Healthy Fruit, Vol. 28, No. 1, March 24, 2020

Prepared by the University of Massachusetts Amherst Fruit Team

Contents

Current degree day accumulations

UMass Cold Spring Orchard, Belchertown, MA (Since January 1)	23-March
Base 43 BE (NEWA, since January 1)	72
Base 50 BE (NEWA, since January 1)	41

Note that apple green tip should occur 99-144 DD (Base 43 BE), although obviously there is a range. Zestar! Is at *very early* green tip+ (22-March) at the UMass Orchard in Belchertown. Macs are not green tip. According to the NEWA Degree Days prediction, by March 30 we will have reached 131 DD's Base 43 BE. Hence my early prediction that we would be at McIntosh

green tip --- which is technically 50% of the buds showing green on the north side of trees -- is right on. Stay tuned.

Current bud stages

Current bud stages. NA, UMass Cold Spring Orchard, Belchertown, MA

NA	NA	NA	NA	NA

More 2020 bud stages here…

Upcoming pest events

Coming events	**Degree days (Base 43 BE)**
Green fruitworm 1st catch	49 to 145
Pear psylla adults active	31 to 99
Pear psylla 1st oviposition	40-126
McIntosh silver tip	58-106
McIntosh green tip	99-144

Upcoming meetings

UMaine Pre-season Tree Fruit Meeting Webinars, Wednesday March 15 and Wednesday, April 1, 2020. 12 to 2 PM. To join: https://maine.zoom.us/j/132684553 Two pesticide recertification credits available for all New England states. See attached for details.

