



Healthy Fruit, Vol. 28, No. 9, May 19, 2020

Prepared by the University of Massachusetts Amherst Extension Fruit Team

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Current degree day accumulations

UMass Cold Spring Orchard, Belchertown, MA (Since January 1)	18-May
Base 43 BE (NEWA, since January 1)	419
Base 50 BE (NEWA, since January 1)	180

According to the NEWA Degree Days prediction, by Monday, May 25, we will have reached 542 DD's Base 43 BE. McIntosh apple petal fall should occur 439-523 DD's Base 43 BE.

Current bud stages

Current bud stages. 18-May, 2020, UMass Cold Spring Orchard, Belchertown, MA

				
McIntosh apple Early petal fall +	Honeycrisp apple Full bloom	Crispie pear Bloom-petal fall (variable)	Redhaven peach Petal fall	Rainier cherry Petal fall

Note: this will probably be the last Current bud stages update for 2019... :-)

More 2020 bud stages [here...](#)

Upcoming pest events

Adapted from [Scaffolds Fruit Journal](#)

Coming events	Degree days (Base 43 BE)
Codling moth 1st catch	395-562
European red mite egg hatch complete	368-470
Green fruitworm flight subsides	258-496
Lesser appleworm 1st catch	276-564
Lesser appleworm 1st flight peak	364-775
Oriental fruit moth 1st flight peak	330-530
Predator mites observed	211-402
Spotted tentiform leafminer 1st flight peak	267-405

White apple leafhopper nymphs on apple	302-560
McIntosh petal fall	439-523

Upcoming meetings

UNH Tree Fruit Webinar for Commercial Orchardists. Wednesday, May 20. 5:30 - 7:30 PM.

Topics will include a Tree Fruit Disease Update, a tutorial on Apple Thinning Decision Making, your comments and questions addressed, and much more on how producers are Responding to COVID-19, including up-to-date guidance on Pick-Your-Own in our region.

NH Pesticide Applicator Credits are pending. [Pre-registration](#) is required to earn credit.

<https://extension.unh.edu/events/tree-fruit-webinar-commercial-orchardists-0>

Wednesday May 20 at *6pm* - UMass Veg & Fruit Teams co-sponsored Zoom Twilight Meeting

Grower forum on Marketing Adaptations in light of COVID19

What changes have you made or are you considering for your farmstand, market, CSA, or PYO? What is working, and what still needs to be worked out? We'll hear from a few farms who have made some of these changes, and help to answer your questions and brainstorm solutions.

Register to get the sign-in info here:

