Healthy Fruit, Vol. 27, No. 8, May 28, 2019

Jon Clements, Author (unless otherwise noted) and Editor

CONTENTS

CURRENT DEGREE DAY ACCUMULATIONS

UMass Cold Spring Orchard, Belchertown, MA	27-May
Base 43 (NEWA, since March 1)	582
Base 50 (NEWA, since March 1)	348

UPCOMING PEST EVENTS

Coming events	Degree days (Base 43)
Codling moth 1st flight peak	312 to 584
Lesser appleworm 1st flight peak	364 to 775
Lesser peachtree borer 1st catch	476 to 668
Pear psylla adults & hardshells present	408 to 606
San Jose scale 1st catch	440 to 620
San Jose scale 1st flight peak	560 to 763
Spotted tentiform LM sapfeeding larvae present	343 to 601
Spotted tentiform leafminer mines forming	367 to 641
McIntosh petal fall	439 to 523

UPCOMING MEETINGS

June 4 (Tuesday). CT Pomological Society Twilight Meeting and Field Day. Beginning at 5 PM with the field day and farm tour, followed by dinner and meeting. Belltown Hill Orchards, 483 Matson Hill Rd, S. Glastonbury, CT. The Preli family grows tree fruit, berries, grapes and Christmas trees. 2.5 Pesticide recertification credits available. Speakers include Dr. Jaime Pinero, UMass, talking about mating disruption & new products, plus his work with SWD; Matt Goclowski, CT DEEP, grass carp permitting process; George Hamilton, UNH, sprayer calibration demo; and more. Many vendors. Free event – Join us.

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

THE WAY I SEE IT

I guess apple fruit thinning is topic of the week. New news, old news, new rules? It's time to apply chemical thinners! Yup, based on fruit size approaching 10 mm, and the new rule 200 to 250 DD (Base 4 degrees C.) as being proposed in the new Apple CHO Model v2019 on NEWA, it's time to apply chemical thinners. Even maybe if you have already done so? Assuming more than one fruit per cluster is still growing? I am seeing it a bit of all over the place out there, but generally fruit set is good, and it's a little early to see how the petal fall thinning spray is working. I have seen good results from blossom thinning with caustic fruit thinners (lime sulfur and ATS) and hormones (NAA). We seem to have a relatively neutral carbohydrate balance, so that calls for normal or maybe even slightly "hot" chemical thinner combos? (How often do we over-thin?) A gold standard thinning spray right now of carbaryl (one quart per acre) PLUS NAA (Fruitone-L, PoMaxa, refine) at 2 to 4 ounces per acre (depending on tree size and amount of thinning desired) is advised, but for small fruited varieties like Gala or Golden Delicious, use 6-BA (Maxcel, exilis) plus carbaryl (only if the temperature is above 75, but below 90). If you don't want to use carbaryl, an NAA/6-BA combo could be used. Good luck out there, let me know if any questions. Or read Duane Greene's take on the situation, or see NEWA CHO model output below. Then you don't have to call me, I've given you all I got! Wish I could deliver on the nice weather :-)

Apple Carbohydrate Thinning Model for Belchertown-2

Change green tip and/or bloom date and click "Calculate" to recalculate results.

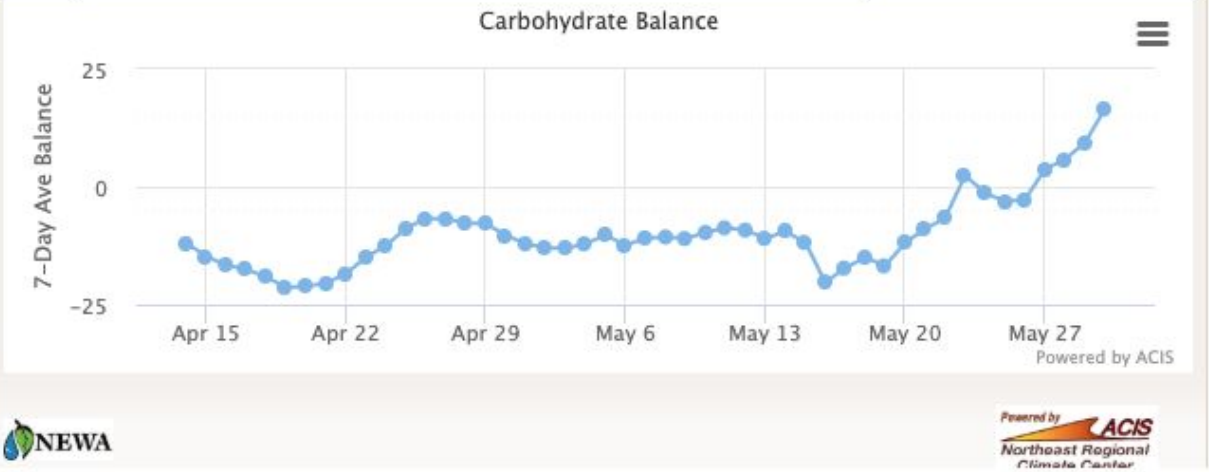
Green tip date	Bloom date	Percent Flowering Spurs	Calculate
4/12/2019	05/10/2019	76-100%	