The way I see it…

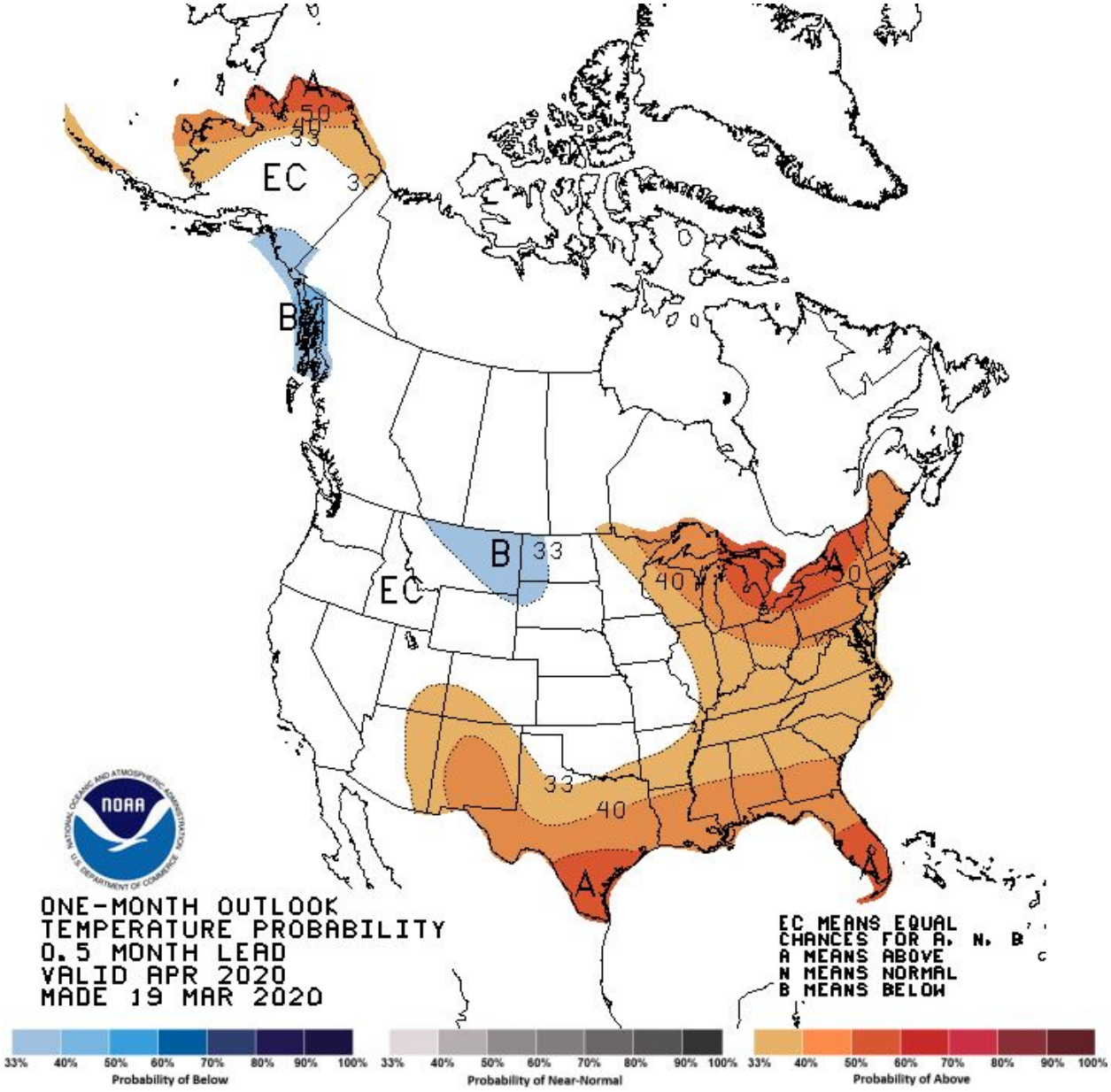
Jon Clements

• This MAY be your last Healthy Fruit (HF), unless you go to the UMass Extension Bookstore (http://umassextensionbookstore.com) and purchase a new 2020 subscription to HF ($65,

e-mail delivery only) in the next week or two. Alternately, you can send me (Jon Clements, 393 Sabin St., Belchertown, MA 01007) a check for $65 (tips accepted) made out to 'University of Massachusetts.' Make sure you note it is for Healthy Fruit subscription, and includes your e-mail address. You can also use this mail-in form to order Healthy Fruit and other UMass fruit publications. You can ignore this of course if you have already sent in your payment. Thanks.

• Sometimes I run into some confusion regarding our UMass fruit program publications and membership in Massachusetts Fruit Growers' Association (MFGA). MFGA membership is $200 ($25 for non-grower members) and includes a complimentary subscription to American Fruit Grower. It does not include any UMass fruit program publications. You can join or renew your MFGA membership using a credit card here. (You can also make a voluntary donation to the UMass Cold Spring Orchard Research & Education Center, UMass Apple IPM Program, and/or MFGA's Horticultural Research Fund.) You can also join or renew MFGA using a mail-in form here. Note that using the mail-in form you can also order UMass fruit publications, but I don't recommend ordering UMass fruit publications with your MFGA membership using that form. If you want to order UMass fruit publications, I recommend you use this mail-in form. (Or you can order and pay using a credit card at the UMass Extension Bookstore.) I hope that clears things up a bit. I encourage you to both join MFGA and order the UMass fruit publications that are of interest to you. More information on our UMass fruit publications is available here. If you have any questions, please get in touch with me.

• OK, where do I start? Kind of rough sledding in more ways than one. Given the recent snow and new coronavirus. We hope everyone is weathering the storm(s) well for now. UMass Extension (and UMass Amherst for that matter) has pretty much shuttered all in-person activities. Professional staff (Jon and Liz) can work remotely from home, but can't travel (including in-state) nor visit the UMass Orchard (it's considered Campus believe it or not). Interestingly, Extension faculty are not as limited and are allowed to travel and conduct on-site research. Hourly farm management staff can carry work as necessary to make sure the 2020 fruit crop at the UMass Orchard is not jeopardized. Social distancing is encouraged for all. (Hey, I do that anyways most of the time!) For all the gory details: Update from UMass Extension on COVID-19 Impacts on Services and Resources So, for the fruit team, remote diagnostics (pictures), consultations, and any other advice we can dispense is on the table, but by voice, e-mail, text, whatever only. As twilight meetings are on indefinite hold, we are strategizing and seeing what we might do to provide that kind of education experience for you remotely. In the meantime, I encourage you to attend the Maine Preseason Tree Fruit Meetings, see attached for details. Note that you can get pesticide credits for attending these webinars remotely! Also, Cornell Cooperative Extension - Eastern NY Commercial Horticulture sponsored a Stone Fruit IPM webinar, and the recording is here: https://www.youtube.com/watch?v=OZMhAgX6hhM&feature=emb_logo I've not watched it yet, but I will. Feel free to reach out to any of our fruit team members with questions or comments, stay well, and we will all get through this. Oh, and spring is coming...