<https://umass-amherst.zoom.us/join/register/tJUkdOygpjojG9JM5eSlxaPH3...>

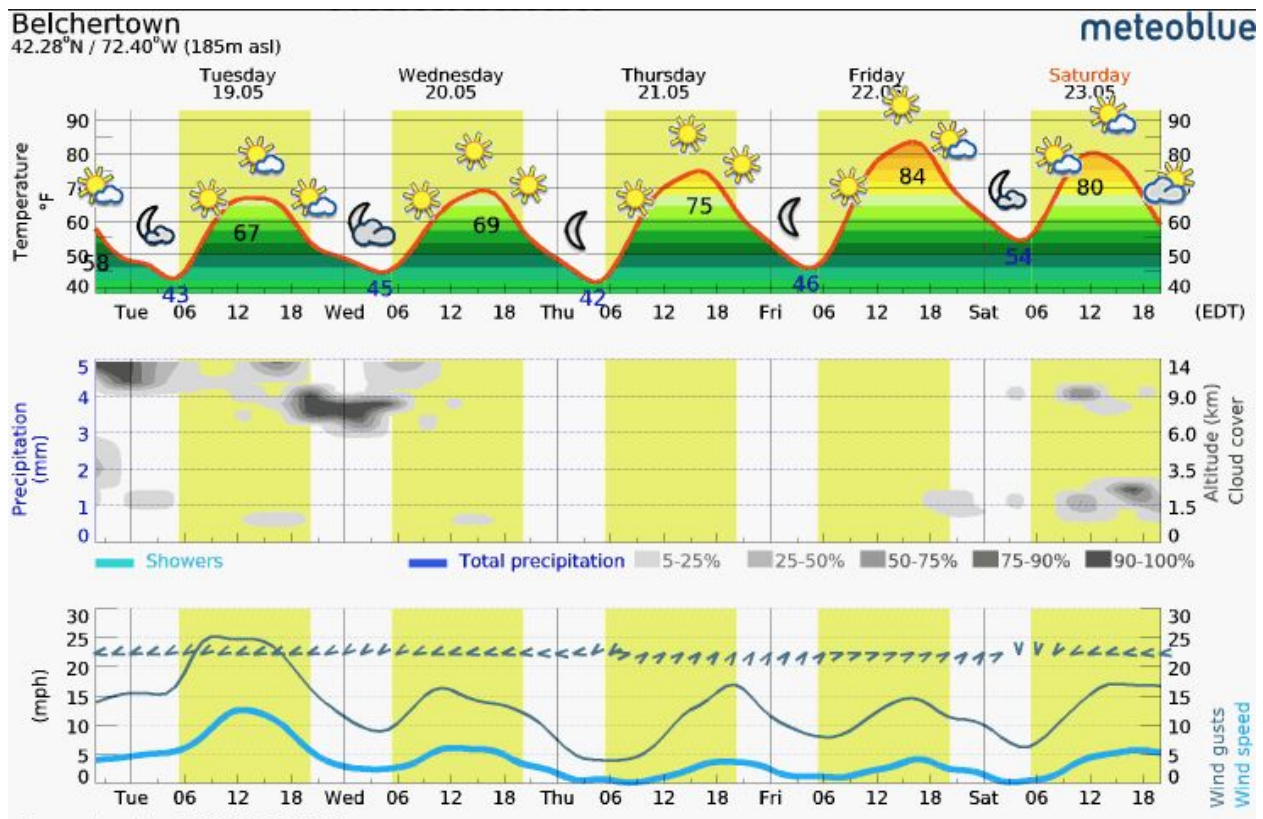
May 21 - June 30, 2020: Seven webinars focusing on the impact, monitoring, and management of invasive insects in Massachusetts. Topics include the spotted lanternfly, spotted wing drosophila, brown marmorated stink bug, emerald ash borer, gypsy moth, Asian longhorned beetle, and more! Webinars will be held from **Noon-1:00 PM** on [May 21](#), [May 28](#), [June 4](#), [June 9](#), [June 16](#), [June 23](#), and [June 30, 2020](#). Details coming soon!

The way I see it...

Jon Clements

I really don't have much to say except relax a bit and enjoy the fine weather we have coming. We deserve it. By the end of the week we will have a better idea how bloom went and our minds

can truly turn to chemical thinning. But see Duane Greene's (and mine) comments below on this subject. Scab and fire blight risk are LOW. Plum curculio are waiting on the horizon...



Rarely are there no blue bars on the Precipitation chart!

Insects

Jaime Piñero

Weekly report of insect pest captures in monitoring traps at CSO (Belchertown, MA)

[Period: 5.12 - 5.18](#)

As shown in the table below, insect activity was not as high as we would have expected given the comparatively warmer temperatures that prevailed on 5.15 (max air temp = 78.4 degrees F) and 5.16 (max air temp = 70.9 degrees F). It seems that petal fall will take place without reaching temperatures that are conducive for high insect activity. Codling moth has not been captured yet in pheromone traps deployed at the UMass Cold Spring Orchard, and RBLR densities are winding down.

Insect	Average captures/trap	Notes
RBLR	1	Pheromone-baited trap
OFM	29	Pheromone-baited trap
CM	0	Pheromone-baited trap
Spotted tentiform leafminer	20	Pheromone-baited trap
Tarnished plant bug	0.08	Unbaited white sticky cards
European apple sawfly	0.17	Unbaited white sticky cards
Plum curculio	1.0	Odor-baited black pyramid traps

Farmscaping: Sunflowers provide multiple benefits to growers

Cultivated sunflowers, *Helianthus annuus*, are native to North America and include 50 species in the genus *Helianthus*. Sunflowers are a good rotational crop and can provide multiple benefits to fruit and vegetable growers. For example, sunflowers support birds, add beautification to the farm, and can generate extra income. Below I provide a brief overview of some of the additional benefits that sunflowers can provide to fruit and vegetable growers.

Farmscaping is a whole-farm ecological approach to pest management—particularly for insects. It refers to the arrangement of plants used for economic purposes (cash crops) and insectary plants used for food and habitat for beneficial insects.

An article on **Farmscaping**, of relevance for fruit producers, will be written over the summer.