Note from the model developer (March 22, 2018):
• The apple carbohydrate model simulates the response to weather of trees that are healthy with normal vigor and bloom, no significant water, nutrient or winter or spring freeze stress, and no significant carry-over stress from a previous year that will change tree responses. We are less confident in the model if temperatures are extremely cold or hot. Each orchard is unique, so use this tool, as any other, in the context of your own experience. For more information click on the "More Info" tab.

Apple Carbohydrate Thinning Model Results

Date	Max Temp (°F)	Min Temp (°F)	Solar Rad (MJ/m2)	Tree Carbohydrate Balance (g/day)		Accum 4°C Degree Days (since bloom)	Thinning Recommendation (Red=Danger of overthinning; Yellow=Caution; Green=Low Risk of overthinning)
				Daily	7-Day Ave		
4/12	55	40	4.6	-6.83	-	0.0	-
4/13	72	55	14.1	-15.88	-	0.0	-
4/14	72	52	10.2	-17.84	-11.93	0.0	-
4/15	63	41	7.0	-12.75	-14.73	0.0	-
4/16	55	37	20.2	-8.82	-16.68	0.0	-
4/17	63	35	22.6	-10.78	-17.5	0.0	-

5/27	79	56	24.6	-3.5	3.75	185.4	Increase Chemical Thinning Rate by 30%
5/28	59	49	8.6	-6.56	5.81	193.5	Increase Chemical Thinning Rate by 30%
5/29	70	47	15.0	8.48	9.37	204.2	Increase Chemical Thinning Rate by 30%
5/30	73	56	14.6	-13.53	16.49	218.2	Increase Chemical Thinning Rate by 30%
5/31	72	49	24.2	39.43	-	230.1	-
6/1	75	53	24.9	32.99	-	243.9	-
6/2	74	49	13.8	8.26	-	256.2	-
6/3	67	54	24.5	46.36	-	268.1	-
	Text color represents expected thinning efficacy: Blue=Mild; Green=Good; Orange=Very good; Red=Excessive						



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.

INSECTS

Jaime Pinero

Rosy Apple Aphid

We have just received notification of localized infestations by the rosy apple aphid, an insect that it is not currently listed in the NETFMG. Below I am presenting some information pertinent to this pest. If you interested in further information on rosy apple aphid, please check the apple section of the NETFMG - in a couple of days.

Of the aphid species that can be found on apple trees, rosy apple aphid causes the most severe damage and is the most difficult to control. Rosy apple aphid, introduced into the United States about 1870, is usually well controlled under conventional management programs but can be severe in certain years or locations. In those years, rosy apple aphid is the most severe aphid pest, as its feeding causes small, deformed fruit and leaf curling. Curled leaves provide refuge for subsequent generations, making control difficult.

The body of this aphid has a waxy coating and usually a slight purplish or rosy tinge. Currently, second-generation nymphs (ALL FEMALES) are working their way down inside the clusters and begin sucking the sap from the stems and newly formed fruits. Their feeding causes the leaves to curl, affording the aphids protection from insecticide applications and some natural enemies.

The third generation is produced in June and early July. Although in the past the majority of this generation developed wings and migrated to plantain, recent evidence shows that the biology of this pest has changed and populations in orchards may no longer need to go to the alternate host plantain but can breed continuously on apple.