New England Tree Fruit Management Guide available online

• 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 (minimally) updated for 2020 -- an online edition of the New England Tree Fruit Management Guide. Note that it's 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. The print version has been discontinued, although you may check with your local Extension person to see if they have any print copies left. (Massachusetts does not.)

Insects

Jaime Pinero

Seeking grower collaborators for mating disruption research on Obliquebanded leafrollers

In 2019, the most challenging insect pests in Massachusetts orchards were codling moth (CM) and other Lepidoptera e.g., leafrollers, plum curculio, stink bugs, and mites in a couple of locations. In 2020, we will address Lepidopteran pests through field-scale research involving (1) evaluation of novel lures for the potential trapping of female CM, leaf rollers, and Oriental fruit moth, and (2) **mating disruption targeting obliquebanded leafroller (OBLR).**

Mating disruption involves the use of sex pheromones to prevent male insects from finding females and mating. Pheromones of many different insects have been identified and synthesized. Mating disruption dispensers in the orchard mimic a calling female, attracting the male to many false sources, thereby confusing the male and preventing mating.

What does the research entail?

The target species for this research is OBLR. We need to select **three locations** with a history of at least moderately high captures/injury from OBLR during the 2019 season. To be able to conduct this research, we need **two** 5-10 acre blocks (at each location). One block will be for mating disruption, the second block will be grower control, where the grower can apply insecticides to control OBLR (or CM).

What will UMass researchers do?

(1) Deployment of new mating disruption dispensers at a low rate (32 dispensers/acre), distributing them evenly across the block in a grid (or checkerboard type) fashion.

(2) Deployment of monitoring traps for OBLR and CM. In the case of CM, we will compare male captures (for monitoring purposes only) using the standard pheromone dispenser versus a new formulation that is purported to have superior captures.

(3) Weekly data collection (male and female CM, OBLR captures in monitoring traps, crop maturity).

(4) Lure (monitoring) replacement as needed.

(5) At harvest, quantification of level of injury by OBLR and CM in the mating disruption and in the grower control blocks.

What will growers do?

All insecticide treatments, including the formulation, insecticide rate/acre (formulation A.I./A), timing, and spray tank mixtures will need to be supplied at the end of the season.

How will growers benefit?

The cost of mating disruption is comparatively higher than conventional chemical control, at least in the short term. Participant growers will receive free mating disruption dispensers and monitoring traps (provided by Trécé , Inc.) plus weekly visits by UMass personnel to record moth captures in monitoring traps, as described above.

The mating disruption system for leafrollers already comes formulated with CM mating disruption pheromone. Therefore, cooperating growers would be expected to achieve adequate levels of CM control with the same materials.

If you are interested in participating in this study, please contact Jaime Pinero at jpinero@umass.edu **by April 3rd**. We anticipate that the research will be initiated in early May.

Left: Adult OBLR. Right: Low-density mating disruption dispensers by Trécé, Inc.

Next week:

Early-season insect pests with a focus on European Red Mite and San Jose Scale.

Diseases

Liz Garofalo and Dan Cooley

Sanitation remains a critical first step to managing scab inoculum! Ok, so maybe *right now* isn't the time to pop out for a spin around the orchard with the flail mower (maybe now is the time to do some snowmobile research??). However, if you have not already, you should be prepared to implement sanitation strategies, specifically leaf chopping and/or urea application, once orchard conditions allow you to do so. Even if you did some sanitation treatment last fall, another trip with the mower is recommended, especially in places where leaves piled up and were matted down with rain. These leaves may be an important source of scab spores.

Precipitation Totals (inches)			
Date	Observed	Normal	Departure From Normal
9/1/19->12/31/19	19.01	16.17	2.84
1/1/20->3/24/20	6.41	9.29	-2.88

Precipitation totals for the fall of 2019. In Belchertown from September 1 to December 31, we accumulated nearly three inches of precipitation more than our "normal". Since January first, we have only accumulated 6.41 inches, leaving us nearly three inches of precipitation deficit so far this year.

