth (OFM) and Codling Moth (CM) activity update.

OMF captures continue to be comparatively high, despite the cool weather (41 OMF were captured in a pheromone baited trap over a 2-day period [10 + 11 May]).

The first CM of the season was captured in a pheromone-baited trap on 10 May. This corresponded to 135.4 DD (base 50), accumulated since 1 January. DD models predicted first catch at 150 DD (base 50). If you are monitoring for CM, remember to check traps twice a week and begin accumulating DD (base 50) after sustained catches in pheromone traps (biofix). First insecticide applications should be made at ~250 DD (base 50) after biofix.

European Apple Sawfly (EAS) activity update.

Over the course of the past week, 4 EAS adults were captured in 6 white sticky cards. Some of these cards have been baited with plant volatiles as part of an experiment that is being carried out.

As a reminder, EAS overwinters as a mature larva in a cocoon a few centimetres below the soil surface. The larva pupates in the spring and adults emerge during the pink stage. Eggs are laid on the calyx end of developing fruit. The first instar larvae tunnels just under the epidermis of the fruit, resulting in the typical ribbon-like scar (primary injury). These apples usually remain on the tree, and the presence of the scars at harvest can reduce fruit value. There is only one generation per year. **EAS damage occurs more frequently when bloom time is extended and petal fall insecticide applications are delayed.**



EAS adult on an apple blossom. Picture: edenkert.hu

I just finished spraying and the rain started. Do I have to spray again?

(based on '*rainfast characteristics of insecticides on fruit*' by Dr. John Wise, Michigan State University)

Growers often question whether an application they have made will be effective if rainfall occurs too soon after the application. But what is too soon? Is it one hour, 4 hours, 24 hours? Rainfall occurring after application can have a significant effect on the residual activity and efficacy of

pesticides. A pesticide's rainfastness, or its ability to withstand rainfall, is an important factor affecting the efficacy of foliar-applied pesticides. Generally, it is best to avoid pesticide application when rainfall is likely; however, weather can be unpredictable, so it is best to choose a product with good rainfast characteristics. Factors that can influence the impact of precipitation on the performance of insecticides are:

(1) The plant-penetrative attributes of the various compounds. Some pesticide chemistries, like organophosphates, have limited penetrative potential in plant tissue, and thus are considered primarily as surface materials. Some compounds, such as carbamates, oxadiazines and pyrethroids, penetrate plant cuticles, providing some resistance to wash-off. Many newer compounds, such as spinosyns, diamides, avermectins and some Insect Growth Regulators (IGR), readily penetrate plant cuticles and have translaminar movement in leaf tissue. Others, like the neonicotinoid insecticides, are systemic and can have translaminar (moves from top surface to bottom of leaf) as well as acropetal movement in the plant's vascular system (moves from center to growing tips of leaves). Penetration into plant tissue is generally expected to enhance rainfastness of pesticides.

(2) Inherent toxicity of an insecticide to the target pest and the persistence of the compound in the environment. In some cases, a compound may be susceptible to wash-off, but its environmental persistence and inherent toxicity to the target pest compensates for the loss of residue, thus delaying the need for immediate re-application.

(3) Amount of precipitation. In general, organophosphate insecticides have the highest susceptibility to wash-off from precipitation, but following light rainfall their high field-rate toxicity to most target pests overcomes the necessity for immediate re-application. Neonicotinoid insecticides are moderately susceptible to wash-off with residues that have moved systemically into plant tissue being highly rainfast, and surface residues less so. Carbamate, IGR and oxadiazine insecticides are moderately susceptible to wash-off and vary widely in their toxicity to the range of relevant fruit pests. Diamide, spinosyn, avermectin and pyrethroid insecticides have proven to be moderate to highly rainfast on most fruit crops.

For most insecticides, a drying time of two to six hours is sufficient to "set" the compound in or on the plant. With neonicotinoids, for which plant penetration is important, drying time can significantly influence rainfastness. For neonicotinoids, up to 24 hours is needed for optimal plant penetration, thus the time proximity of precipitation after application should be considered carefully. Spray adjuvants, materials intended to aid the retention, penetration or spread on the plant, can also improve the performance of insecticides.