A cool, wet spring favors aphid development because it provides conditions unfavorable for parasites and predators.

DAMAGE. Rosy apple aphid causes a decrease in tree vigor because of foliage loss and damage to the fruit through dwarfing, misshaping, and staining. The aphid injects a toxin with its saliva that causes the leaf to curl and the fruit to be distorted. A single stem mother located on the underside of a leaf near the midrib will cause the leaf to fold. The presence of only a few stem mothers can cause a severe curling of all leaves surrounding an opening flower bud; within such curls ideal protection is afforded to the rapidly developing aphids. 'Cortland', 'Ida Red', and 'Golden Delicious' are the varieties most frequently showing fruit injury. Fruit adjacent to rosy apple aphid colonies are stunted, puckered at the calyx end, and ridged like a pumpkin.

CONTROL (post-petal fall): Because the curled leaves protect the aphids, then the best control will be achieved with a systemic insecticide. Some insecticide options include Admire Pro and Movento (active ingredient: spirotetramat*, at a rate of 6 to 9 fl. Oz). Click here to access the MOVENTO LABEL.

**Spirotetramat is an insecticide derived from tetramic acid, a systemic material, for the control of sucking insects in their juvenile, immature stages, including aphids, scale insects, and whitefly. It produces growth inhibition of younger insects, reduces the ability of insects to reproduce, resulting in mortality. Spirotetramat is harmless to slightly harmful to beneficials such as hoverfly larvae, spiders, predatory bugs, wasp parasites, ladybird beetles and lacewings.*

Winter Moth Update *(from the lab of Dr. Joseph Elkinton - UMass)*

Winter moth attacks a wide variety of plants, but is especially problematic on oak, maple, birch, apple, and blueberry. Look for heavy defoliation accompanied by high densities of winter moth larvae (green inchworms) in May. Dr. Joseph Elkinton sent out the note below. Apple growers are kindly asked to be on the lookout for winter moth in Western MA (see text highlighted in yellow:

"We have been surveying coastal Connecticut and Central Massachusetts for winter moth with pheromone traps each year for quite a few years. As we predicted in the 2014 paper we published on winter moth spread, we have now documented the spread of winter moth to the western edge of both states, i.e. Stamford CT and North Adams, MA. Densities in these regions, so far as we know, have remained low. In the meantime, however, we have successfully controlled outbreak populations of winter moth in eastern Massachusetts, Maine and Rhode

Island with the parasitoid Cyzenis albicans. See link below. However, populations in the western regions of MA and CT or in the Hudson Valley of New York are very far from our populations with Biocontrols established. It would not surprise me at all to see outbreaks developing in these regions. Apples in particular, are a favored host. This is a very busy time for all of us but if you could send out a notice to apple growers in these regions, to be on the lookout for high densities of little green inchworms, they should collect them while they are still available, and place them in in a container with apple foliage. We will arrange to pick them up and determine whether they are winter moths or Bruce spanworm, the native species. We do this with DNA analysis. We will be prepared to release Biocontrol agents next fall in any such populations. Please confirm receipt of this and send it on to whoever you think might be appropriate".

Below are pictures of winter moth larvae:

Link to the article on Biological Control of Winter Moth:
https://www.fs.fed.us/foresthealth/technology/pdfs/FHAAST-2018-03_Biology_Control_Winter-Moth.pdf

DISEASES

Liz Garofalo

Big question of the day -- is **primary apple scab** season over? Probably. But now is the time to look for scab lesions. If you don't see any over the next week or two, congratulations. Don't worry though, in a couple weeks it will be time to start covering for summer diseases.

Fireblight -- the models seem to be suggesting high risk, but, there's not much bloom left, and it's kind of cool right now. BUT, if you have open bloom and wetting, a strep spray might be advised. You really should be using the models to judge your risk. Rather than relying on us… :-)

That's about it…

Primary scab lesion v2019?

