



Healthy Fruit, Vol. 26, No. 9, May 29, 2018

Jon Clements, Author (unless otherwise noted) and Editor

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Current degree day accumulations

UMass Cold Spring Orchard, Belchertown, MA	28-May
Base 43 BE (NEWA)	734
Base 50 BE (NEWA)	416

Upcoming pest events

Coming events	Degree days (Base 43)	Meaning?
Codling moth 1st flight peak	563 to 991	1st sustained trap catch = biofix set to start DD model for insecticide timing
Dogwood borer 1st catch	754 to 1243	If used, mating disruption should be up soon; alternately, any time now for directed insecticide trunk spray
European red mite summer egg hatch	737 to 923	Consider the use of highly refined summer oil sprays beginning now at one gallon per 100 gallons finished spray
Oblique-banded leafroller 1st catch	797- to 980	Hang pheromone traps to monitor presence/absence and set biofix
Oriental fruit moth 1st flight subsides	829 to 1103	Getting late for mating disruption, petal fall insecticides should be taking care of
Peachtree borer 1st catch	781 to 1320	If used, mating disruption should be up soon
Pear psylla 1st summer generation adults present	737 to 885	See Hawkeye's Corner
Redbanded leafroller 1st flight subsides	604 to 891	Petal fall and 1st cover insecticides should deal with it?

Spotted tentiform leafminer 1st flight subsides	678 to 946	Should be scouting for mines as a result of egg-laying by this 1st generation
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Ag-Radar Summary

Key insect life cycle and management dates

Note: for 2018, we have ten Massachusetts orchard locations subscribed to AR: Amherst, Belchertown (2 locations), Brookfield, Deerfield, Easthampton, Groton, Leominster, Northboro, and Westhampton. The website for looking at AgRadar for these locations is: <http://extension.umaine.edu/ipm/ag-radar-apple-sites/>. What follows is the AgRadar summary for the Belchertown location.

Estimated Apple Scab Ascospore Maturity, 29-May -- 99%; the next rain should release all the available primary spores if it has not happened already. **Key Apple Scab Dates:** First primary scab infection (including those with only night rain) that lasts past Half Inch Green starts: April 25. If present, lesions from the season's first primary scab infection period would become visible and begin producing conidia for spread of secondary scab on: May 7, Monday. Date of 'Final' significant primary scab ascospore release is: June 1, Friday. 'Final' defined as best guess of 99+% cumulative ascospore release, and high probability that at least 95% of ascospores have been released. Secondary scab protection and scouting should continue until 2nd generation lesions from the season's final ascospore release have had time to begin appearing.

Codling Moth (CM) -- 1st generation, first sustained trap catch biofix date: May 15, Tuesday. Codling moth development as of May 29: 1st generation adult emergence at 29% and 1st generation egg hatch at 0%. In most orchards, insecticide targetted against plum curculio and apple maggot prevent codling moth damage. If targetted codling moth control is needed, key management dates are: 1st generation 3% CM egg hatch: June 2, Saturday, = target date for first spray where multiple sprays needed to control 1st generation CM. 1st generation 20% CM egg hatch: June 11, Monday = target date where ONE spray needed to control 1st generation CM.

ObliqueBanded Leafroller (OBLR) -- 1st generation OBLR flight begins around June 7, Thursday.

Oriental Fruit Moth OFM -- 1st generation OFM flight starts: May 3, Thursday. 1st generation 55% egg hatch and first treatment date, if needed: May 26, Saturday.

Plum Curculio (PC) -- Increased risk of PC damage as McIntosh and similar cultivars increase in fruit size: May 23, Wednesday. Earliest safe date for last PC insecticide spray: May 27,

Sunday.

Spotted Tentiform Leafminer (STLM) -- 1st STLM flight, peak trap catch: May 10, Thursday. 1st generation sapfeeding mines start showing: May 19, Saturday. Optimum sample date is around Wednesday, May 23, when a larger portion of the mines are visible.

McIntosh Bud Stages -- Thursday, May 10: Full Bloom; Thursday, May 17: 95% Petal Fall; Friday, May 18: 100% Petal Fall; Wednesday, May 23 Fruit Set.

Upcoming meetings

12-June, 2018. Fruit Twilight Meeting. TBA. (Any takers?)

14-June, 2018. Fruit Twilight Meeting. In cooperation with Rhode Island Fruit Growers' Association. Barden Family Orchard, 56 Elmdale Rd., North Scituate, RI. 5:30 PM.