For additional information, consult the original article here:

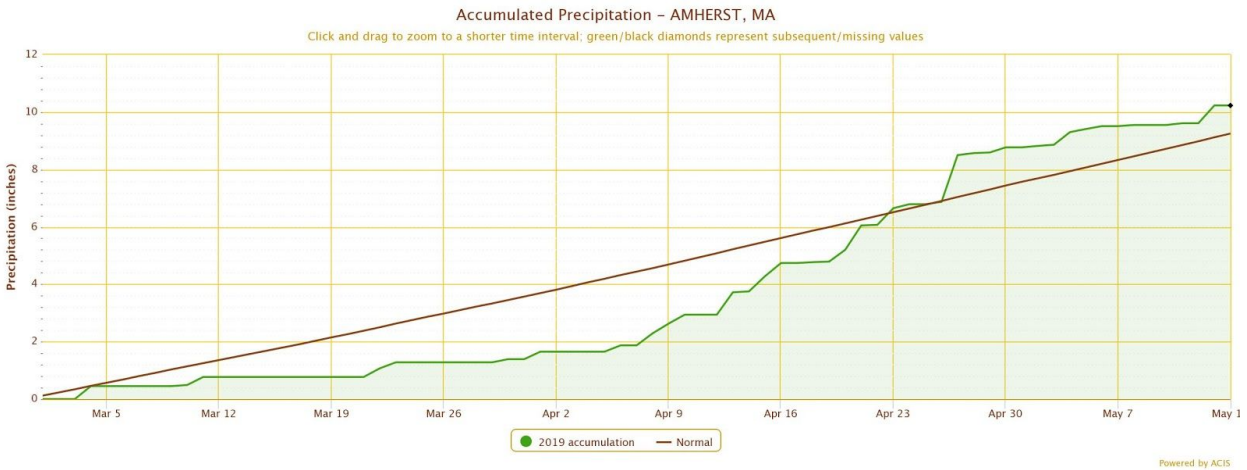
https://www.canr.msu.edu/news/rainfast_characteristics_of_insecticides_on_fruit