While there is a fairly solid snow cover in some places right now, it won't last. So far in our lab tests, we have not seen any ascospores. (By "our" I mean the makeshift lab in my home office. Feel free to check out my Instagram: https://www.instagram.com/ciderchick007/ for all the goofy pictures of adventures in working from home you could never want to see.)

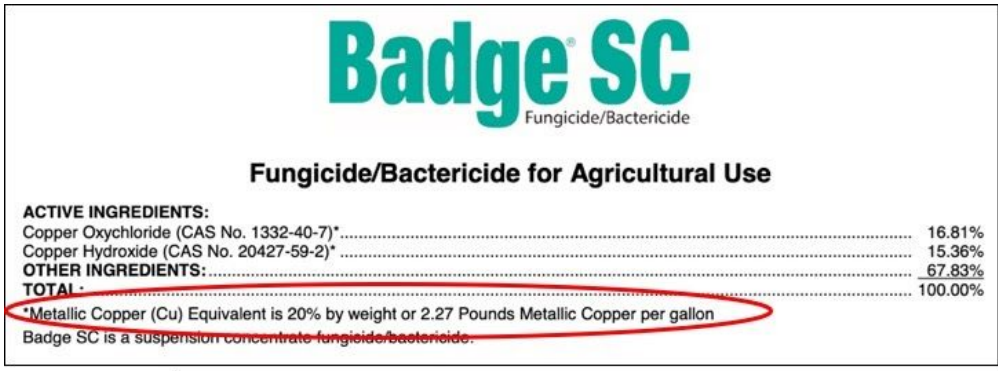
Dormant to Green Tip Copper

Regardless of fire blight history, apply copper at silver to green tip *every year and cover the whole orchard.*

Copper is primarily for use against fire blight. However, epiphytic *Pseudomonas* bacteria, which can cause blossom blast in apples, will also be knocked down with a copper spray. Your goal is to get enough copper coverage on all of the trees in your orchard to suppress the *Erwinia* and other pathogenic bacteria. Copper will also give some protection against scab, generally about 5 to 7 days.

Phytotoxicity can occur when copper is applied later than half-inch green. *Avoid copper and oil when temperatures are predicted to be near freezing*, as this can also damage leaves. If trees have not yet passed silver tip, the combination should be ok.

Apply at least 2 lb. of metallic copper per acre. Most formulations have 20% to 50% metallic copper. Check labels to ensure copper concentrations are in this range. Lower concentrations, like products such as Cueva are meant for summer application, and have lower copper concentrations. Cueva has 1.8% metallic copper by weight. Compare that to Badge with 20% metallic Cu. To get to 2 lb/A metallic copper would require 0.9 gal. of Badge, but 12.5 gal. of Cueva. I'm betting the Badge application is a lot cheaper.

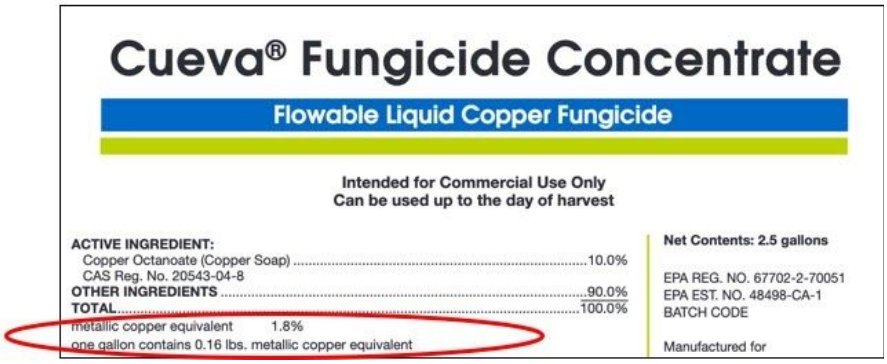


Badge® SC
Fungicide/Bactericide

Fungicide/Bactericide for Agricultural Use

ACTIVE INGREDIENTS:
Copper Oxychloride (CAS No. 1332-40-7)* 16.81%
Copper Hydroxide (CAS No. 20427-59-2)* 15.36%
OTHER INGREDIENTS: 67.83%
TOTAL: 100.00%

*Metallic Copper (Cu) Equivalent is 20% by weight or 2.27 Pounds Metallic Copper per gallon
Badge SC is a suspension concentrate fungicide/bactericide.



