



Healthy Fruit, Vol. 26, No. 3, April 17, 2018

Jon Clements, Author (unless otherwise noted) and Editor

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Current degree day accumulations

UMass Cold Spring Orchard, Belchertown, MA	17-April
Base 43 (NEWA)	79
Base 50 (NEWA)	28

Note that apple green tip should occur app. 101 DD (Base 43), although obviously there is a range. We are green tip (17-April) in Belchertown.

Current bud stages

Current bud stages. April 17, 2018, UMass Cold Spring Orchard, Belchertown, MA

McIntosh apple Green tip +	Honeycrisp apple Green tip	Gold bosc pear Dormant +	Redhaven peach Swollen bud	Regina sweet cherry Dormant +

Upcoming pest events

Coming events	Degree days (Base 43)	Meaning?
Green fruitworm 1st catch	50 to 148	Too early to do anything! You are not targeting the moths, but the worms when they hatch later.
Green fruitworm peak catch	96 to 231	Coming soon...
Pear psylla adults active	31 to 99	Keep your eyes on the forecast for an opportunity to apply oil!
Pear psylla 1st oviposition	40 to 126	Oil, oil, oil. Adults continue to lay eggs. Keep early populations down to reduce future pressure!
Redbanded leafroller 1st catch	114 to 177	???
Spotted tentiform leafminer 1st catch	118 to 218	This first trap catch is very unreliable in predicting if you will have a problem, but moth flight is

		beginning; red sticky traps on tree trunks can also be used.
McIntosh green tip	98-145	Apply copper and/or oil

Upcoming meetings

Mark you calendar, May fruit twilight meetings will be May 8 (in western MA) and May 10 (Foppema's Farm, Sutton, MA). Details coming soon...

The way I see it...

OK, this weather is downright abysmal! There, I said it. Onward. We are actually at green tip (McIntosh) in Belchertown. It's been cold, but not cold enough where I expect to see any bud damage (yet). Most orchards should have gotten or be getting a copper spray. Rumor has it apple scab spore maturity is ahead of phenology, so be forewarned -- the next apple scab infection period, well, if you have much green tissue showing, it might be wise to be covered up with a mancozeb and perhaps with Syllit or Vanguard or Scala fungicide. But, a very small percentage of spores are mature -- clean orchards will be fine w/o fungicide (depending on your threshold for risk taking).

Pear psylla are active in some orchards, [see these nice pictures of pear psylla adults and eggs on pear buds](#) taken last week in eastern MA by Jaime Pinero.

New England Tree Fruit Management Guide available online

- The New England Extension tree fruit specialists -- which include myself and Dan Cooley at UMass, Mary Concklin at UConn, Heather Faurbert at URI, Terry Bradshaw at UVM, George Hamilton and Alan Eaton at UNH, and Glen Koehler and Renae Moran at UMaine -- have officially launched 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, and especially if you have Amazon Prime, search 'New England Tree Fruit Management Guide' on amazon.com. Your comments/feedback on this work in progress would be appreciated. How do you get your spray/pesticide information these days?

Insects

Jaime Pinero

Integration of biological control (*involving insect-killing nematodes*) with attract-and-kill (*involving odor-baited trap trees*) for sustainable plum curculio control.

This article provides an overview of entomopathogenic nematodes (EPNs) as a biological control option for orchard pests, including plum curculio (PC). This is followed by a brief discussion on previous research aimed at integrating EPNs with odor-baited trap trees for control of PC larvae and adults.

I. Implementing Biological Control through the Application of Insect-Killing Nematodes.

You may be more familiar with nematode species that can cause problems in tree fruit orchards. Those are called plant-parasitic nematodes and they can damage tree roots. However, there are beneficial nematodes (called '**entomopathogenic nematodes**' or **EPNs**) that attack the larval stages of soil-dwelling pests!

What are EPNs? Nematodes are very small, soft bodied, non-segmented roundworms that are parasites of insects. They can be obligate (*they need a living organism to survive*) or sometimes facultative (*they also have the ability to reproduce and develop in a free-living situation*). EPNs occur naturally in soil environments and locate their prey in response to carbon dioxide, vibration, and other chemical cues.