From Mary Concklin @ UConn

Twilight Meeting: The CT Pomological Society Annual Summer Twilight meeting will be held on **Wednesday, June 13, 2018** at 6 PM. Bishops Orchard, 520 New England Rd, Guilford, CT.

RSVP is requested for dinner planning purposes. E-mail Michael Williams at michael.w@bishopsorchards.com or text to 860-304-3506 and include your name and # attending. No cost to you. This is open to everyone. Join us, meet new friends and catch up with old ones. Discussion on pest issues with Dr. Jaime Pinero, UMass Extension's new fruit entomologist; I will discuss disease issues; Evan Lentz and Casey Lambert, UConn iPIPE interns, will discuss the iPIPE program; staff at Bishops will give a tour of the farm; and more. 2 Pesticide credits will be available.

The way I see it

Jon Clements

I'm admittedly a bit out of it after spending a few days in Vermont over the Memorial Day weekend. It did not take long to notice, however, that chemical thinning applications are taking hold and we are getting some good fruitlet size differentiation. Your mileage may vary, and the window for another chemical thinning application is going to close this week. If fruitlets are getting much bigger than 15 mm, consider a [rescue thinning application of ethephon](#)?

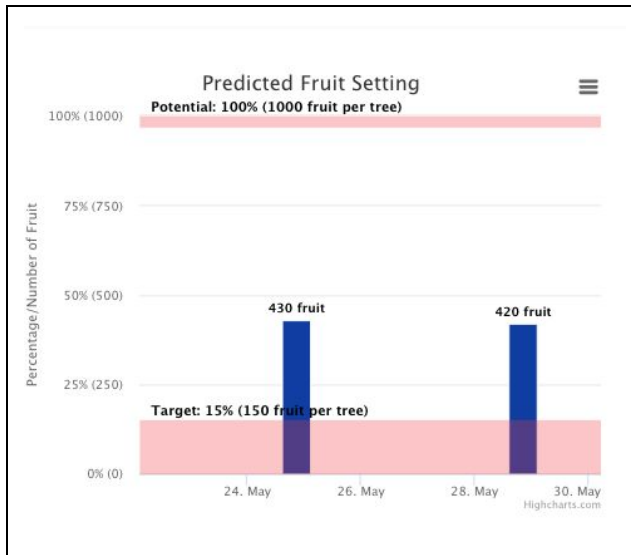


Wild apples still in bloom on 28-May, 2018 in northern Vermont

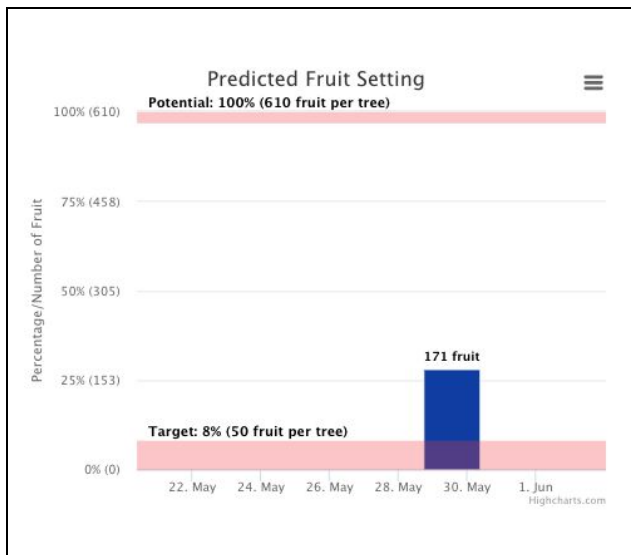
Otherwise, and back to reality::

- scab is showing up in force in an unsprayed McIntosh block, don't let your guard down
- newly planted trees are pushing hard, keep water on them, strip leaders of competing lateral shoots, consider a Promalin application to promote branching and push lateral growth (see [Horticulture](#))
- weeds are growing rapidly, get some herbicide on sooner than later as they will only get harder to get a handle on with time