Cueva® Fungicide Concentrate

Flowable Liquid Copper Fungicide

Intended for Commercial Use Only
Can be used up to the day of harvest

ACTIVE INGREDIENT:
Copper Octanoate (Copper Soap) 10.0%
CAS Reg. No. 20543-04-8
OTHER INGREDIENTS 90.0%
TOTAL 100.0%
metallic copper equivalent 1.8%
one gallon contains 0.16 lbs. metallic copper equivalent

Net Contents: 2.5 gallons

EPA REG. NO. 67702-2-70051
EPA EST. NO. 48498-CA-1
BATCH CODE

Manufactured for

Getting the copper into the cracks and crevices on trees is critical. So apply as dilute a spray as is practical. Mix with oil, at least 1 qt./100 gal., though you can go higher if you're also trying to control scale and mites. Again, *if green tissue is visible, watch out for freezing temperatures* within 24 hours of application.

Horticulture

Jon Clements

You should read the upcoming March Message for thorough Plant Growth Regulator (PGR) updates thanks to Duane Greene. But I want to point out one new PGR, that is Protone® (Valent) which is now labeled for apple and pear thinning. I understand it can be a mild to very effective fruitlet thinner when applied at the traditional thinning window, especially 10 to 15 mm fruit size, and when under a carbohydrate deficit. Note the label indicates a 5 to 20 mm fruitlet size range with one application generally being effective. (Although two applications are allowed.) The label rate range is 6.6 to 33.1 oz. per acre (for both apples and pears) which is

equivalent to 100 - 500 ppm at 100 gal/A spray volume. Thinking ahead, Protone® is also labeled to assist with early defoliation of fruit trees. (But let's not go there yet.)

The somewhat early spring has frost/freeze on everyone's minds. A reminder, for more information, and what to look out for?

- CSF Apple Stage / Freeze Damage Probability
- Apple Frost Risk
- Critical spring temperatures for tree fruit bud stages (MSU)
- Critical Temperatures and Bud Stage Charts (WSU)

Small Fruit Update

Sonia Schloemann

Crop Conditions: Mild Spring weather has continued to push things along ahead of schedule.

Strawberries - check under the mulch to see if any new growth has begun. Remove mulch is it has or plants (and yield) will suffer. Removing mulch this early means fields will be vulnerable to frost/freeze events as we work our way through the next 6-8 weeks. Be ready to recover the field or turn on irrigation for frost protection. More on that soon.
Raspberries/Blackberries - buds are swelling and blackberries are showing some green. It seems that there is little winter injury this year in most cases. However, since we are running early, damage can still occur this spring if we have a freeze event after budbreak. Delayed dormant cane/spur blight applications are recommended where these were a problem last year and inoculum wasn't fully removed during dormant pruning. See New England Small Fruit Management Guide for recommended materials and rates.

Blueberries - Buds are swelling. (See MSU Blueberry Growth Stages Chart) Pre-emergence herbicide application window is closing soon. See article in this week's IPM Berry Blast. The New England Small Fruit Management Guide Bramble weed management recommendations also provides recommended herbicide materials and rates. Scout your field for scale insects. Dormant oil applications should be made soon, too. Winter moth eggs may be approaching hatch soon, but growers should wait a couple of weeks after egg hatch to apply controls if needed. Egg hatch usually coincides with Red Maple bloom, so watch for that. Then wait a while to see if spray is warranted since many areas have good control with the WM parasitoid C. albicans. (See last week's IPM Berry Blast and we'll provide an update from Heather Faubert from URI as soon as it is available.) Some plantings have shown a lot of winter injury and/or cane blight. Prune as much of that out as you can. A dormant application of lime sulfur may

still be possible, but don't wait too long as the window for that (before might pass quickly. Other options might include Hydrogen peroxide/peroxyacetic acid products, copper sulfate products, or metaconazole products, which have a somewhat longer application window. The New England Small Fruit Management Guide also provides dormant and delayed dormant Blueberry disease management recommendations. It's a bit early yet for mummy berry sprays. Apothecia don't show up until forsythia is in bloom which might be next week. More on this in the next issue of Healthy Fruit.