HORTICULTURE

Chemical thinning suggestions for May 29, 2019

Duane Greene

Over the past week apple fruit development has progressed in most orchards from petal fall to fruit sizes ranging from 6 to 12 mm. This is the size range where it is appropriate to apply chemical thinners, if weather conditions allow. Hopefully, most of you took advantage of opportunity last week to apply thinners during the warm period. Results of thinner application require 7 days to develop to the point where you can see the results of your thinner. Rarely have
I seen over-thinning as a result of petal fall thinners so during this week you will undoubtedly need to make another thinner(s) application. This is the period when fruit are most vulnerable to thinners. As fruit size increases from this point on it will be more difficult to thin them.

It appears that several times during this period there may be a chance for rain or thunderstorms that adds to uncertainty about if or when you should make an application. In the past I have been asked many times if it rains after as thinner application how much thinner activity was washed off? My suggestion then, as well is now, is it depends upon how long after the application did the spray dry. Generally, if the spray dries for at least 30 minutes you will get about 80% of the thinning effect. Admittedly much of the substance behind that response is experience but there is science as well. The accompanying graph was taken from my PhD thesis done on the penetration of NAA and NAAm into pear leaves. This experiment was done under controlled conditions in the lab. The intention was to follow uptake of NAA into pear leaves over time. If the spray droplet was prevented from drying then there was a near linear uptake of NAA as long as the drop did not dry. This illustrates the usefulness of having a relatively long drying period. After 24 hours, the droplets on some leaves were allowed to dry. Once the droplets started to dry there was a rapid acceleration of uptake of NAA into the leaves and it continued until the droplet dried. This is attributed to an increase in concentration of NAA as the droplet dried. After the droplet dried there was only a small amount of uptake. The majority of uptake is due to the drying process. If one extrapolates the situation into a real life orchard situation, drying times will be much shorter than the 24 hours shown, thus uptake from the undiluted spray may be relatively small if spray drying occurs soon after application. Therefore, the majority of NAA uptake can be attributed to accelerated uptake into the leaves during the drying process itself.

I have tested this unintentionally as a result of mistakes I have made in the orchard in applications to unintended trees in experiments. In both instances I tried to wash off the NAA within 5-10 minutes of application, but without success. Even after drenching the treated trees with large amount of water in an attempt to wash the spray off, I still noted measurable amounts of epinasy (twisting and turning of leaves) typical of NAA application 24 hours later.

Chemical thinning options during the 7 -15 mm fruit size stage

All thinners, in general, may be used during this time period.

NAA. This is a workhorse of the thinners available since it is strong enough to do meaningful thinning and if used appropriately is very effective. Often orchardists are concerned about NAA over-thinning. However, given the weather forecast with appropriate but not excessive temperatures, this should allow you to use higher rates of NAA where needed without the fear of over thinning. If nervous about using rates of 12 to 15 ppm then you can reduce the rates a little and include carbaryl.