SUNFLOWERS PROVIDE POLLEN AND NECTAR TO BENEFICIAL ARTHROPODS INCLUDING POLLINATORS AND PARASITOIDS AND PREDATORS OF INSECT PESTS.

Based on field-scale research, sunflowers are listed in many extension factsheets and other such publications as excellent plants to attract beneficial insects in addition to those known to be important pollinators. In a study conducted in Florida, researchers reported that beneficial insects observed on sunflowers and nearby crop vegetation (within 1 yard of sunflowers) included predatory insects and spiders, parasitic wasps, and important pollinators. The authors

concluded that sunflower plantings may be an effective way to attract beneficial insects into cropped fields. They also attract pest-patrolling birds!

Examples of beneficial insects visiting sunflowers and other insectary plants



Lady bug



Minute pirate bug



Big-eyed bug



Tachnid fly



Hover fly



Lacewing



Soldier beetle



Assassin bug



Predatory wasps



Parasitic wasps

SUNFLOWER AS A TRAP CROP FOR THE BROWN MARMORATED STINK BUG (BMSB).

Management options for the BMSB continue to be based on timely applications of broad-spectrum insecticides. The wide range of plant species that BMSB uses for feeding and reproduction, when coupled with the aggregation behavior of BMSB along borders as it invades a crop has been exploited by investigating the use of trap crops as a management tactic.

Trap crops are plants that are planted next to a higher value crop so as to congregate the pest in trap crops where they can be easily attacked by natural enemies and/or killed by insecticides. By using trap crops farmers can: (1) lessen pesticide use and decrease costs, (2) preserve the pests' natural enemies, (3) improve crop quality, and (4) help conserve the soil and the environment.

Research conducted in Pennsylvania, Georgia, and other regions of the USA showed that sunflower is a very attractive trap crop plant for BMSB. The successive planting of sunflowers with a second trap crop such as sorghum can extend the period of attractiveness of trap crop

plantings to BMSB. Since the trap crop will be most effective when it begins to flower or seed, it is important to establish it earlier than the desirable crop.

Sunflower and sorghum are very attractive to several species of stink bugs and leaf-footed bugs. Both trap crops are inexpensive to establish from seed.

This summer, we will conduct a small study at the UMass Cold Spring Orchard to demonstrate the attractiveness of sunflower, sorghum, pearl millet, and buckwheat as trap crops of BMSB and other insect pests.

SUNFLOWERS PLAY A SIGNIFICANT ROLE IN REDUCING PATHOGENS THAT CAUSE DISEASES TO BUMBLEBEES.

Pollinators are threatened by numerous stressors including pathogens and inadequate food. Parasites and pathogens have been implicated in the declines and even disappearance of bee species, including bumble bees. While flowering strips are increasingly planted to increase pollinator abundance and diversity in agricultural settings, some flowering plant species come with a risk of increased pathogen infection in pollinators.

Recent research conducted by Dr. Lynn Adler (UMass Amherst) and collaborators have shown that when bumblebees eat sunflower pollen, the levels of infection by pathogens are dramatically and consistently reduced. When they compared the effects of nine sunflower cultivars, and four wild sunflower populations, they found that all pollen types dramatically reduced a gut parasite of the bumblebee. The authors suggest that *“given consistent effects of sunflower in reducing pathogens, planting sunflower in agroecosystems and native habitat may provide a simple solution to reduce disease and improve the health of economically and ecologically important pollinators.”*