How do EPNs kill the target pest?

The infective juvenile stage is the only free-living stage of EPNs. Juveniles penetrate the host insect via the spiracles, mouth, or anus. Once inside the insect's body, juveniles release symbiotic bacteria into the insect's blood (called hemolymph). The bacteria multiply in the insect hemolymph and the infected host usually dies within 24 to 48 hours. Nematodes continue to feed on the host tissue, and they mature and reproduce. The progeny nematodes develop through four juvenile stages to the adult. Large numbers of infective juveniles are eventually released into environment to infect other hosts and continue their life cycle.



Plump wax moth cadaver with thousands of wiggly nematodes, ready to serve as biocontrols against soil-dwelling crop pests. The infected cadavers can be placed in orchard soil, and the nematodes will seek for prey, protecting crops from pests. Photo credit: Peggy Greb, USDA Agricultural Research Service, Bugwood.org

What are the advantages of using EPNs? EPNs are one form of biological pest control that is compatible with IPM programs. To start with, EPNs are non-toxic to humans, they are relatively specific to their target pest(s) and they multiply often, making the system sustainable. EPNs can

also be applied with standard equipment and have been exempted from EPA pesticide registration. In addition, there is no need for personal protective equipment, there are no re-entry restrictions and there is no risk of insects developing resistance.

To see EPNs in action, click on the following link. It will take you to a 2-minute video by Koppert Biologicals: <https://goo.gl/BdXxSZ>

Recent EPN research conducted for PC control. Field studies (Belchertown, MA, and Kearneysville, WV) were conducted in 2011 and 2012 by Dr. Tracy Leskey and Dr. David Shapiro-Ilan, in collaboration with UMass collaborators. Researchers compared the efficacy of two species of nematodes (*Steinernema riobrave* and *Steinernema feltiae*) against PC larvae in the soil. These two nematodes performed best in previous laboratory and semi-field trials conducted by the same researchers. After application of each nematode species to areas under apple tree canopies that had known numbers of PC larvae, treatment effects were assessed by comparing the number of PC adults emerging from each plot, versus the untreated control.

Results indicated that, relative to the untreated check, *S. riobrave* caused **85.0%** and **97.3%** control in 2011 and 2012, respectively, in Belchertown, and **100%** control in West Virginia on both years. The other nematode species, *S. feltiae*, caused 0% and 84.6% control in 2011 and 2012, respectively, in Belchertown, and 78.2% and 69.7% control in West Virginia. (Shapiro Ilan et al. 2012, 2013).