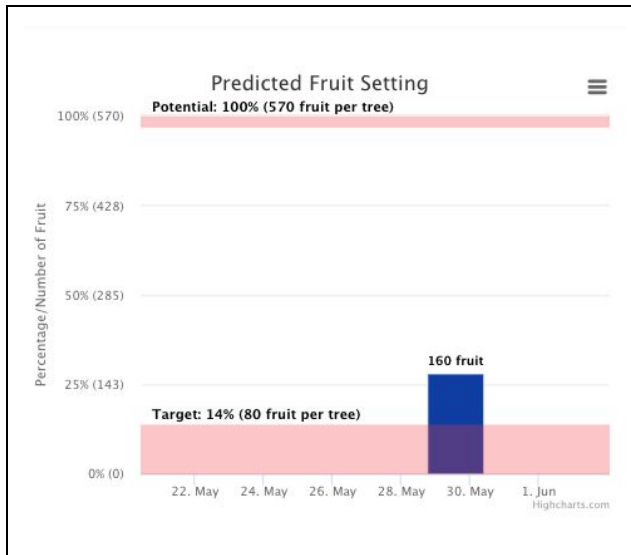
And, now for just one more thing, although you may put it in the "FWIW" or "so what?" category. But I've been testing the new Malusim app (malusim.org) out of Cornell. I've been measuring growing fruitlets on 5 clusters on 5 trees for Pazazz™, Fuji (Morning Mist), Gala (Buckeye), Honeycrisp, and McIntosh (Snappy Mac). In addition, Paul O'Connor, Dan Cooley's graduates student has been photographing -- using a highly specialized camera on loan from Carnegie Mellon University, the objective being to see if fruitlet growth rate can be imaged and then apply machine learning to emulate the fruitlet growth rate model based on actually measuring fruitlets over time -- a bunch (more than 100) Empire (Tome) clusters, and we have also been measuring those. Below, are preliminary snapshots of what's going on. Bottom line is another measurement should be made, but if I had to guess more thinning will be necessary on some of these. Or, the last thinner will work and all will be good? We will know next week...



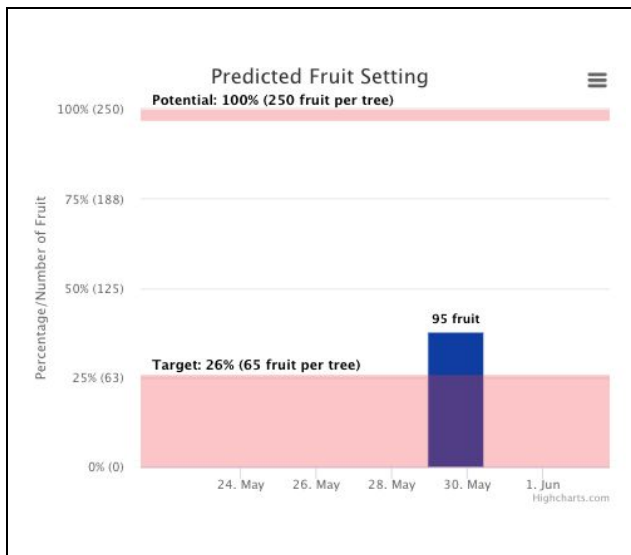
EMPIRE - are still setting way too many fruit, I'd be making another thinner application if looking for large EMPIRE!



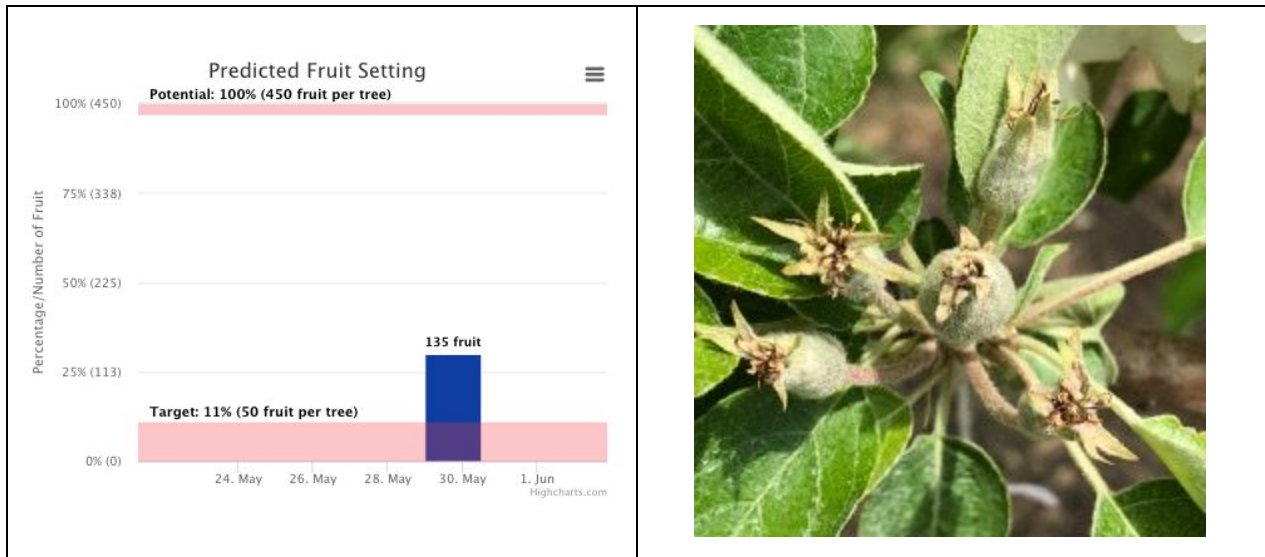
PAZAZZ™ - getting there, I would be waiting on this one as Pazazz has a tendency to thin easily...