Photo credit: Ben Barnhart

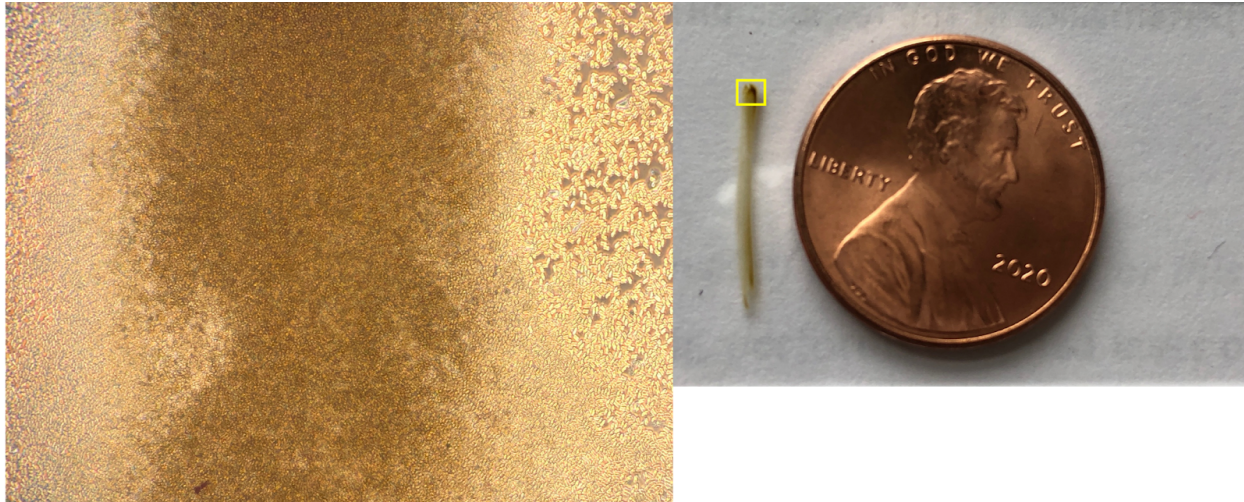
Diseases

Liz Garofalo and Dan Cooley

Apple Scab weekly update:

	Ascospore Observation Method and Spore Count		
Date	Petri Plate Assay	Funnel Trap	Total Count
3/31/20	0	0	0
4/7/2020	0	21	21
4/14/2020	1	0	1
4/20/20	162	117	279
4/28/20	95	44	139

5/5/20	89	1421	1510
5/12/20	259	5275	5534
5/18/20	205	Too many to count	205

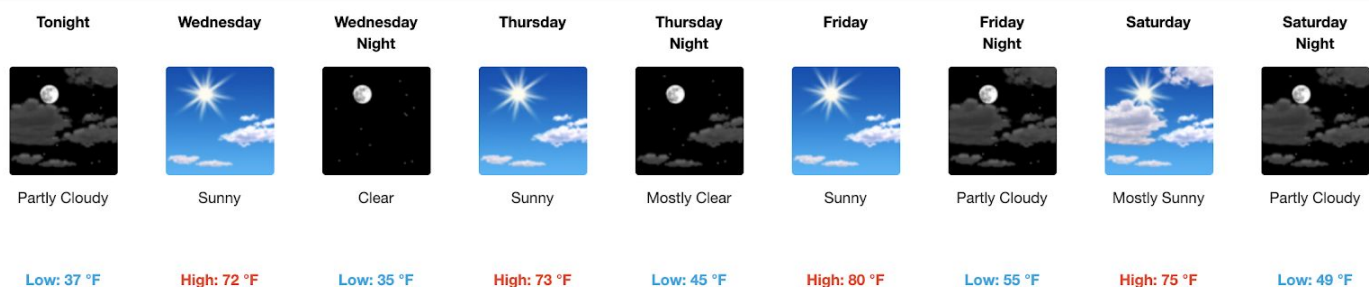


Left: 200X magnification of a microscope field of view containing tens of thousands of spores. The dark section in the middle of the photo of spores is a literal mountain of apple scab ascospores, and physically impossible to count. Right: iPhone photo of the slide from the funnel trap used to assess ascospore maturity. The yellow/brown line is all the ascospores deposited on the slide, visible to the naked eye due to the high density of spores. If you were to quarter that tiny yellow square in the photo of the trap slide, and quarter it again, one of those sections would still be larger than the area covered by the spores seen in the left photo. Photos taken 5-18-20.

Hopefully, this picture gives you some sense of just how much inoculum is currently available to eject when the next rain comes along. This is not 100% ascospore maturity (ASM). NEWA currently estimates ASM at 97% in Deerfield, 95% in Belchertown and 98% in East Bridgewater. **Bottom line**, there is an enormous amount of inoculum in an orchard with a history of scab, and plenty of susceptible tissue to infect. To quote Dan from last week's Healthy Fruit: "The SDHIs alone (Aprovia, Fontelis, Sercadis), the Qols (Flint, Sovran), or pre-mixes of both (Luna Sensation, Merivon, Pristine) are not only very good against scab, but will pick up mildew and rust..."

That being said, there is not a drop of rain in the forecast from Pittsfield to East Bridgewater.