DISEASES

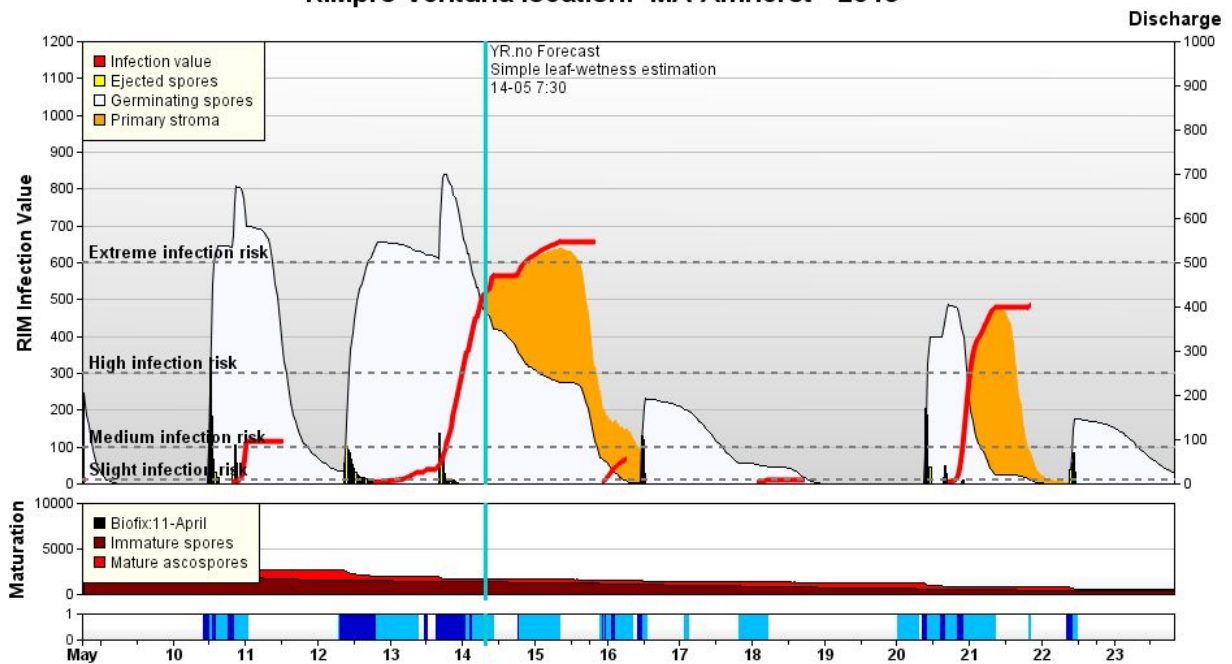
Liz Garofalo

Apple scab like every year seems to be dragging on. Spore counts are low this week, but, that is to be expected after all the rain we had over the weekend. No big surprise, we are seeing more rain this year (green line) so far than the historical average (brown line). In Amherst, we are up about an inch, although this varies immensely by location!



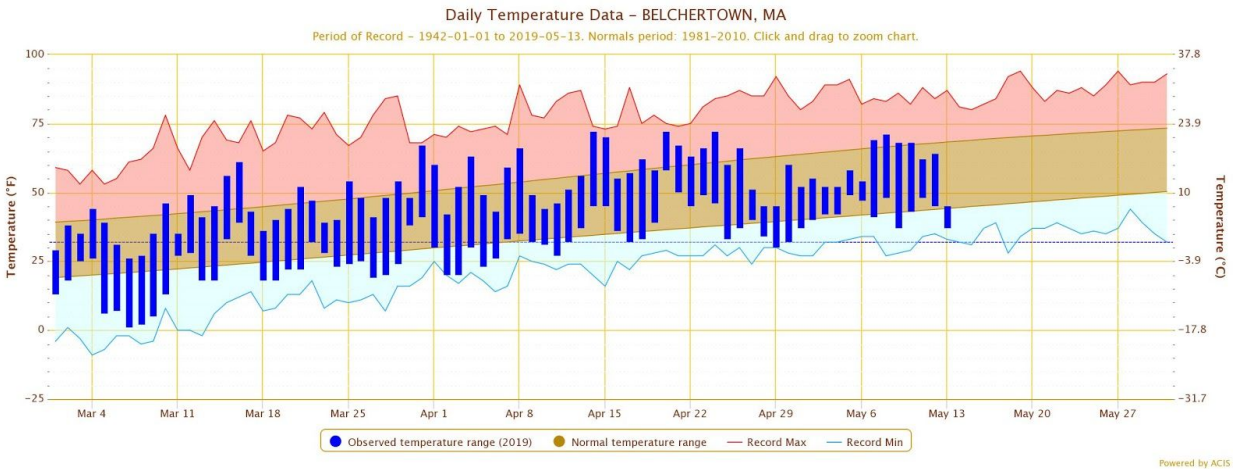
We are in the middle of yet another infection event. Today's date is indicated by the vertical blue line in the graph below:

RIMpro-Venturia location: MA-Amherst - 2019



The best news here, though, is that we are in the tail end of primary scab season. There are likely to be two more estimated significant infection events for Massachusetts, but, the light is at the end of the tunnel.

Fireblight, much like proper May weather, so far, is a bit of a no show this year. Full bloom across most of the region has come, and in some cases passed. The on up side of this weather is that the bacterium have not had much opportunity to get onto flower's stigma, let alone build up population levels there.



Average, maximum and minimum temperatures for Belchertown, MA May 1 through May 13. The tan bar represents the average temperature range, the upper red line daily maximum extreme and the lower blue line daily minimum extreme. Until today, we have been seeing fairly “normal” temps over the last week. Record maximum temperature for May 13 was 87°F, in 1947. Last year, on this date, maximum temperature was 63.2°F, with a minimum of 52.1°F.