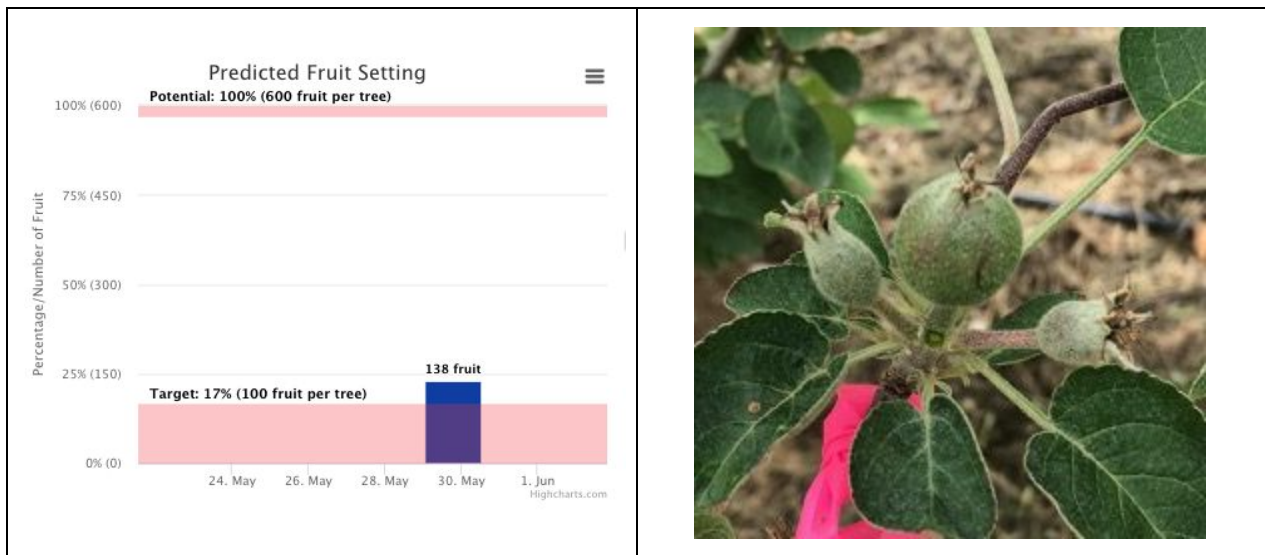
FUJI -- getting there, last chemical thinning application may do the job (or not) have to re-measure in a few days...



GALA -- overall poor return bloom on these, so I would let them rest now...with a few too many clusters still, arghh...



HONEYCRISP -- I'd be in here again touching these Honey's with some NAA or carbaryl...



MCINTOSH -- looking good, would be letting these ride, but we know McIntosh thins easily! Right?