Extended Forecast for Belchertown MA



Fire Blight. While temperatures have nudged up and entered into the range needed for fireblight bacteria to grow, moisture requirements may or may not be met sufficiently to cause infection. RIMpro is suggesting flowers that opened on May 14 and 15 were infected but symptoms won't be evident until beyond the current model forecast (so, into June). RIMpro does not estimate new infections coming up in the current fireblight risk forecast. In NEWA, both the CougarBlight and Infection Potential EIP Value are low or moderate (respectively) for the next two days. Both models suggest increased risk for May 22, 23 and 24. Clear as mud, right?

Bottom line, if you have open bloom, or blossoms yet to open, keeping a strep application at the ready may be wise.

Horticulture

Thinning Recommendations for May 19, 2020

Duane Greene

Most orchards in Massachusetts should be at some stage of bloom. The weather forecast for the coming week is favorable for bee activity and fertilization of flowers. If you have not applied a thinner yet, I strongly urge you to consider a petal fall application. The options that you have available are essentially the same that appeared in last week's recommendation. If you have had little or no frost, repeat bloom is strong and the weather remains favorable during most of the bloom period then a petal fall thinner application takes on special importance.

Petal Fall Thinning Options

NAA. This is a workhorse thinner for this time of year. I recommend application at 10-12 ppm. It may be applied alone at petal fall but to get additional thinning, application with carbaryl is recommended. In my estimation this is the best option you have available now to achieve meaningful thinning.

NAD. This is an underused thinner that is very safe (will not over thin). For those who are nervous about applying petal fall thinners, NAD would be a good choice. It is not as potent a thinner as NAA. As with NAA it may be applied alone or in combination with carbaryl. You

should apply this at 50 ppm, the highest rate allowed on the label. If you use a lower rate you will probably be disappointed in the thinning results. If your orchard has a good return bloom and very little or no frost damage then the addition of carbaryl to the NAD is suggested.

Carbaryl. This has been the standard thinner used in New England for many years. It is considered a mild thinner which leads to its popularity. With very few exceptions, carbaryl should not be the only thinner orchardist should depend upon to single-handedly do all thinning on a variety. We recommend using between 1 pt and 1qt per 100 gal for thinning. Carbaryl is unusual among chemical thinners in that the thinning response is concentration independent. This is significant in that the insecticidal rate of carbaryl, commonly used for plum curculio control, is 1.5 to 3 qt. per acre. Therefore, if you increase the rate of carbaryl you apply at petal fall to the insecticidal rate it will have essentially no additional thinning activity beyond that which you would expect from the usual lower thinning rate of 1 pt to 1 qt per 100 gal. Carbaryl is very toxic to bees. It should not be applied until petal fall, after the bees have been removed from the orchard.

Effective chemical thinning is aided by favorable weather. Of course, we can't predict what the weather will be later in the thinning season. However, we can take advantage of favorable weather when it presents itself during specific windows of opportunity. It appears now that petal fall may be one of those golden opportunities you can and should take advantage of.

My current thoughts on chemical thinning at petal fall (addendum to Duane Greene's comments)

Jon Clements

I've been listening to a lot of thinning advice lately, most notably a webinar last week out of the Hudson Valley where Terence Robinson advised on his thoughts. In bullet list form, I am going to tell you what I think is important to note as a result of my soaking it in...

- Frost/freeze damage? If less than 40% of kings are damaged, and lateral flowers are undamaged, proceed with chemical thinning as normal. If more than 40% of kings are damaged, but lateral flowers are mostly undamaged, thin with lower rates. If flower damage is >75%, no chemical thinning, just plan on hand thinning. I don't think too many are in the latter category, and in fact, most have no damage. Proceed as below.
- Petal fall thinning/return bloom spray, when bees are out of the orchard is important. As Duane alludes, NAA (Fruitone, Pomaxa, Refine) and carbaryl (Sevin) are the gold standard. I don't like PPM, so I will say a rate of 4 oz. per acre NAA plus 1.5 qt. carbaryl per acre (it's cheap) should be the standard and I don't see any reason not to apply unless you have significant frost damage to apple flower buds. The NAA will also help initiate the return bloom process in Honeycrisp and other biennial varieties.