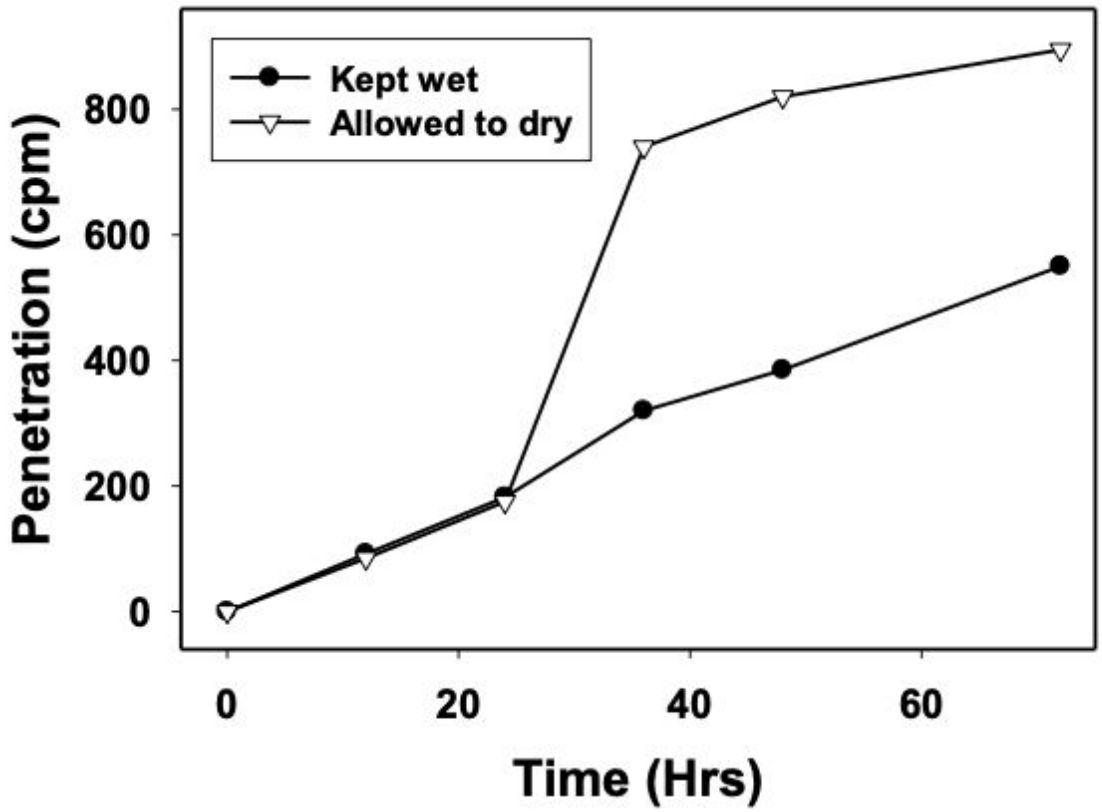
MaxCel. This is very effective thinner that has the dual advantage of also providing some increase in fruit size due to additional cell division. It is widely acknowledged that it should be used only under warm condition for best results. Use by itself, it is a mild thinner. When combined with carbaryl thinning activity is much greater and its activity with carbaryl rivals

NAA for potency as a thinner.

Carbaryl. Carbaryl is a longtime favorite of fruit growers because it is mild and rarely, if ever overthins. It is appropriate to us alone on easy-to-thin varieties such as Cortland or Cripps Pink (Pink Lady). In order to get adequate thinning on most varieties it must be combined with other thinners. Some orchardists do not want to use carbaryl because of concerns about buildup of mites due to the killing of mite predators.

Amid-Thin. Traditionally this thinner is not use this late. It is a mild thinner that has the reputation of causing pygmy fruit, primarily on Delicious.

NEWA predicts a slight carbon excess during the next few days and the suggestion is to increase the thinning rate by 30% because under these conditions it will be more difficult to thin. This is the period in the development of fruit where carbon balance does play in important role in the ability of applied thinners to thin effectively. Based upon the weather forecast and the information in the carbon balance model this is not a time to be timid or conservative in your selection and use of thinners. Given the information from these resources almost assures you that over thinning will not occur. From here on for the rest of the thinning season it will be more difficult to thin if you do not accomplish it this week.



Don't forget to strip those leaders on young trees to keep the leader dominant -- you don't want an "umbrella" tree! (And yes, I should have cut off that piece of dead wood after stripping.) JC

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.

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**: June-bearing varieties range from green fruit to ripening fruit, depending on variety and if row covers were used. New fields are still being planted due to