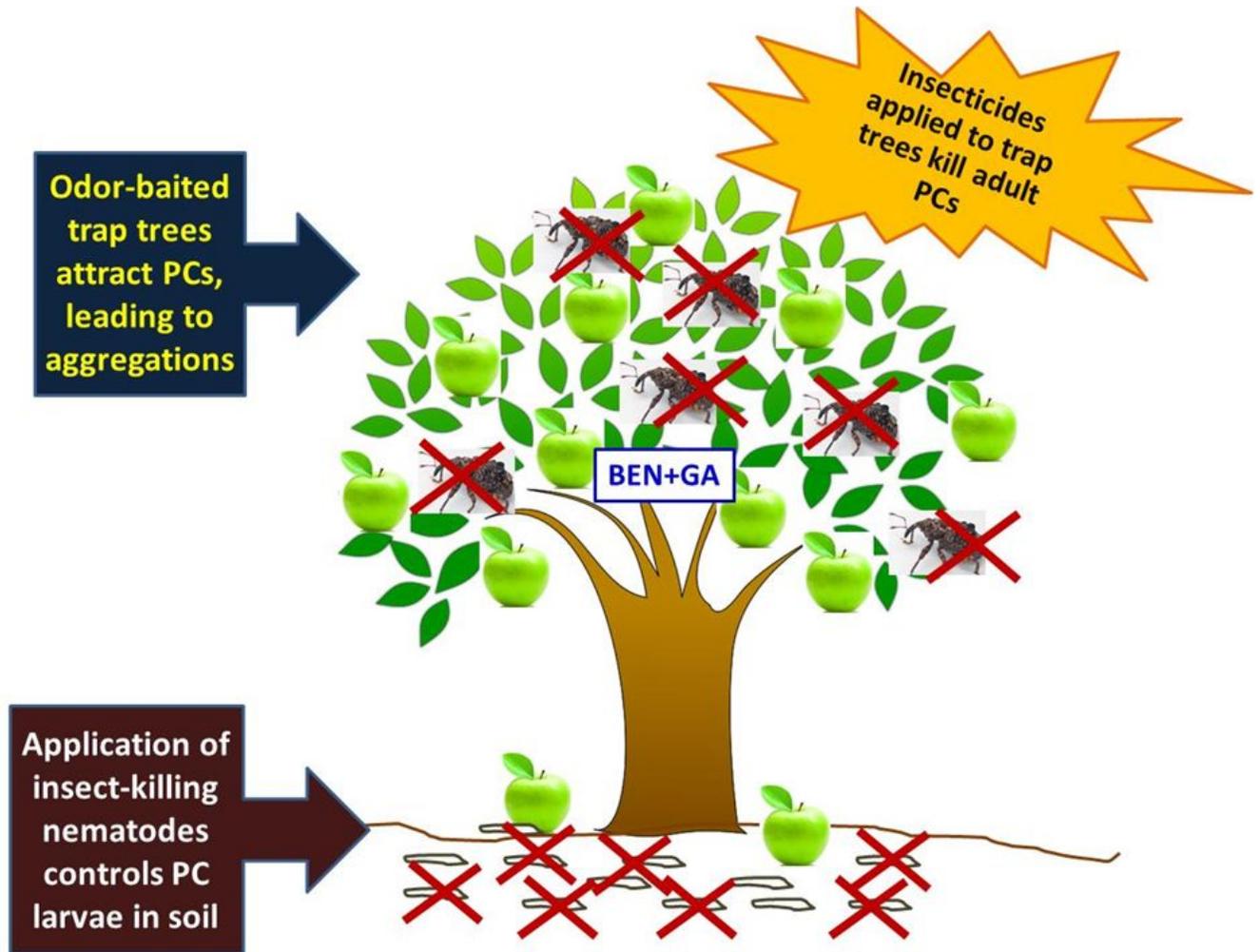
***Steinernema riobrave* was the most effective nematode species against PC larvae. The above results are highly encouraging because this is the first time that biological control of PC shows high promise in the near future.**

II. Integration of Biological Control (Involving EPNs) with Attract-and-Kill (Involving Odor-Baited Trap Trees) for Sustainable PC Control.

Previously, extensive field research that aimed at screening compounds for attractiveness to PC led to the identification of a synergistic two-component lure (Piñero et al., 2001; Piñero and Prokopy, 2003). This dual lure, comprised of the plant volatile benzaldehyde (BEN) in association with grandisoic acid (GA), the synthetic PC pheromone, was used successfully by the late R.J. Prokopy (Prokopy et al. 2003, 2014) to develop an effective monitoring system for PC involving odor-baited trap trees. More recently, Leskey et al. (2008) evaluated odor-baited trap trees for direct control of PC, with promising results. This new approach calls for baiting the branches of several perimeter-row trees, and confining insecticide applications to those trees only.

Combined findings from the last 15+ years indicate that PCs do aggregate on perimeter-row trap trees that are baited with BEN+GA. Farmers can then spray insecticide to trap trees to kill PC adults. Application of EPNs underneath the canopies of trap trees controls PC larvae in the soil.

Plans are underway to demonstrate the effectiveness of an integrated PC control system involving odor-baited trap trees and EPNs (see diagram below). This will be done in 2018 in 4-5 orchards throughout Massachusetts. Stay tuned!