Grapes - Vines are still dormant and growers should be finishing up pruning soon.

Figure 1) Left and center - Blueberry Bud Stages ranging from Budswell (T2) and Early Green/Pink Tip (T3); Right - Forsythia pre-bloom (**Photos**: S. Schloemann, UMass Extension 3/20/20)

Figure 2) Left - Prelude Raspberry early bud break; Center – Wild bramble early green tip; Right – Concord Grape tight bud. (**Photos**: S. Schloemann, UMass Extension 3/20/20)

Figure 3) From left to right: Black Currant – early leaf expansion; Gooseberry – leaf expansion and flower buds just visible; Lingonberry – budbreak; Haskap/Honeyberry – leaf expansion and buds fully visible. (**Photos**: S. Schloemann, UMass Extension 3/20/20)

Figure 4) Blueberry buds at UMass Cold Spring Orchard on 3/24/20. (**Photos**: L. Ware, UMass Extension)

Hawkeye's corner (notes from the field)

Liz Garofalo

Pests will do what pests will do. Wooly apple aphid continues to be present, at harvest, the "ashy" waxy secretions that give this sticky pest its name can accumulate on fruit. While not active yet, it's good to maintain an open canopy to increase spray penetration. Pear psylla, on the other hand, is indeed on the wing! When adults are present and temperatures permit, a solid dose of oil will deter the overwintered adults from laying eggs. Get a jump on these buggers before they get a foothold in your pears!

Wooly apple aphid colonies like to form on big pruning cuts. Belchertown, MA

Wart-like galls resulting from wooly apple aphid colonization. Belchertown, MA

Adult pear psylla, active March 6, 2020. Belchertown, MA

Days and bud stages will also continue to march on. If nothing else, we can rely on our trees in changing times.

Cider apple "Alkmene", green-tip March 11, 2020. Belchertown, MA

Ginnybrook pear (a variety of interest for perry), swollen bud-bud burst. March 12, 2020 Belchertown, MA.

Silver-tip. March 24, 2020, Greenfield, MA.

Guest article

SANITIZING MEASURES: Spring Clean-up for Orchards
David Rosenberger (ret.), Plant Pathology, Hudson Valley Lab, Highland, NY

Reprinted from Scaffolds Fruit Journal, Vol. 29, No. 1, March 23, 2020

Attention to a few disease-control details in early spring can make life easier through the rest of the summer. Following is my list of reminders.

For Apple Scab and Marssonina
In blocks or around trees where these diseases were a problem last year, disease control this year will be much easier if overwintering leaves can be removed, shredded with a mower, or sprayed with urea prior to bud break. The latter two approaches will speed decay of the leaves, thereby destroying the overwintering phases of the fungi before the full complement of spores can be released.
Details for these processes have been described elsewhere (Rosenberger 2005; Acimovic 2020). Where neither of these diseases were a problem last year, there is no reason to spend extra time and money on managing leaf litter.

For Fire Blight
Where fire blight was a problem last year, all diseased twigs, branches, and cankers should have been removed during winter pruning. The pathogen in winter prunings will lose viability as the prunings dry out. So far as we know, there is no risk of spreading the pathogen by shredding the prunings with a flail mower. After winter pruning to remove cankers, the next line of defense is provided by a copper spray applied at silver tip or green tip. The preponderance of evidence suggests that new low-rate coppers provide relatively short residual activity on trees

(Rosenberger et al. 2013). For the silver tip spray, we generally suggest copper products that can be applied at rates that will result in application of at least 2 lb of elemental copper per acre, thereby providing more extended protection. In years with a late spring when trees are expected to progress rapidly from green tip to tight cluster, using lower rates of copper may help to reduce the risk of fruit russetting that can occur if copper residues persist too long and injure tissue at the base of flower buds that later develops into fruit. However, weather so far this year suggests that we may have a more drawn-out spring where higher rates of copper will prove beneficial for controlling fire blight in problem blocks. In blocks where no fire blight has been found in either of the past two years, there is little if any reason to apply copper. Copper is used to suppress bacteria emerging from obscure infections that remain in the orchard after pruning. If there has been no evidence of fire blight for two years, then presumably there are no active blight infections and therefore no targets for the copper sprays in apples or pears.