soggy field delays. **Tarnished Plant Bug** can still cause damage but the risk is declining as the fruit begins to size up. **Eastern Flower Thrips** (EFT) can be a problem now as well as **Two-spotted Spider Mites** (TSSM). EFT do not overwinter in New England but come up on weather fronts each year. EFT feeding can cause direct damage to the fruit with rasping mouth-parts that results in a bronzing/russeting of the berry skin, which affects marketability. TSSM haven't been reported in high numbers yet since the weather hasn't really been that favorable, but they could ramp up quickly when things dry out and warm up a little. Check underside of leaves for these little guys. Good biocontrols are available for them. More on this next week. **Aphids** can be problematic, too, because of their ability to vector **virus** diseases, especially Strawberry mild yellow edge virus and Strawberry Mottle Virus. Scout for all these insects now and take action if thresholds are exceeded. Primary infections of **Botrytis gray mold** take place during bloom but aren't expressed until fruit sizes up and begins to ripen. Weather conditions have been highly favorable for infection this Spring. Fungicide applications when fruit rot is found can help suppress secondary infections if primary infections were not well controlled. L**eaf spot disease** has begun to appear on susceptible varieties in some fields. Usually no action is needed for these until after renovation, but highly susceptible varieties may benefit from fungicide applications now to prevent severe infections. Finally, **Bacterial Angular Leaf Spot** may be more prevalent this year than most due to the weather. See last week's HF for more on this disease. **Brambles**: Early floricane raspberry varieties are blooming, others will follow soon. Primocanes in raspberries are approaching knee high and growing well. **Orange Rust** is being found on both Blackberries and Black Raspberries. Weather has been highly conducive to the spread of this fungus. It often comes into cultivated fields from wild brambles on the edges. Try to eradicate wild brambles near your cultivated plantings to avoid this and other problems (e.g., viruses and SWD). This is a systemic disease so can not be eradicated once symptoms are found. Infected plants must be rogued out. Nearby plants should be protected with fungicide applications. Now is the time to see the orange sporulation of this disease and to rogue out the plants. Once sporulation is over, it is not easy to identify infected plants. See the New England Small Fruit Management Guide for recommended materials and rates. **Blueberries**: Bushes are in late bloom to fruit set. There may be some **latent winter injury** showing up in some locations where early shoot growth looked normal but then wilted and collapsed. This is because of sublethal damage to vascular tissue that just couldn't support normal growth. This should be pruned out of bushes to avoid opportunistic infections from cankers and the like. Some fields have shown a high degree of **Mummy Berry** infestation (shoot strikes and blossom blight). This has been reported in Eastern NY and Western MA and is likely due to perfect weather conditions for infection this year lining up with a field history of this disease. Where this is the case, management with systemic fungicides to burn out existing infections is recommended but may only reduce fruit infection slightly because bees help distribute inoculum to flowers. However, it may also help tamp down the inoculum for next year. It will be important to approach next year aggressively regarding Mummy Berry. Mowing grass frequently, raking up fallen mummies or tarping beneath bushes to catch falling mummies, applying a thick layer of mulch next spring to cover remaining mummies, etc., are among things that are recommended. Applying urea in the fall and spring to 'burn out' inoculum may also help. Finally, **Winter Moth** is back in the news (*see also above in*

tree fruit entomology section). Dr. Joe Elkinton at UMass has been trapping statewide for this insect for many years. His releases of the biocontrol *C. albicans* to suppress Winter Moth has been very successful in Eastern counties. In the last 2-3 years growers have not had to spray for WM where it had been devastating for the previous 10 years. Now, his trapping has shown some surprising WM finds in far Western MA and CT. No corresponding releases of the biocontrol have been made yet so there is potential for serious problems in coming years. Joe would like to know if you see WM caterpillars on your farm if you are outside the I-495 radius in MA. Email him at elkinton@ent.umass.edu.

Severe Mummy Berry shoot strikes in Blueray - 5/24/19

HAWKEYE'S CORNER (notes from the field)

Liz Garofalo

Pear psylla adults and nymphs are out there. Scout your pears, and if any sign of pear psylla treat with any one of the options listed in the New England Tree Fruit Management Guide.

Codling moth adults are being caught in pheromone traps. No insecticides need to be applied until eggs begin to hatch. Therefore, best treatment options begin in a week or two.

Plum curculio? Need we say more, apple fruits will become very susceptible to PC damage the next warm, showery evening.

Ed. note. I found this little synopsis from THE JENTSCH LAB of the current insect management situation quite appropriate. JC

GUEST ARTICLE

No GUEST ARTICLE this week...

FACEBOOK ME

Jon Clements
7 mins ·

Really liking the way these Honeycrisp look after lime sulfur at bloom using pollen tube growth model

Jaume Lordan and Kanwar Kamalender Singh Parihar 1 Comment

Like Comment Share

Jon Clements As opposed to Honeycrisp, no lime sulfur. Ugh...

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/scafolds/

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

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

Acimovic Lab at Hudson Valley

Peter Jentsch's Blog

The next Healthy Fruit will be published on or about June 4, 2019. In the meantime, feel free to contact any of the UMass Fruit Team if you have any fruit-related production questions.

Nourse Farms

FMC Agricultural Solutions

New England Vegetable & Berry Growers' Association

Massachusetts Fruit Growers' Association