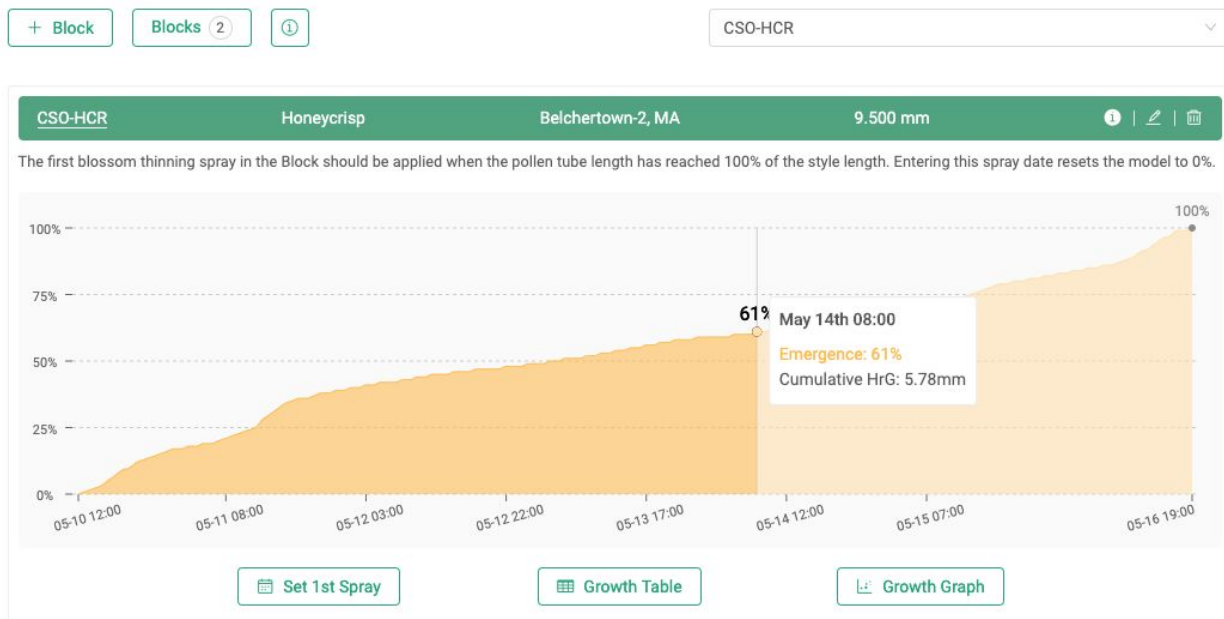


HORTICULTURE

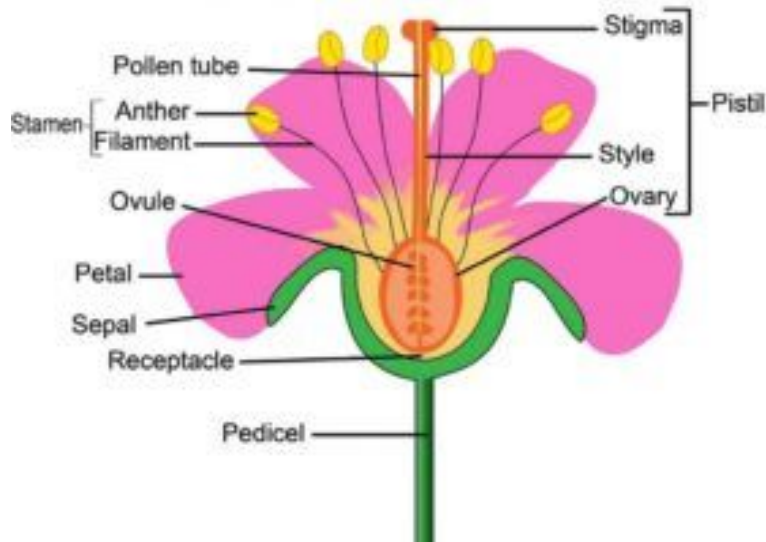
Pollen Tube Growth Model???

