

Healthy Fruit, Vol. 27, No. 9, June 4, 2019

Jon Clements, Author (unless otherwise noted) and Editor



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CURRENT DEGREE DAY ACCUMULATIONS

UMass Cold Spring Orchard, Belchertown, MA	3-June
Base 43 (NEWA, since March 1)	694
Base 50 (NEWA, since March 1)	348



UPCOMING PEST EVENTS

Coming events	Degree days (Base 43)
Black stem borer 1st flight peak	617 to 915
Codling moth 1st flight peak	566 to 986
European red mite summer egg hatch	737 to 923
Lesser appleworm 1st flight peak	364 to 775
Lesser peachtree borer 1st catch	476 to 668
Pear psylla 1st summer generation adults	737 to 885
Redbanded leafroller 1st flight subsides	609 to 893
San Jose scale 1st flight peak	560 to 763
Spotted tentiform leafminer 1st flight subsides	680 to 944
White apple leafhopper 1st brood adults 1st catch	679 to 1041



UPCOMING MEETINGS

Fruit twilight meeting, Tuesday, June 11, 2019. 5:30 PM. Bashista Orchards, 160 East Street, Southampton, MA. 2 pesticide recertification credits. Light supper served, no pre-registration necessary, \$20 registration collected at the door. Meeting stars and UMass

Amherst Faculty Autio, Cooley, and Pinero will speak on current horticulture, disease, and insect management. Extension Educators Clements, Schloemann, and Garofalo co-star.

Fruit twilight meeting, Wednesday, June 12, 2019. 5:30 PM. Tougas Family Farm, 234 Ball Street, Northboro, MA. 2 pesticide recertification credits. Light supper served, no pre-registration necessary, \$20 registration collected at the door. In cooperation with University of Rhode Island Extension and Rhode Island Fruit Growers' Association. Meeting stars and UMass Amherst Faculty Autio, Cooley, and Pinero will speak on current horticulture, disease, and insect management. Extension Educators Clements, Schloemann, Garofalo and Faubert (URI) co-star.

July 10 (Wednesday). Massachusetts Fruit Growers' Association Summer Meeting. Sholan Farms, 1125 Pleasant Street, Leominster, MA



THE WAY I SEE IT

June is the beginning of summer. Can we breathe a sigh of relief? Maybe. Things look pretty good, fruit set is modest to very good, I am seeing the effects of petal fall and later chemical thinners at the UMass Orchard in Belchertown. That job should be done -- although there is a quickly closing window to get one more chemical thinner on now -- to be followed by hand thinning ASAP where warranted. Peach hand thinning can begin pretty soon. Codling moth insecticides should be applied soon if CM is a problem. Plum curculio pressure should remain high for another week or two. Newly planted trees should be pruned and trained such to protect the growth and stature of the central leader. That's about it, I am headed out to the CT Pomological Society Meeting this evening (June 4) and hope to see many of you at the Fruit twilight meetings next week, it has been an interesting spring and I am sure there is a lot to talk about.



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 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: http://netreefruit.org. Finally, if you really, really want a printed version, order here: https://www.umassextensionbookstore.com/products/29.



Jaime Pinero

Spotted Wing Drosophila (SWD) Update

As reported in the May 21st issue of *Healthy Fruit*, on May 17th the first SWD of the season was found in a monitoring trap baited with diluted grape juice (at the UMass Cold Spring Orchard). More SWD have been caught (single specimens) in other locations but, so far, <u>NO SUSTAINED SWD CAPTURES</u> have occurred. The table below shows the dates and locations where SWD have been found in monitoring traps as of June 4th, 2019.

DATE	Location (host plant)	Lure/bait	Male SWD	Female SWD	Other Drosophilids
May 17 th	Cold Spring Orchard	Scentry SWD lure	0	0	57
	(cherry)	AlphaScents lure	0	0	74
		Diluted grape juice	0	1	0
May 29 th	Deerfield (cherry)	Scentry SWD lure	0	0	350
		AlphaScents lure	0	0	966
		Diluted grape juice	0	1	101*
May 29 th	Whately (non-host plants	Scentry SWD lure	0	0	676
	nearby raspberry)	AlphaScents lure	0	0	478
		Diluted grape juice	0	1	176 <mark>*</mark>
June 3 rd	UMass campus	Scentry SWD lure	1	0	66
	(elderberry)	AlphaScents lure	0	0	150
		Diluted grape juice	0	1	9

^{*}Traps are serviced twice a week, whenever possible. But on this occasion traps were serviced after one week; thus, some fermentation of grape juice took place, which attracted more non-targets.