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Diseases

Dan Cooley

Still Chillin’

This past week’s weather and the predictions for what’s coming leave the scab situation largely unchanged. Take a look at the disease recommendations for the past two weeks for details, because they still apply. There are still a very few ascospores mature and ready to release, while there’s a very little green tissue available to infect. Fungicides such as copper, mancozeb (3 lb. rate), or captan (2.5 lb. Captan 80 or equivalent) should be enough to deal with potential early infections. As I said last week, to deal with high inoculum situations or to get some post-infection activity, add Syllit, Vanguard or Scala. Save the more effective materials for later, tight cluster through bloom.

It’s interesting that temperatures have been hovering in a range where apple trees grow very little or not at all, while the scab fungus does keep slowly developing. This is basically what has led to a little more inoculum than we usually have relative to apple growth stage.

Horticulture

Jon Clements

Got branching? If not, see the recommendation on MaxCel ([label](#)) or Promalin ([label](#)) labels to apply high concentration of 6-BA in paint to one-year-old wood pre-bud break. (See below for relevant part of label.) I expect Exilis 9.5 SC ([label](#)) and [Perlan](#) ([label](#)) to do the same. Also see [F-140 Branching Apple Trees with Plant Growth Regulators](#).

MAXCEL

LATEX APPLICATION

Use	Application Rate: Concentration of a.i. in PPM	Product/ Acre	Application Method and Timing
Apples (Nursery and Young Orchard) For increasing lateral bud break and shoot growth, improve branch angles, and provide a better tree framework for early cropping. (Not for use in California)	5,000-7,500 ppm (0.2-0.33 pint <i>MaxCel</i> per pint of latex paint)	Do not apply more than 320 oz of <i>MaxCel</i> (20 pints) per acre per season.	Apply in the spring when terminal buds begin to swell but before shoots emerge. At the point where branching is desired, uniformly apply the <i>MaxCel</i> /latex paint mixture with a brush or sponge to cover the bark surface thoroughly. Apply only to one year old wood.

NOTE: Do not apply the *MaxCel*/latex paint mixture after bud break. Applications after buds have broken have been known to cause some injury to the tender shoot tips and fail to promote shoot growth from that point.

NOTE: Any type of application of *MaxCel* to non-bearing pears and non-bearing sweet cherries has a one year pre-harvest interval.

PROMALIN

Table 2 - Latex Applications

Crop	Rate	Timing
Apples (Nursery and Orchard)	5,000 - 7,500 ppm* [0.2-0.33 pint (3.2-5.3 fluid ounces) <i>Promalin</i> per pint of latex paint]	Apply in the spring when terminal buds begin to swell but before shoots emerge.
Non-bearing Sweet Cherries (Orchard only)		

*parts per million

NOTE: Do not apply the *Promalin*-latex paint mixture after bud break. Applications after buds have broken have been known to cause some injury to tender shoot tips and fail to promote shoot growth from that point.

NOTE: Uniformly apply the *Promalin*-latex paint mixture with a brush or sponge to cover the bark surface thoroughly. Apply only to one year old wood.

NOTE: Any type of application of *Promalin* to non-bearing pears and non-bearing sweet cherries must not be made later than one year prior to first anticipated fruit harvest.

Hawkeye's corner (notes from the field)

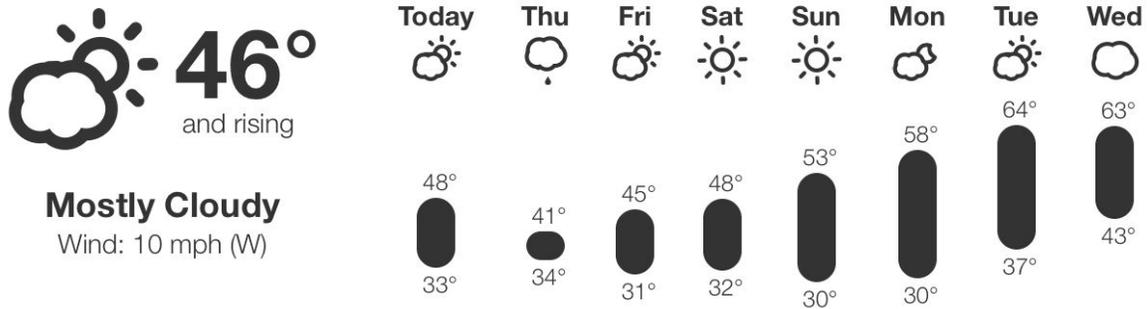
Liz Garofalo

I'd dearly love to tell you that there is an oil application opportunity coming our way but, unfortunately, it looks like we are a week out on that. Assuming the forecast holds (and you know what they say about assuming...). If you take a look at the forecast in [NOAA](#), you'll see

they say about the same as [Dark Sky](#).