Jon Clements

I have been looking at the [Pollen Tube Growth Model \(PTGM\) on NEWA](#) to try to track a bloom thinning application to Honeycrisp at the UMass Orchard. Below is what it looks like as of this Tuesday morning:



Explanation. I think. Model was started last Friday, May 10 approximately when Honeycrisp was in nearly full king bloom and pollination weather was good. Flowers were being pollinated. Pollen tubes started growing. (See parts of a flower, below.) The darker yellow shaded portion of the graph estimates the pollen tube growth rate. This is mostly (exclusively?) a function of hourly temperature. (You need a NEWA weather station to use the PTGM.) OK, so on May 14 at 8 AM (this morning) it shows Emergence at 61%. (Not sure what that means, trying to get clarification on that. It may be just another way of saying the following.) It also says pollen tubes are just shy of 6 mm length at this time. I should mention I measured the style lengths last Friday and they averaged just under 10 mm, which is the length the pollen tube(s) would have to grow to fertilize the flower/ovary and initiate fruitlet development, right? So, I got a few days to go -- right now it says for those flowers that were opened and pollinated last Friday (or so) they should be setting fruit on Thursday and at that time I can spray with lime sulfur and kill all the remaining styles/pollen tubes that have not reached the ovary. Conventional wisdom says to apply a caustic bloom thinner -- like lime sulfur, but remember, it's only labeled for disease control, like scab -- at 80% bloom, which is about now. Of course the weather has been very unfavorable for such a course of action! But, circumstances favorable, I do plan to apply lime-sulfur (for scab control of course!) this Thursday or Friday to Honeycrisp, and maybe this weekend to Goldrush.



Parts of an flower, from:

<https://www.toppr.com/guides/biology/anatomy-of-flowering-plants/flower/>

Chemical thinning during the coming week - flip a coin!

Duane Greene

The weather the past couple of week has been challenging. Trees in most orchards are now entering a stage of physiological development when we normally start our chemical thinning program. Under most circumstances growers try to select times to make applications when weather favorable for thinning follows application. The problem with this “wait for better weather window” is that it may not come for some time and in the intervening time fruit continue to grow and size. I am suggesting that you make take one of two approaches.

1. Take the traditional approach and wait for more favorable weather to come. The weather forecast in the short term is not favorable but starting this weekend there is promise of improving weather. Be prepared to act then. If the weather persists and remains on the cool side then more aggressive measure will be required to get adequate thinning. Until fruit reach about 6 mm over thinning is less likely especially under cool conditions. My concern is that you may keep waiting for better weather which may not come or if it does come it may not come until the fruit have grown so large that thinning may be a challenge. How much faith do you have in the accuracy of a weather forecast over 3 days in advance?
2. The second approach is not intuitive but it is one that is worth considering. Apply thinners regularly and at a moderate rate as fruit grow. If applications are made during time when weather is not ideal then over thinning is most unlikely. However, persistence will results in some thinning activity. As this season is unfolding it appears to me that multiple applications of thinners may be required to achieve adequate thinning.

Waiting to make a thinning decision is not necessarily a choice. I call it procrastination. If you make the choice of waiting, give yourself a time limit. The weather is supposed to warm to the upper 60s to 70 this weekend. If it does not then option 2 above, in my opinion, is your only prudent choice.

What thinner(s) should you consider using now?

- MaxCel - all thinners with the *exception* of MaxCel can be considered. MaxCel especially appears to require warm temperature following application to be effective and its use as a petal fall spray has been very disappointing.
- Amid-Thin - Amid-Thin is a mild thinner that is frequently used at bloom and petal fall. It is a mild thinner even at the highest rate allowed and when applied during favorable weather, so carbaryl should be included with a petal fall spray.
- NAA - NAA is an excellent choice to use now. Under the weather conditions we are currently experiencing the 10 to 12 ppm rate is considered an appropriate rate. Consider including carbaryl with NAA.
- Ethrel - recently I have been recommending the use of Ethrel as a blossom or petal fall spray at 300 to 400 ppm. Under the cool conditions that we are experiencing now it is not a strong thinning treatment and it may help with return bloom.
- Carbaryl - when used alone at petal fall under weather conditions that we are now experiencing it may be only slightly more effective as a thinner than spraying water alone on your trees. Include carbaryl with either NAA or Amid-Thin.