- Timing the petal fall spray should coincide with complete petal fall, but also 100 to 150 DD's (Base 39 F. from bloom) seems to be optimum. For Belchertown, the [Apple Carbohydrate Thinning Model](#) result on NEWA shows the UMass Orchard in Belchertown hitting this mark from May 22-24. Of course make sure bees are out of the orchard and most petals are off the trees before applying carbaryl.
- The Apple Carbohydrate Thinning Model result on NEWA shows the UMass Orchard in Belchertown having a very modest carbohydrate deficit upcoming during this time period, and in fact says to increase the chemical thinner rate by 30%. BUT, the model is not overly helpful until fruits approach 10 mm, so for now just use the above recommended rate of NAA and carbaryl. It does suggest the timing, however, is good for activity of these petal fall thinners. BTW, makes sure you use the v2019 of the [Apple Carbohydrate Thinning Model](#).

Advice on the 10 mm thinning stage will be upcoming in next week's Healthy Fruit when the Apple Carbohydrate Thinning Model is more useful. And we will see by then what's happening with the weather and apparent fruit set. Good luck out there...

Chemical Thinning Options

- Bloom
 - Ammonium Thiosulfate (ATS)
 - Lime Sulfur and Oil
 - Promalin
 - Maxcel
 - NAA
 - Amide-Thin
 - Regalia
- Petal Fall (fruits at 5-6mm)
 - Sevin
 - AmideThin
 - Maxcel + Sevin
 - NAA + Sevin
 - Maxcel + NAA
- Fruits at 11-13 mm
 - NAA + Sevin
 - Maxcel + Sevin
 - Maxcel + NAA
- Fruits at 15-20 mm
 - NAA + Sevin
 - Maxcel + Sevin + Oil
 - Ethrel + Oil

Best chemical thinning options are highlighted in [Blue](#) (courtesy Terence Robinson)

Small Fruit Update

[Sonia Schloemann](#)

PYO Update: MDAR has released their **PYO Guidance Bulletin** this week. To see the full text click [here](#). The UMass Fruit and Vegetable Teams are co-sponsoring a discussion forum on

[Marketing Adaptations in the Covid-19 Era](#) tomorrow on May 20th at 6:00pm (also, see details above in the Upcoming Meetings section).

Crop Conditions: Cold weather in the last week (temperatures falling to the low-mid 20°Fs at ground level in some areas), has caused damage in several crops. The full extent of damage may not be fully apparent for a few days as tissue begins to degrade. To assess the extent of damage check both open and unopened flowers to see if there has been damage. Several crops are in or approaching bloom which is a key time for disease and insect damage. Blueberries and raspberries can be fertilized now. Wait until post-harvest to fertilize strawberries.

Strawberries: June-bearing fields are growing rapidly now with the warmer weather. Frost damage has likely occurred in many places across the state on open blossoms and also on unopened buds. Many healthy blossoms remain though, so harvest may not be greatly impacted. We may not be out of the woods for frost so keep vigilant for another week or so. Fields approaching bloom should be scouted for [Strawberry Bud Weevil](#), [Tarnished Plant Bug](#) and [Two-spotted Spider Mite](#). Bloom is the most important time to protect against [Botrytis Gray Mold](#) and [Leather Rot](#). With all the water put out in the fields for frost protection (in addition to rain events), the possibility is high for trouble with [Bacterial Angular Leaf Spot](#). Avoid further wetting of the canopy if at all possible between now and harvest. New Fields are being planted.

Raspberries: Summer bearing varieties are showing good lateral growth now with flower clusters beginning to expand. New primocane growth is getting to be 8"-10" in height. Watch for evidence of [Raspberry Fruitworm](#), [Tarnished Plant Bug](#) and [Two-Spotted Spider Mites](#) (especially in high tunnels). As fields move into bloom, [Botrytis Gray Mold](#) is the main disease of concern. For raspberries in high tunnels [Powdery Mildew](#) is also a major concern.

Blueberries: There may have also been some damage to blueberry blossom tissue in some areas. Blueberries can take slightly colder temperatures plus they are higher off the ground which helps keep them away from the coldest air. Damage is difficult to assess until around petal-fall when damaged tissue is easier to see. As fields enter bloom, now is the time to set out pheromone traps for [Cranberry or Cherry Fruitworm](#). Protection against fruit rot diseases like **Botrytis** and **Anthracnose** is also important during bloom.

For management recommendations for any of these insect pests or diseases, refer to the [2020 New England Small Fruit Management Guide](#) for materials and rates.