For Bitter Rot

In blocks where bitter rot was a problem last year, remove all fallen fruit, fruit mummies, and pruned twigs from beneath trees and either dispose of them away from the orchard or flailchop them in row middles to break them down for more rapid decay. Rotted fruit left on the orchard floor over winter have been recognized as inoculum sources since 1903 (Schrenk and Spaulding 1903; also see commentary at http://blogs.cornell.edu/plantpathhvl/apple-diseases/summer-diseases/bitter-rot/). Twigs pruned from trees last summer or this spring can be colonized by the bitter rot pathogens. Those colonized twigs may produce inoculum for fruit decay in summer.

For Crab Apple Pollenizer Trees

Where crab apples are used to enhance cross-pollination, any cankers in the crab apple trees should be removed during summer pruning. In Washington State, cankers on crab apple pollenizer trees have been identified as the inoculum sources for several important postharvest pathogens of apples and pears (Xiao et al. 2014). The diseases identified on the west coast are not very common as postharvest pathogens in eastern apple orchards, perhaps because those diseases are suppressed by the extensive summer fungicide programs that we must employ to protect fruit from flyspeck and other summer fruit rots. Nevertheless, it is unwise to allow fungal cankers to persist within orchards, even if they are found only on pollenizer trees.

Black knot

For those growing plums and tart cherries, any black knots found in trees should be pruned out before trees reach the white bud stage by cutting at least 8 inches below the existing knot. The knots that are removed should be either burned immediately, buried, or bagged for disposal with other trash that is sent to a landfill. Do NOT dispose of the pruned-out knots in a hedgerow beside your orchard: Spores from the prunings will blow back into the orchard and cause new infections. (Even though I should have known this, I learned it the hard way in a research block many years ago!) Removing black knots from infected trees is the primary method for controlling this disease. Fungicides applied during bloom will NOT protect trees when there is an abundance of inoculum from knots that were not removed during winter.

Peach Leaf Curl

Peach leaf curl is relatively easy to control using copper sprays or one of the labeled fungicides that are listed in Cornell's Pest Management Guidelines for Commercial Tree Fruit Production. Applications can be made during leaf drop in autumn or at bud swell in spring. If the peach crop was frozen out last year and no brown rot fungicides were applied to protect fruit last summer, then trees may be more prone to leaf curl this year. It seems that fungicides applied during summer to control brown rot reduce survival of leaf curl during summer and thereby reduce disease pressure for the following year. Summer fungicides alone are not enough; they must still be supplemented with either the leaf fall or the swollen bud application recommended for controlling peach leaf curl. Nevertheless, leaf curl disasters in the Hudson Valley have often been associated with orchards where the leaf curl spray was omitted or mis-timed in a year following a frozen-out crop. Leaf curl sprays in spring should not be applied before buds are swollen because the leaf curl fungus overwinters in the buds and fungicides applied to fully dormant buds can be washed off before the buds swell enough to allow the fungicide to contact the overwintering fungus. Leaf curl sprays applied after buds have opened may be less than 100% effective, but applying a leaf curl spray a bit late is better than not applying any control at all.

For all of the above: "A stitch in time saves nine." Stopping or slowing diseases before they get started is much easier and more cost-effective than trying to stop them after they begin to spread. For an apt illustration, check your local news feed for commentary on the coronavirus.

Note on active links: Some of the links in this article do not work correctly when clicked. You can get around this formatting issue by copying and pasting the URL link directly into your browser. Sorry for the inconvenience.