SMALL FRUIT UPDATE

Sonia Schloemann

2019-2020 New England Small Fruit Management Guide: available online at - <http://ag.umass.edu/fruit/ne-small-fruit-management-guide>. Print copies are also available \$16 plus shipping by ordering from your state's Extension Office or by going to <https://www.umassextensionbookstore.com/products/108>.

NEWA: New Berry Models - **NEWA** has incorporated a new **Blueberry Maggot** degree day model and will soon be introducing one for **Cranberry Fruitworm**. Strawberry models for **Gray Mold** and **Anthraxnose** are also being added.

CROP CONDITIONS: Strawberries: Cool weather has slowed progress but early varieties of June-bearers are coming in to bloom. Fields with low-lying areas or with poor drainage are suffering from excess soil moisture. See last week's update for some thoughts on protective actions against root diseases (especially **Red Stele**), possible need to re-apply herbicides, and possible need for light fertilization to make up for nutrient leaching from so much rain. Frost

seems unlikely in the 10-day forecast but fields should be set up for protection just in case. Begin scouting fields for [Strawberry Clipper](#) and [Tarnished Plant Bug](#). Spray applications can be made prior to bloom but should be suspended during the bloom period to protect pollinating insects. [Botrytis Gray Mold](#) infections can occur on open blossoms even in cool conditions. Fields with a history of infection will be more at risk than new fields or fields with low overwintering inoculum. Be ready to apply fungicides at 10% bloom in moderate-high risk fields regardless of weather. [Bacterial Angular Leaf-Spot](#) may begin to show up during or after bloom, too. This cold wet weather is conducive to its development. Well time copper applications can help protect fruit calyx tissue, but over application can lead to phytotoxicity. Copper hydroxide formulations may be more effective than copper sulfate formulations. Actigard® has also shown some ability to reduce infections by stimulating plant defences. **Brambles:** Shoot growth is beginning to even out in some fields, reaching 5"-6". No blossom tissue is visible yet. Some fields continue to show significant winter injury with dieback or very uneven shoot growth. As mentioned last week, this may even out with time or may eventually show that there is some vascular damage that will be more apparent when there's more foliage or a fruit load on the canes. Time will tell. Some foliage is showing off coloration, likely due to poor nutrient uptake in cold soils. No insect activity has been reported this week, due to the cold temperatures. Where fertilizer applications were already made, it may be necessary to re-apply to make up for nutrient leaching from all the rain. The same is true for herbicide applications, depending on the materials that have been used. See label instructions for guidance on the need for reapplication. **Blueberries:** Early varieties are in full bloom and others range from late pink to early bloom. Bloom set seems very heavy this year. Augment native pollinators with honey bees (1-3 hives/acre) or bumble bees (1 hive/acre) to achieve good fruit set. Bumble bees are better pollinators than honey bees for blueberries (long story), and also are better adapted to working in these cool, cloudy, rainy conditions. One complication is that [Gypsy Moth](#) is showing up in some areas. First or second instar caterpillars are being seen in apple and blueberry plantings. They are tiny now but can do a lot of feeding and can do significant damage to blueberry bloom. Hot spots with heavy infestation may need to be treated with a bee-safe option such as B.t. IGRs (e.g., Confirm) can also be used but should be applied late in the day to minimize bee exposure. Mummy berry [shoot strikes](#) are visible now and suppressing sporulation from these infections is key to protecting fruit from the second stage of this disease. See the [New England Small Fruit Management Guide](#) for recommended materials and rates.