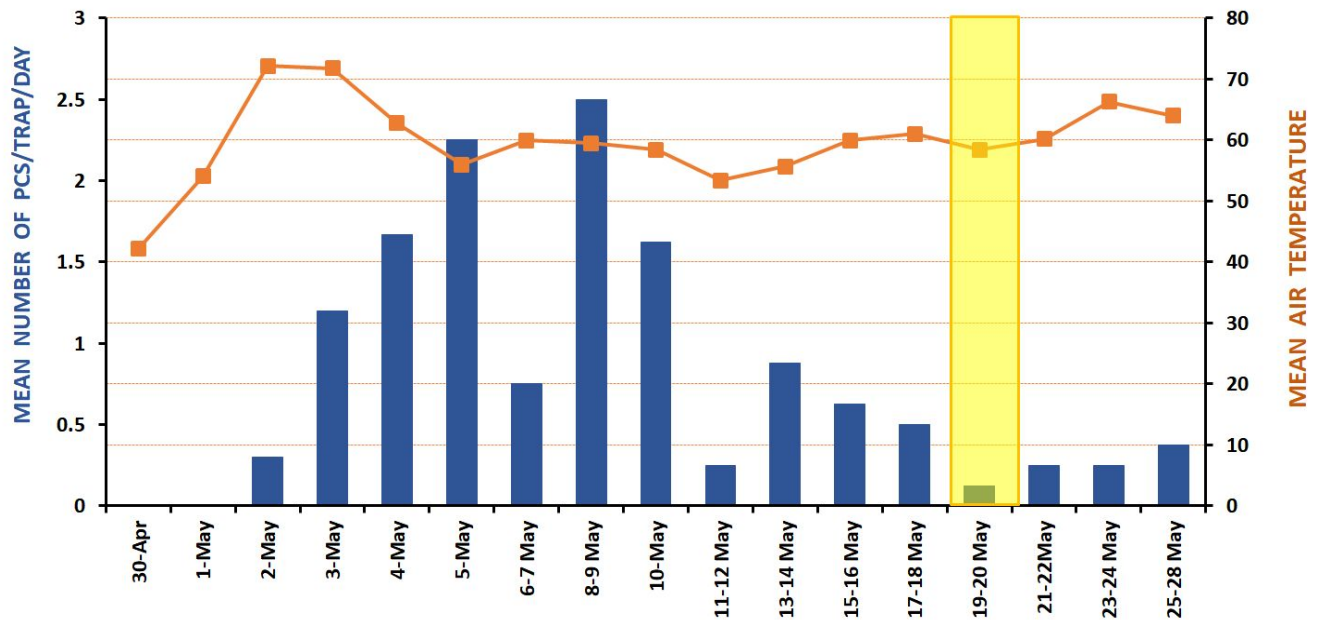
Insects

Jaime Pinero

Plum curculio update and peach tree borers

The period of plum curculio (PC) immigration is pretty much over, as indicated by comparatively low captures of adult PCs by black pyramid traps baited with benzaldehyde (BEN) and grandisoic acid (GA). Traps were deployed in late April in an unsprayed section of the UMass Cold Spring orchard. As shown in the graph below, for the last 10 days or so (May 19-28) PC captures have been quite low in despite of relatively warm air temperatures. The yellow rectangle shows the

petal fall period for McIntosh trees in Belchertown. This orchard block doesn't get insecticides because we use it for research on PC and other arthropods and some diseases. After the petal fall insecticide spray, subsequent PC pressure should be minimal in most well-managed orchards in MA. A different story may be for orchards neighboring abandoned or having not so well managed trees.



Several PC experiments continue to be conducted in apple orchards. Most of those experiments aim at (1) evaluating additional aromatic compounds to potentially increase the attractiveness of BEN + GA, and (2) demonstrating the effectiveness of odor-baited trap trees and use of beneficial nematodes to kill PC larvae in the soil. If a more attractive lure could be developed, then growers interested in using odor-baited trees for PC control could potentially use fewer trees, reducing costs.

One recent experiment compared the attractiveness of BEN produced commercially by AgBio, Inc. (the same company that markets GA) versus that of the BEN formulation that has been prepared in our lab at UMass. [Results indicate that both lures are equally attractive, which is good news. Until now, we didn't have information about the performance of the BEN lure from AgBio.](#)

PEACH BORER AND LESSER PEACH BORER. On a separate note, you may know that mating disruption is an alternative to chemical control that is increasingly being adopted by peach growers to control peach borer (*Synanthedon exitiosa*) and lesser peach borer (*Synanthedon pictipes*). For example, in Georgia 3,500 acres will be under mating disruption this year. Mating disruption has been used in the northeast and Michigan against these pests for quite some time now. Some Massachusetts peach growers have been using mating disruption as a way of

controlling these pests. From conversations I have had with some of those growers, mating disruption seems to be working very well.

Did you know that beneficial nematodes can be used both preventively and curatively to control peach borer and lesser peach borer? A guest article (see below) featuring multi-year research conducted by Dr. David Shapiro-Ilan (USDA-ARS, Byron, GA) and collaborators is included in this issue of *Healthy Fruit*.

If you ever happen to experience a peach tree infestation by borers and are interested in a demonstration of the use of beneficial nematodes to save borer-infested tree(s), please let me know. I will be happy to work with you on the application of nematodes.

Do you have any suggestions for articles on arthropod IPM? Please let me know!

Contact info: jpinero@umass.edu; (413) 545-1031 (campus office); (808) 756-2019 (cell).