Literature cited

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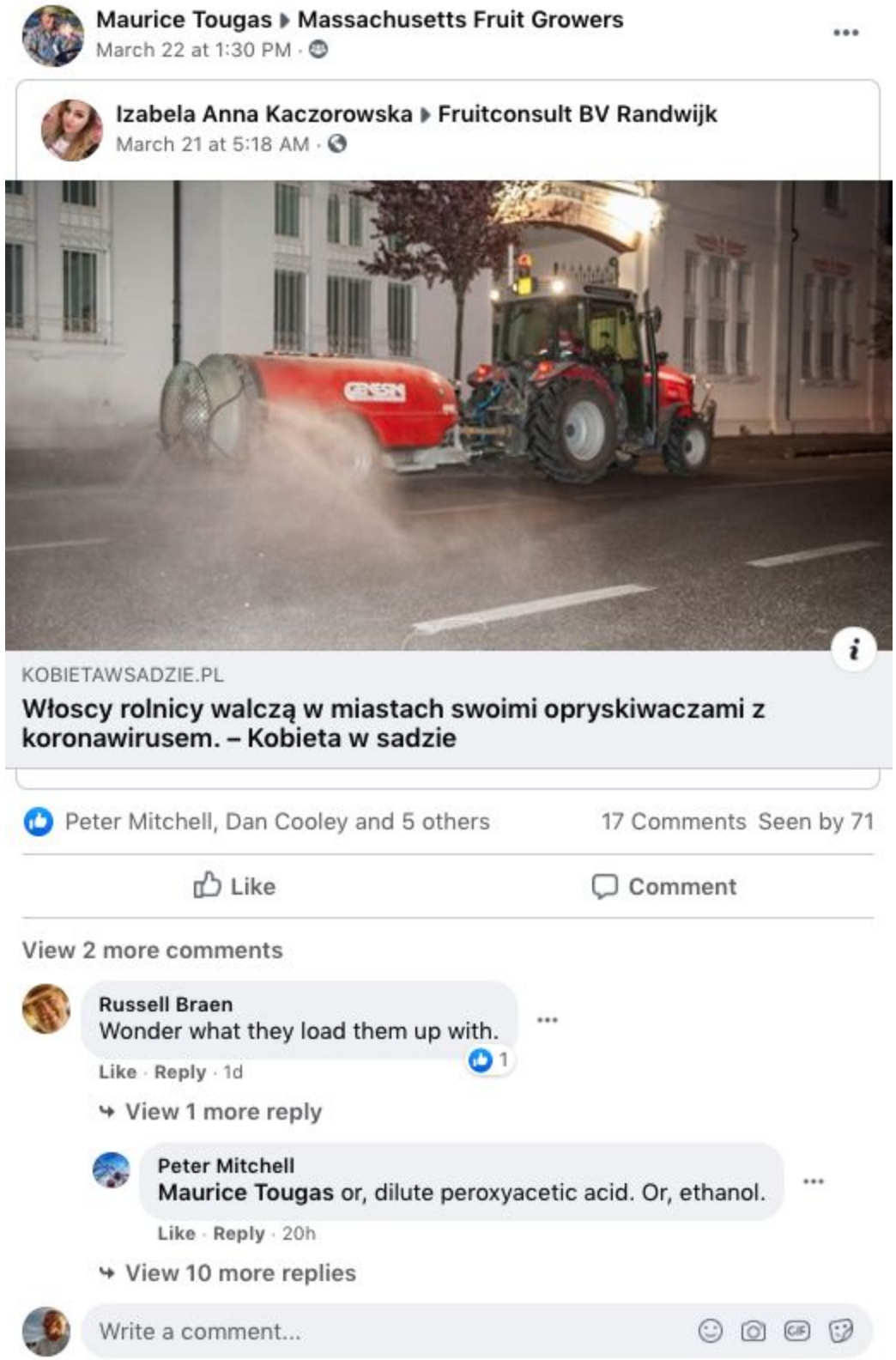
Maurice Tougas ▸ Massachusetts Fruit Growers
March 22 at 1:30 PM ·
Izabela Anna Kaczorowska ▸ Fruitconsult BV Randwijk
March 21 at 5:18 AM ·
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1
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View 1 more reply
Peter Mitchell
Maurice Tougas or, dilute peroxyacetic acid. Or, ethanol.
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Useful links

UMass Fruit Advisor: http://umassfruit.com

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

Network for Environment and Weather Applications (NEWA): 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 March 31, 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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