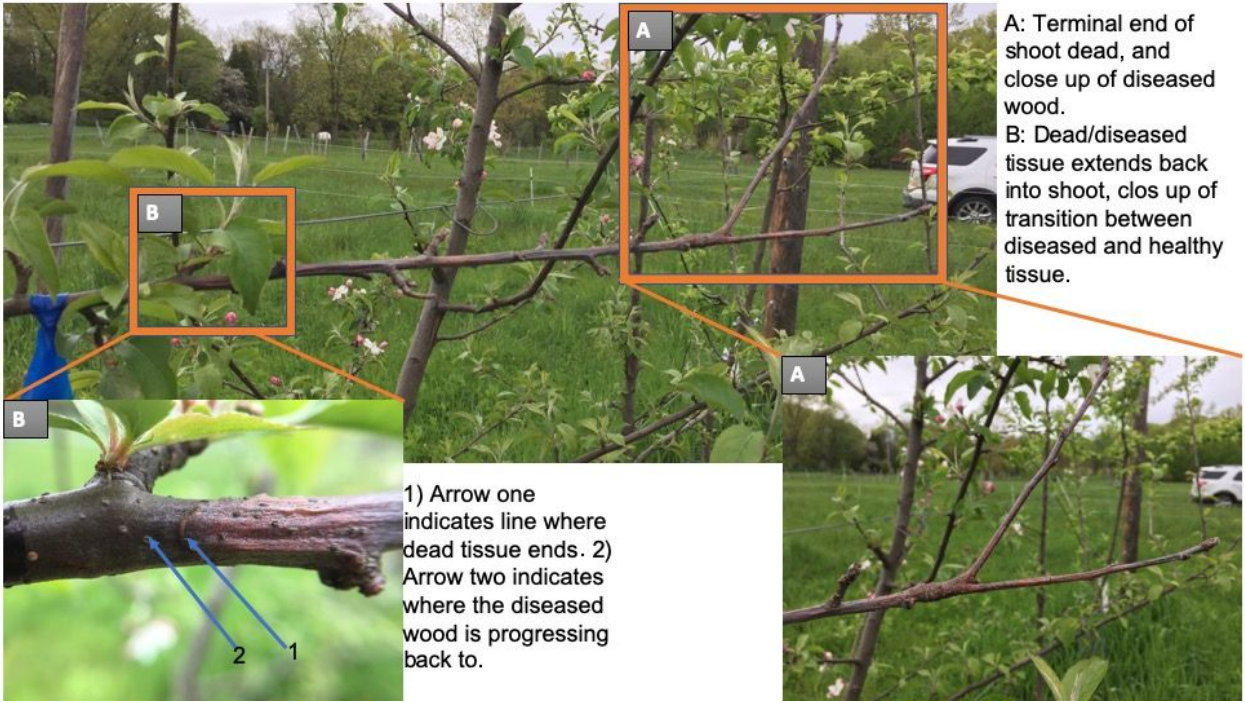
Berry Bud Stages 5/13/19 - from left; Strawberry flower trusses pre-bloom, middle left; 6" shoot growth on red raspberry showing some interveinal chlorosis, middle-right; blueberry full bloom, right; bumble bee hive in blueberry field.



HAWKEYE'S CORNER (notes from the field)

Liz Garofalo

Mystery apple disease cropping up in multiple locations... Currently, there are samples in the diagnostic lab for analysis. Stay tuned!





GUEST ARTICLE

Srdjan Acimovic, Plant Pathology and Plant-microbe Biology, Cornell's Hudson Valley Lab, Highland, NY. Reprinted from [Scaffolds Fruit Journal](#), Vol. 28, No. 8, May 13, 2019.

Apple blister spot is a bacterial disease that affects fruit and leaves. It is caused by a Gram-negative bacterium, *Pseudomonas syringae* pv. *papulans*. During the growing season, this pathogen is very likely present in most of the apple orchards as an epiphyte – i.e., living on the surface of leaves, flowers and fruit. It survives over the winter in apple buds, in leaf scars and on diseased fruit left on the orchard floor. Blister spots lead to economic damage by impacting the fruit cosmetic quality, thus preventing it to be sold for a top price on the fresh fruit market. Yield weight is not reduced but the fruit can only be sold for juice, severely reducing the profits. The most affected cultivars are 'Mutsu' ('Crispin'), 'Fuji' and 'NY-1', where 'Mutsu' is extremely susceptible, but other cultivars such as 'Golden Delicious', 'Red Delicious', 'Cortland', 'Gala' and 'Jonagold' are also susceptible to this disease, but much less than 'Mutsu'. Other cultivars can get infected, usually when planted near the infected trees of 'Mutsu', which serve as the inoculum source ('Idared', 'McIntosh', 'Rome Beauty'). The pathogen is spread by rain and insects. Blister spot infections are favored by frequent rains during bloom (which is currently the case this spring in the Hudson Valley) and continuing into mid- to late June, when the fruit have developed stomata. Fruit start being susceptible when stomata first form on them. If the weather is rainy during bloom and for several weeks after petal fall, almost 100% of 'Mutsu' fruit can be infected.