Diseases

Dan Cooley



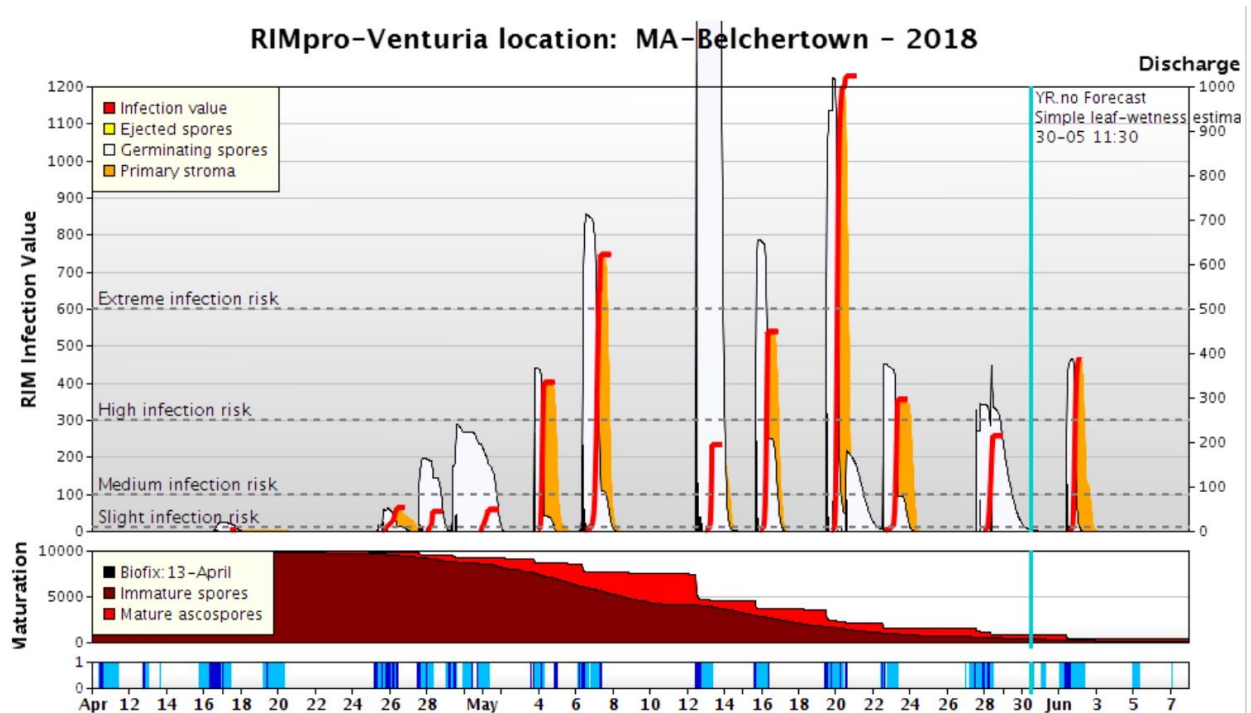
I have no problem finding scab on unsprayed McIntosh in our Block X spray trial. Early lesions showed last week, and I needed red arrows to point them out in the picture. A week later, not so much.

Infections are also showing up in commercial orchards, where timing was off, rates were off, or one of the several things that can make a spray less than 100% effective happened. In those orchards, take advantage of heat and full rates of Captan to keep things from getting out of hand.

If there isn't any secondary scab in an orchard, then it's still a little early to stop scab fungicides. NEWA says primary infections at Cold Spring Orchard were over as of the last rain on Sunday and Monday (May 27 - 28). RIMpro disagrees, and says we have one more primary infection coming with the next rain on Friday. Again, I look to Liz Garofalo and here spore traps for clarity. She is still finding spores, in fact quite a few of them, and agrees with RIMpro: at least one more infection for Cold Spring and western MA.

Both NEWA and RIMpro generally agree on the timing and number of primary scab infections this year, calling it 9 or 10, depending on what happens at the end of this week. NEWA says that there was an infection on March 29 - 30. This is NEWA being stupid. Green tip came on April 14 at CSO.

RIMpro also gives a sense of how intense an infection period is. This year, lines have been added to indicate risk in a typical orchard. Looking at the season of infection periods at CSO, the early season infections May 6 - 8 is "extreme", as was the May 20 infection, the heaviest of the year. The blue/green vertical line indicates the present, and shows the predicted infection could be serious. I don't want to get all scab-geeky, but to me it's interesting that a lot of spores were released and germinated on May 13, but few of them lasted long enough to actually infect. It wasn't wet enough for long enough.