The 1-2-3 Approach to SWD Management

1. MONITORING

A monitoring program for susceptible crops is recommended. Commercial lures are available. Research being conducted at UMass has shown that Concord grape juice diluted at a 1:3 ratio

(e.g., 2 ounces of grape juice in 6 ounces of water) performs well at capturing the first SWD of the season. The trap needs to be hung on a plant, stake, or trellis 3–5 ft. or feet above the ground, on the most shaded / coolest side of the plant canopy.

2. CULTURAL PRACTICES

Cultural controls are practices that reduce the establishment, reproduction, dispersal, and survival of immature SWD.

<u>Sanitation</u>: Fruit should be harvested frequently and completely. Culled fruit should be removed from the field and either frozen, "baked" in clear plastic bags placed in the sun, or disposed of off-site.

<u>Canopy management</u>: Prune plants to maintain an open canopy. This may make plantings less attractive to SWD and will improve spray coverage. Previous research showed SWD is driven by temperature and relative humidity, preferring wet, humid weather to hot and dry. SWD activity decreases at temperatures above about 86°F, and egg laying ceases at 91°F. SWD also doesn't do well below 20% relative humidity. Research conducted in Michigan revealed that opening up the canopy helped reduce the level of infestation in tart cherries by 40%, in the absence of any insecticides.

3. INSECTICIDE SPRAYS

No action threshold is available for SWD. Consequently, recommendations are to make weekly application of effective insecticides once fruit starts changing color. Researchers have been evaluating numerous insecticides to identify the products that provide effective SWD control while reducing negative impacts to non-target organisms including pollinators. A number of registered conventional insecticides have shown to be effective against SWD in recent trials by Michigan State University researchers. Insecticides with fast knockdown activity such as the organophosphate Malathion*, the pyrethroids Asana (esfenvalerate), Danitol (fenpropathrin), Mustang Max (Zeta-cypermethrin), and Brigade (bifenthrin), and the spinosyns Delegate and Entrust (organic) have performed best.

Researchers from Michigan State University (Van Timmeren and Isaacs) have documented that spinosad (Entrust) and Spinetoram (Delegate) consistently performed as well as some pyrethroids such as Zeta-cypermethrin (Mustang Max). Malathion also showed good performance. Most insecticides lost efficacy after rainfall, and one of the exceptions was Zeta-cypermethrin (Mustang Max). Efficacy of most treatments was reduced greatly after exposure to just over 2 cm of rain. By one week after treatment adult mortality was not significantly different from the untreated controls for most insecticides that had been exposed to rain.

*While effective at suppressing SWD, malathion degrades with UV light, therefore increasing the rate could help mitigate the effects of environmental degradation of this insecticide.

The table below was extracted from the New England Small Fruit Management Guide, for use in highbush blueberries.

IRAC	
4A	Assail 30 SG 4.0-6.9 oz (1)
3	*Asana XL, 4.8-9.6 0z (14)
3	*Bifenture 10DF, 5.3-16.0 oz (1)
3	*Brigade WSB, 5.3-16.0 oz (1)
15,4A	Cormoran, 20 oz (8)
3	*Danitol 2.4EC, 10.6 oz (3)
5	Delegate WG, 6 oz (3)
28	Exirel, 13.5-20.5 (3)
3,4A	* Hero, 4-10.3 oz (1)
1B	Imidan 70 W, 1 1/3 lb (3)
1A	*Lannate 90, 0.5 - 1 lb (3)
3	*Mustang Max, 4.0 oz (1)
3A	⊘ Pyganic 1.4EC, 32-64 oz (0)
15	Rimon 0.83EC, 20-30 oz (8)
3,4A	* Triple Crown, 6.4-10.3 oz (3)
5	
UN	

IRAC=Insecticide Resistance Group, FRAC=Fungicide Resistance Action Group.
*Restricted use pesticide; pesticide applicators license required.