Blister spot symptoms usually express first around 2 to 3 months after petal fall. This bacterium has also been found to maintain its populations on the leaf, flower and fruit surfaces of other apple cultivars, as well as on the leaves of some orchard weeds such as dandelion, clover, quackgrass, leafy spurge and common mallow. Young 'Mutsu' fruit are highly susceptible to infections for roughly 6 weeks, starting from around 14–17 days after petal fall, and stay susceptible for 4–5 weeks more; i.e., until stomata on fruit have developed into lenticels. Afterwards, the fruit lenticels are no longer susceptible to infections.

The best control can be achieved by spray applications of streptomycin, with the first application made at 10–14 days after petal fall, and two additional spray applications made at weekly intervals after the first one, especially if more rains have occurred. If the first application is made too late, efficacy is not guaranteed. It is essential not to apply more than 2–3 sprays of streptomycin in total for this disease. Summer sprays of streptomycin are NOT recommended, except after a hailstorm, so as not to promote antibiotic resistance in *Erwinia amylovora* and *P. s. pv. papulans*. Dilute sprays are highly recommended to secure good leaf and fruit coverage where populations of *P. s. pv. papulans* reside and multiply. It is recommended to mix

streptomycin with Phostrol or StarPhite or Aliette WDG (fosetyl-AI) in these applications. Use of streptomycin must be reserved only for the years with very favorable conditions for blister spot, stated above, primarily to avoid development of streptomycin-resistant strains of *P. s. pv. papulans*, which have been detected in the past. Resistance to this antibiotic can be quickly acquired by *P. s. pv. papulans* and lead to antibiotic-control failures. Resistance can emerge in only a few years after consecutive antibiotic use. Monitoring of *P. s. pv. papulans* populations for streptomycin resistance emergence is highly recommended to prevent this problem from increasing. On farms where no resistant strains of this pathogen are detected, use of this antibiotic is an option, especially after recent history of the disease. In the classic planting systems, where other less susceptible cultivars are interplanted with or are near 'Mutsu', the disease can spread to these other cultivars. In spring, a 2–4 lb Kocide per 100 gal (or other copper formulation equivalent spray), from green tip and 1/2-inch green bud growth stage, may reduce the overwintering populations of *P. s. pv. papulans* that can emerge from overwintering pockets and overall effect some small degree of control. During pink bud, petal fall and early cover sprays, application of Aliette WDG or phosphorous acid; i.e., phosphite materials (e.g., StarPhite, Phostrol, ProPhyt) can reduce infections.



Blister spot on Mutsu apple and foliage

(<https://articles.extension.org/pages/60624/blister-spot-of-apple>)



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Franklyn Carlson 1977 we had 1 foot of snow. Full bloom, good crop.

Like · Reply · 12h

👍 2



Rosie Leger



Like · Reply · 7h



Jon Clements Yup, it could be worse I suppose...

Like · Reply · 1m



Write a comment...





USEFUL LINKS

[27th Annual March Message \(2019\) to Tree Fruit Growers \(Google Doc\)](#)

UMass Fruit Advisor: <http://umassfruit.com>

Scaffolds Fruit Journal: <http://www.nysaes.cornell.edu/ent/scaffolds/>

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

Follow me on Twitter (<http://twitter.com/jmccextman>) and Facebook (<http://www.facebook.com/jmccextman>)

[Acimovic Lab at Hudson Valley](#)

[Peter Jentsch's Blog](#)

The next Healthy Fruit will be published on or about May 21, 2019. 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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