Weather for Belchertown, MA

More at [Dark Sky](#)



All the same, be ready to get oil on for pear psylla as soon as you can. If you haven't had the opportunity to do so yet, you may want to consider putting an ovicide in with it. After you have scouted to confirm egg laying has occurred in your pears (check out Jaime's awesome psylla pics linked above!). Esteem (IRAC 7C) is a good choice for this use (see label for rates, etc.). Centaur (IRAC 16) is also a good choice, HOWEVER, you get only two applications per year, so, you may want to keep this one in the shed and break it out if populations begin to rise drastically later in the season or as a solid rotation option for your resistance management program.



What I don't dearly love is poorly managed weeds (as a matter of fact, it makes me bonkers!). I think this photo wins the prize for ugliest, wartiest burr knot of all time. Why? The weeds that were permitted to overwinter inside the mouse guards conspired with the wet weather to create the burr knot which then became a hot spot for a wooly apple aphid party, hence the warts and white "stuff" in the pic. As I mentioned last week, you should have all last year's

weed debris cleaned out of the tree rows so that the pre-emergent herbicide application you use will be effective (aren't you glad I didn't say scab sanitation?!). It won't do you any good if it doesn't make it to the soil where it will toast seeds as they begin to sprout. Here are a few weed management options that you can employ this spring:

Pre-emergence:

Alion (Group 29) for orchards established 3+ years-> For “optimal” results, soil surface should be dry at time of application and remain dry for 48 hours following application. After that period, however, moisture is needed to activate the herbicide. Alion will not control already emerged weeds. If overwintered weed debris remains on the ground (in rows), it could prevent the herbicide from reaching the ground and reduce control.

Surflan (Group 3)-> This does not control rhizome or other root-type emergence. This material only deals with weeds emerging from seed. This material requires rain/irrigation to activate when applied to fine or high organic matter soils.

Ed. note: Prowl H₂O is good for annual grasses at this time: Gallery is a must in new plantings (see New plantings-1st leaf in New England Tree Fruit Management Guide for more options)

Post-emergence:

AimEC (Group E)-> For burn down of emerged weeds up to 4” in height. Controls broadleaf weeds only.

Gramoxone (Group 22)-> Label signal word “DANGER”.

2, 4-D (Group 4)-> Label signal word “DANGER”.

Rely (Group 10)-> Do not apply more than 4.5 pounds of active ingredient per acre per year, or, make more than 3 application per acre per year. Warm temperatures, high humidity and bright sunlight increase the efficacy of Rely (so, this is better for later Spring into Summer as a contact only material).

Glyphosate (Group 9)-> As with most burndown herbicides, weeds under drought conditions are less susceptible to control with this material.

Pre and Post:

Chateau (Group 14)-> **Do not apply within 300 yards of non-dormant pear. Apply before pink for apples and prior to bud break on pear and stone fruit.**

Check labels for rates and tank mixing compatibility.

Prowl H₂O (Group 3)-> May be used in bearing and non-bearing plantings. Do not exceed 4.2 quarts per acre per year in pome fruits.

Guest article

No guest article this week...

Facebook Me



Amy Irish-Brown

14 hrs · 🌐



I'll try anything to get some warmer weather in here! I wonder if we might be in a mini ice age and the weather people have missed it. I feel like I'm in that movie "The Day After Tomorrow".



Like

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You, Gary P. Pullano and 18 others

Useful links

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

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

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

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[Acimovic Lab at Hudson Valley](#)

[Peter Jentsch's Blog](#)

The next Healthy Fruit will be published on or about April 24, 2018. 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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