Fire blight symptoms should be showing where conditions were right for infection and streptomycin wasn't used. I know this because conditions were right at CSO, and we made sure there was inoculum by spraying it on Jonagolds and Macs. This makes everyone nervous, me included, but it's the only way we learn what things work against the nasty bacteria. Last year, we ran the same experiment, testing biocontrols, but it was too cold for bacteria to grow after we inoculated flowers. We got no infections. This year, we got plenty.

We used strep, and it worked. I know we put on enough, because I got some yellow-white margins on a few leaves. So, even where we dumped on bacteria, streptomycin could control the infections.

In commercial orchards, the mid-May infections, if they happened, will show up this week. I would guess that growers who used strep during bloom should not have problems.

However, there are a few straggler blossoms out there, and the conditions for the past few days and coming up are ideal blight weather. So get rid of the blossoms, if possible.



Horticulture

Chemical Thinning suggestions the next 7 days

Duane Greene

Weather over the past week was in general favorable for thinning. In most cases this favorable weather coincided with the fruit size where fruit are most vulnerable to chemical thinners. If thinners were applied 6 or 7 days ago then orchardists should be able to see some fruit size differential developing within clusters. Although this past week was probably the best opportunity to thin, the weather forecast for the coming week appears favorable enough to do touch-up thinning in blocks of trees that are still set too heavily. In Belchertown, fruit size is generally between 12 and 15 mm. Thinners do not work as well as fruit size approaches 15 mm and greater, especially if the weather the previous week was favorable for thinning. The carbon balance model for the next 3 days indicates that there is a neutral to slightly negative carbon balance. This is interpreted to mean that standard thinning rates for a variety or block should be used. If fruit size is near 15 mm then I suggest that orchardists use thinner combinations. I urge all orchardists who still have heavy set trees to take advantage of the opportunity presented now to get out and apply thinners. After this week it will become progressively more difficult to thin. Take advantage of the thinning opportunity available to you this week. Much of what was said last week about thinner capability is still applicable. When fruit approach the 15 mm fruit size stage BA (MaxCel, Exilis Plus) with carbaryl may be a good choice. Keep in mind that BA works well only when temperature is warm following application, and based upon the weather forecast this appears to be the case this week. Application of NAA alone or NAA plus carbaryl at above 15 mm fruit size has the potential to result in smaller fruit size or no size increase even though it may thin. This is especially true when high rates of NAA are used and temperature following application is hot.

It should be noted that tree treated with Apogee or Kudos will be more difficult to thin. If you did treat some trees with either one of these growth retardants you should be more aggressive in your thinning program.

Next week fruit size should be 18 mm or larger. At that point the only recommended and effective thinner is ethephon plus carbaryl and thinning reliability of this combination is erratic.

Promalin and MaxCel guidelines for branching and tree growth

James Wargo

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Ed. note: I received this e-mail on 9-May from Jim Wargo, who lives and grows apples in Connecticut, and also is a Valent USA representative. Jim has field experience in using Promalin and Maxcel to enhance young tree growth. I thought his experience and information was worth sharing with you. Thanks Jim

Both **Promalin** and **MaxCel** can be used for branch initiation and promoting tree growth. The time to use these products to maximize orchard productivity is upon us. The how and when to use them can get confusing since there are several different scenarios where they may fit. I've outlined some specific guidelines below depending on what the desired goal is.

Promote branching on whips or leader growth on one year old wood (last season's growth) - This includes newly planted whips and leaders on trees planted last year. Timing of application on one year old wood is when spur leaves have unfurled and trees have 1 to 3" of new shoot growth. For trees in 2nd or 3rd leaf, apply along the leader of the tree where shoot growth is desired (same timing). This can also be done on first year whips planted in the orchard to make small side shoots along the whip. Apply after spur leaves have unfolded and only to the section of the whip where branching is desired.



MaxCel was applied to the length of newly planted whips to initiate side branching. MaxCel treated on left, untreated on right (notice lack of branching in untreated)

Photo: Jon Clements, UMASS Extension

Promote side (axillary) shoot development on current season's leader growth - Here MaxCel or Promalin is applied in multiple applications with every 5-6" of new terminal growth. This use was initially designed to produce feathered nursery trees, but can be beneficial when applied to the leader (current season's growth) on 1 and 2 year old trees in the orchard as well. It will help to prevent blind wood from developing along the leader.



Promalin applied along current season terminal growth. Notice side branch development along leader where Promalin was applied.