(UN) unknown mode of action

Brand names for chemicals is for informational purposes only. No endorsement is implied, nor is discrimination intended against products with similar ingredients. Please consult pesticide product labels for rates, application instructions and safety precautions. Users of these products assume all associated risks.

For resistance management do not make more than two sequential applications of insecticides in the same IRAC group.

Got Codling Moth (CM) and/or Oriental Fruit Moth (OFM)?

I hope not! But if you happen to come across fruit or other tissue infested by these Lepidopteran pests, please let me know (text: 808-756-2019, jpinero@umass.edu). We need to collect as many larvae of CM and OFM as possible for two reasons: (1) as part of a research project led by Penn State, we will compare levels of resistance of CM to Altacor in field populations of CM in the Eastern US - baseline levels of susceptibility were determined around the time when Altacor was first commercialized, which will be used as a comparison for current populations, and (2) to initiate colonies in our lab, for future research. Thanks!



Liz Garofalo and Dan Cooley

Apple scab

According to the NEWA apple scab model forecast for Amherst, MA 100% ascospore maturity was reached on May 26, and all spore were essentially discharged on May 17. We are still, however, trapping (very few) spore in the lab from this location. This all lines up rather nicely with the scab forecast from RIMpro which estimates the final significant primary event for Amherst to have occured on May-13, 14, and 15. It is interesting to note that RIMpro shows a few- very few- ascospore still around, much like what we have found in the lab this week. In terms of practical application, what this tells me is that primary scab season is effectively over. Anywhere infections, which you should be seeing by now, were established, burn out and keep covered to prevent secondary scab from getting the upper hyphae (you really should be used to my terrible jokes by now).

Map Results More info

Apple Scab Results for Amherst (UM ALC)

Primary scab season is over. Ascospores were essentially all released on May 17.

If you are unsure whether ascospores have been depleted in your orchard, enter your green tip date to recalculate ascospore maturity for your orchard.

Green Tip Date: 4/12/2019 Click if greentip has not occurred

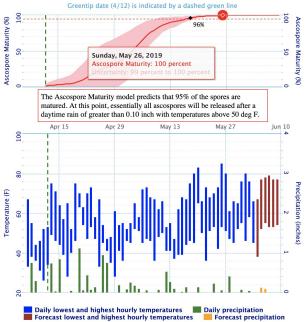
Ascospore Maturity Graphs

Infection Events Summary								
	Past	Past Past Current 5-Day Forecast Forecast Details						
Date	6/1	6/2	6/3	6/4	6/5	6/6	6/7	6/8
Infection Events	No	No	No	No	Combined	Yes	No	No
Average Temp (F) for wet hours	-	65	57	62	70	64	65	63
Leaf Wetness (hours)	0	4	2	1	16	11	2	2
Hours ≥90% RH	10	4	2	5	0	8	0	0
Rain Amount	0.00	0.05	0.01	0.00	0.13	0.10	Night 7% Day 4%	Night 5% Day 6%

Download Time: 6/4/2019 10:00

Infection events, shown in red above, are based on the Revised Mills Table and are calculated beginning with 0.01 inch of rain. The word "Combined" means the wetting event on this day is being combined with another wetting event using the following rule: two successive wetting periods, the first started by rain, should be considered a single, uninterrupted wet period if the intervening dry period is less than 24 hours. When an infection event is in the 5-day forecast, the actual weather data logged may or may not translate into an actual infection event. Therefore, the table output may change once actual weather data are logged.