Figure 1) Strawberry row fully leafed out prior to blossom extension (left); Newly planted strawberry field (center); 'Prelude' raspberry pre-bloom (right). **Photos:** S. Schloemann, UMass Extension 5/15/20



Figure 2) 'Double Gold' Raspberry new cane growth @ 8-10" (left); Blueberries in early bloom (center); Bumble bee hive in blueberries (right). **Photos:** S. Schloemann, UMass Extension 5/15/20.



Figure 3) Gooseberry early fruit set (left); 'Rovada' red currant fruit set (center); 'Balsagard' Lingonberry pre-bloom (right). **Photos:** S. Schloemann, UMass Extension 5/15/20.

Hawkeye's corner (notes from the field)

Liz Garofalo



No big surprise, European apple sawfly (EAS) is on the move and likes cider apples as much as I do. Or, in this case dual purpose. This EAS is exploring a GoldRush blossom. Dare I say... Take a moment to enjoy the sun, things are mostly quiet, for now.

Guest article

'OrchardWatch' Weather Monitoring Grid at UMass Orchard

Daniel Cooley, Jon Clements, Paul O'Connor, and Lyndsey Ware

OrchardWatch is our vision to use remote sensors in an effort to gather as much environmental and visual data as possible at the UMass Orchard in Belchertown, MA. We hope to get a "feel" as to how the orchard trees might be responding to varying environmental stimuli. Using these sensors will give farmers more micro-climate/micro-space information to base management decisions on - leading to more targeted and effective management decisions. For example, a block surrounded by trees may have a longer wetting period than one on the top of an open hill because it takes longer to dry. This may make a difference in terms of managing apple scab. Another scenario; degree days may vary significantly enough that insect development will also vary in different blocks. We don't *know* this, but the primary goal of this project is to figure it out!

In order to *figure it out*, we've installed a total of nine "weather stations" over the past eight months (September 2019 through April 2020) using Onset Computer Corporation hardware and their Hobolink software to monitor "weather" conditions across 50 acres of the UMass Orchard. (Special thanks to Jim Krupa, Research Technician, for assistance with all the installations.) We are calling this our "Weather Monitoring Grid" component of OrchardWatch. There are two Onset RX3000 logging base stations dubbed "OrchardWatch-North" and "OrchardWatch-South", and seven Onset Hobonet Field Monitoring System "motes." At each of the nine locations, the Weather Monitoring Grid measures the following environmental conditions:

- Air temperature, relative humidity and dew point at six feet (degrees F.)
- Rainfall (inches)
- Wetness (%)
- Solar radiation (W/m²)
- Wind speed (including gust speed) and direction
- Soil temperature (degrees F.)
- Soil moisture (volumetric, m³/m³)

These weather data are logged every five minutes and reported to the Hobolink cloud service (hobolink.com) every 10 minutes via cellular data transmission. Hobolink login provides configuration options and public data access:

OrchardWatch-South: <https://hobolink.com/p/28ce970fb2430a7eb547758bc6f4aa95>

OrchardWatch-North: <https://hobolink.com/p/bd2fa7ebce71003581f2f184ee0b6c12>

Both these sites are also on NEWA, the Network for Environment & Weather Applications:

http://newa.cornell.edu/index.php?page=weather-station-page&WeatherStation=ma_beow

http://newa.cornell.edu/index.php?page=weather-station-page&WeatherStation=ma_bown

Future plans include installing cameras at each location to capture real time orchard phenology and sky conditions. Cameras might even be able to see pest activity as if one were actually scouting in the orchard. We will investigate machine learning and statistical analysis tools to help develop and improve upon various models such as disease, pest pressure, tree growth and health, etc.

For more information and/or to request weather data, contact Daniel Cooley (dcooley@umass.edu), Jon Clements (jmcext@umass.edu) or Paul O'Connor (proconnor@umass.edu).



Orchard Watch Weather Monitoring Grid at UMass Orchard, Belchertown, MA



Onset RX3000 base station



Onset Hobonet "mote"

Facebook Me

No Facebook Me this week...

Useful links

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

[UMass Extension Fruit Team YouTube Channel](#)

[UMass IPM Fruit Loop Podcast](#)

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 26, 2020. In the meantime, feel free to contact any of the UMass Fruit Team if you have any fruit-related production questions.

Thank you sponsors...



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[New England Vegetable & Berry Growers' Association](#)



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