Ascospore Maturity and Weather Summary for Amherst (UM ALC)







Start Date & Time	End Date & Time	Wet Hours	Temp Avg. (F)	Rain (in.)	Combined Event
June 5 8:01 AM	June 6 9:00 AM	25	67	0.23	
May 30 10:01 PM	May 31 9:00 AM	11	59	0.08	
May 28 12:01 PM	May 29 8:00 AM	20	48	0.42	
May 25 10:01 PM	May 26 8:00 AM	10	56	0.07	
May 23 7:01 PM	May 24 8:00 AM	13	58	0.23	
May 20 12:01 AM	May 20 1:00 PM	13	68	0.14	
May 17 8:01 AM	May 17 5:00 PM	9	54	0.15	
May 12 8:01 AM	May 16 8:00 AM	56	42	0.93	Yes
May 10 11:01 AM	May 11 12:00 AM	13	57	0.08	
May 7 5:01 PM	May 8 8:00 AM	15	52	0.06	
May 2 1:01 AM	May 6 8:00 AM	77	53	0.63	Yes
April 28 6:01 PM	April 30 1:00 PM	22	41	0.20	Yes
April 26 4:01 AM	April 27 8:00 AM	28	47	1.70	
April 22 3:01 PM	April 24 8:00 AM	29	55	0.67	Yes
April 18 4:01 AM	April 21 2:00 PM	49	56	1.24	Yes
April 14 9:01 PM	April 15 4:00 PM	17	58	0.88	Yes
April 12 10:01 PM	April 13 11:00 AM	13	56	0.74	
April 8 3:01 AM	April 10 9:00 AM	36	40	1.07	Yes
March 29 1:01 PM	March 30 12:00 PM	23	45	0.12	

This disease forecasting model was co-authored and developed in collaboration with Dr. Kerik Cox in the Department of Plant Pathology and Plant-Microbe Biology at Cornell University in Geneva, New York. Please contact Dr. Cox with any questions regarding the scientific content and recommendations delivered in model outputs.

Disclaimer: These are theoretical predictions and forecasts. The theoretical models predicting pest development or 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, pest presence, and disease occurrence determined through scouting or insect pheromone traps.





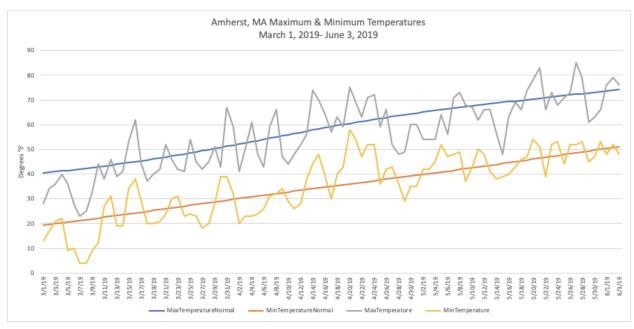
Climate check in:

It seems like we have had more rain over the last few weeks than is "normal", however, for Amherst, we are actually down about a tenth of an inch from average precipitation accumulation. From March 1, we have accumulated a total of 11.87" of rain.

Amherst, MA March 1, 2019- June 3, 2019

Actual Precipitation	Normal Precipitation	Departure from Normal
11.87 (in inches)	12.03 (in inches)	-0.16 (in inches)

The temperatures have been overall cooler, but not by much. No surprises there with fire blight being a *near* no show this year.



Temperatures for Amherst MA: The "normal" temperature range falls in between the solid, smoothed blue and orange lines. While we have certainly experienced some variability, as shown by the grey and light orange lines. This spring can go down in the history books as largely uneventful. Except for all those stuck in the mud tractors, of course.

Summer diseases

The summer diseases of apples include the blemish complex, sooty blotch and flyspeck (SBFS), and three fruit rots: black rot, bitter rot and white rot. Last year in New England, fruit rots were a big problem. The table below rates the major apple fungicides for summer disease management, showing efficacy for those that are registered for at least one of the diseases, and those that are not registered for any.

Fungicide Selection

Given the problems with black rot and bitter rot last year, and the potential for SBFS every year, choose fungicides that will be effective against all three diseases. Generally these include Omega, Flint Extra and Sovran, and the pre-mixes Luna Sensation, Merivon and Pristine. These should be mixed with captan for resistance management.

Topsin is effective against SBFS and black rot, but not very effective against bitter rot.

Up to 77 days before harvest, the EBDC fungicides are a good choice, either alone or in combination. When these fungicides could be used in summer, they controlled summer diseases well.

Scheduling

Fungicides should be applied as frequently as 10 to 14 days if weather conditions, cultivars and recent problems with bitter rot combine to indicate high risk of infection. Where risk is lower, obviously the interval can be extended. And if, like last year, we have a deluge of 2 inches or more of rain, it may be necessary to go in to reapply before 10 days have passed. While not exactly the same, this is similar to the fungicide program used for black rot. The Group 11 fungicides are systemic, and will withstand more rain than captan.

Fungicide Ratings for Control of Summer Diseases of Apple

	k.		Ratings for the Con	trol
Trade Name	FRAC code	Sooty Blotch/ Flyspeck	Black/ White Rot	Bitter Rot
Captan, Captec	M4	3	1	2
Topsin M	M1	4	4	1
Flint Extra	11	4	3	2
Sovran	11	4	3	2
Aprovia	7	3	2	2
Sercadis	7	2	2	NR
Luna Sensation	11 + 7	4	3	3
Merivon	11 + 7	4	3	4
Pristine	11 + 7	4	3	3
Inspire Super	3 + 9	4	NR	NR
Omega	29	3	3	3
Indar	3	2	NR	NR
There is a 77 day pre-l	narvest interval for th	e EBDC fungicide	es	
Dithane, Manzate, Penncozeb, Maneb, Poly	M3 yram	4	3	4
The following fungicia	les are NOT REGISTE	RED for summer	diseases	
Syllit	M7	NR	NR	NR
Procure, Rally, Rhyme/Topguard, Rubig	3 an	NR	NR	NR
Scala, Vanguard	9	NR	NR	NR
Fontelis	7	NR	NR	NR
Luna Tranquility	7 + 9	NR	NR	NR

Key to control ratings:

NR = not registered for disease; **0** = none, **1** = slight, **2** = fair, **3** = good, **4** = excellent



Chemical thinning recommendations for week of June 4...

Duane Greene

Chemical Thinning May be Challenging in the Next Few Days. Depending on the variety and the location, fruit size generally ranges from 12 mm up to 18 mm. Once fruit growth reaches about 15 mm they become increasingly difficult to thin. I have observed overset in a number of blocks of trees this spring. The carbon balance model on the NEWA site indicates that over the next few days the carbon balance will be in general positive. Weather conditions are forecast to improve from midweek on to allow for thinner application. It should be warm enough to achieve adequate thinning but not so warm that you should fear over thinning. Both NAA plus carbaryl and MaxCel plus carbaryl are appropriate to use during this period. I have observed MaxCel to work well at these larger fruits sizes (14-15 mm). Since you are getting very close to the end of the season when chemical thinner can be effective I would suggest using MaxCel at 2 quarts per 100 gal plus 1 quart of carbaryl per 100 gal to get thinning on heavily set trees. MaxCel requires warm weather to be effective. It should be warm enough for MaxCel to thin effectively. NAA is the other viable option for thinning this late and this is generally the option that many orchardists choose. I suggest using NAA at 2-4 oz/100 gal or 5-10 ppm. Given the weather forecast for the coming week, I see little chance of either NAA plus carbaryl or MaxCel plus carbaryl causing excess thinning. The danger at this stage in the thinning season is not getting enough thinning as opposed to excessive thinning.

We have not yet advanced so far into the chemical thinning season as to warrant a "Hail Mary" tactic as a last ditch effort to achieve thinning. Take advantage of what you have right now.



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.

Massachusetts Cultivated Blueberry Growers Association Summer Meeting - June 16, 2019. 12:30-3:00. Sunburst Blueberry Farm, 44 Rawson St., Uxbridge MA. No cost to association members, \$15 others. Bring lunch and a chair. 1.5 Pesticide Credits. See: http://www.mcbga.com.

CROP CONDITIONS: **Strawberries**: Harvest in June-bearing varieties has begun in many areas. Things to keep an eye out for during this period are <u>Two-Spotted Spider Mite</u> (TSSM), Strawberry Sap Beetle, <u>Anthracnose</u>, <u>Botrytis</u> and <u>Slugs</u>. The wet cool weather has kept TSSM populations low. If/when we get a dry hot stretch, they may explode in hot-spots in the field. Spray applications during harvest are far from ideal and control measures so close to renovation may not be cost effective. Predator releases might be worthwhile in fields where TSSM

populations are very high. Given the wet start to the season, you might also see slime molds showing up on the plants. This is a superficial fungus that does not infect the plants but can look alarming. **Brambles**: Floricane raspberry varieties are blooming. <u>Tarnished Plant Bug</u> (TPB), Strawberry Clipper and Botrytis Gray Mold can be a problem now, especially if bramble fields are near strawberries. Potato Leafhopper (PLN) has not been reported yet but can come in soon. Check the link to see what hopper burn looks like on raspberries. Primocane varieties are growing well except where fields are excessively wet. Blueberries: Bushes are post-bloom and in the green fruit stage. We're seeing more mummy berry than in recent memory. Once past bloom, the primary and secondary infection period is past and fungicide applications won't be as effective in reducing fruit infections. Cherry/Cranberry Fruitworm (CBFW/CFW) may be approaching the egg hatch period. Models are available to time this for spray applications. Accuracy depends on pinpointing a biofix, which is the date of first capture of moths in pheromone traps. The first consistent appearance of moths is used to set the biofix, or start of the model, and this usually starts at about 350 GDD base 50°F after March 1 (pre-bloom period). To set the biofix, you would have checked traps twice a week during bloom to establish cranberry fruitworm captures. Once CBFW moths were caught on two consecutive checks, the biofix would be set as the date **before** this sustained catch, which is the "zero" catch before. Once the biofix is set, keep track of GDD base 50°F. Once 400± GDD base 50°F have accumulated from the time of the biofix, the CBFW egg laying period commences. If you did not establish a biofix, you can short cut this model by estimating a total accumulation of 750 GDD base 50°F as the approximate start of CFW egglaving. This is the time to begin a spray program, especially if you had significant CBFW in previous years. This year we are lagging behind on GDD so we may have late emergence of CBFW caterpillars.



Photos: left, CFW adult male - *MSU Blueberry Facts*; next, CBFW adult male - *MSU Blueberry Facts*; middle, CBFW (top) and CFW (bottom) larvae - *MSU Blueberry Facts*; right, CBFW feeding and frass in fruit cluster - Rutgers Crop Pest Advisory.



HAWKEYE'S CORNER (notes from the field)

Liz Garofalo

Brown marmorated stink bug (BMSB) has been a hot button topic for quite some time. I've been tracking it for five years now. As you recall, I'm sure, last year we exceeded the apple economic threshold at one site (Ok, so, this *would* have been over apple threshold if the trap had been in

an apple block, instead it was in raspberry. Nonetheless, this was the highest trap capture to date in the traps we have been using. Once ghost traps went out we saw a steep increase in BMSB trap numbers.) Additionally, other nearby sites had highest ever (for us) BMSB trap captures. As such, this year we are on tinder-hooks to make sure we know *exactly* when these dirty so-and-so's are on the move. Everyone has likely seen them in their homes and outbuildings. They are migrating out, now, however, and looking for food and mates. And I don't mean the kind of mate you go to the ball game with. Full disclosure, these photos are from an unsprayed apple block (pictured below) adjacent to a glass greenhouse with a rainforest in it, so, no big surprise we are seeing them here in fair numbers.



Remember, in addition to setting traps, you should be scouting the canopy, especially the upper portion, to determine presence and possible damage. Bear in mind, stink bug damage, native or invasive, looks the same, and we are also seeing natives in traps now. This makes visual scouting of the canopy that much more important!



6-3-19, BMSB observed in known hot spot on UMass campus in unsprayed, espaliered scab resistant apple planting outside of Durfee Conservatory.



No GUEST ARTICLE this week...





54 mins · Belchertown · ❸ ▼





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Vikas Sharma Powedry milidue

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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/scafolds/

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

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Acimovic Lab at Hudson Valley

Peter Jentsch's Blog

The next Healthy Fruit will be published on or about June 11, 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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