Promote growth of weak growing or runted non-bearing trees - Whole tree sprays of Promalin will promote growth of the entire tree. This use has been particularly beneficial on weak growing varieties (Honeycrisp, Snap Dragon, Spur Red Delicious) and runted out trees. Additionally, whole tree sprays can be of value on replant sites where growth often lags. For whole tree sprays, apply Promalin to the entire tree after trees have initiated 2 – 3” of new shoot growth.



Whole tree spray of Promalin to promote tree growth of Honeycrisp (2nd leaf)

Accelerating leader growth in Tall Spindle systems – where the goal is to get the leader to reach the top wire as quickly as possible, direct the Promalin application to the tip of the leader once trees have 2 – 3” of new tip growth. Multiple applications directed toward the growing point will keep the leader growing for an even longer period and add more growth. To promote extension of the leader and initiate side branching at the same time, apply to the whole length of the leader including the tip. Multiple applications will be needed with every 6 – 8” of leader growth to obtain side branching along the entire length of the leader.



Promalin applied to leader tips to promote extension growth. Both photos show treated leaders

Promote branching on blind wood that is older than one year - If the goal is to promote branch development in bare spots on older wood (wood older than one year), you first have to notch the bark above the buds with a hacksaw blade and then apply MaxCel or Promalin to the notch. Notching should be done between bud break and about 2 weeks afterwards so there is a relatively small window of opportunity to get it done.



The combination of MaxCel and notching to promote branch development in 2 and 3 year old blind wood.

When to Use Promalin vs. MaxCel? - I'm recommending Promalin where the goal is to promote leader growth (getting it to the top wire as fast as possible) and in situations where longer side branches are desired. Basically MaxCel and Promalin will do the same thing in terms of shoot initiation, but the added GA4+7 in Promalin helps with cell elongation resulting in longer branches. In general terms, I think MaxCel is the better option on more vigorous varieties such as Fuji and Gala while Promalin is a better option for weaker growing varieties such as Honeycrisp, Snap Dragon and Red Delicious.

All uses described above should be applied at 300 -500 ppm. Typically 500 ppm is used. This equates to 1 gallon of either Promalin or MaxCel in 40 gallons of water. If using an airblast sprayer, consider stretching the rate to 1 gallon in 50. The use rate is the same for both products. For best results, add a small amount of water soluble 20-20-20 at labeled rates. No surfactant is needed.

Regards,
Jim

Hawkeye's corner (notes from the field)

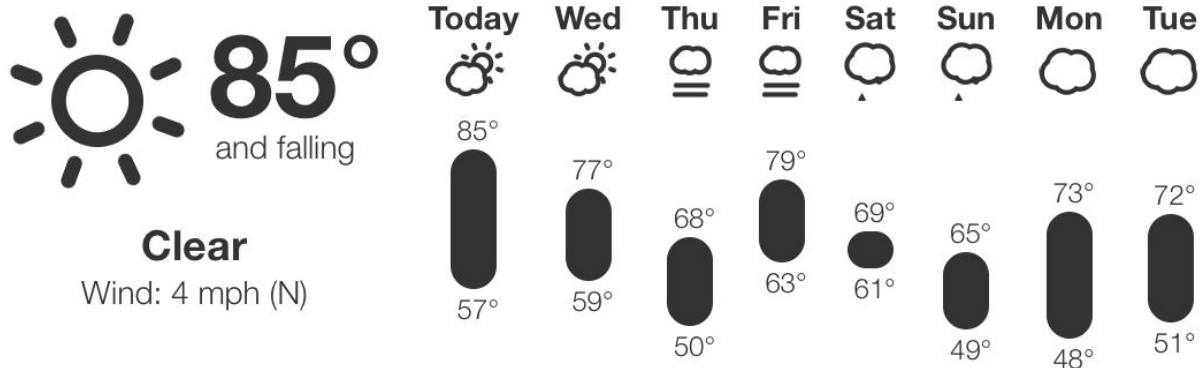
Liz Garofalo



Summer **pear psylla** adults are present. Time to start watching for oil application windows to deter egg laying. At this point no more than a 0.5% (0.5 gallons per 100 gallons) rate should be used. Forecast is looking good for oil too. With the early season oill applications being hairy this year, that is, it was hard to find a time to apply oil when the temperatures weren't to low, its even more important to deter egg laying of this new generation of adults. The nymphal populations and the damage they cause will get out of hand before you know and the overlapping generations makes targeted and effective insecticides tricky. I really can't stress enough how important a management tool oil is in the battle against pear psylla.

Weather for Belchertown, MA

More at [Dark Sky](#)





Plum curculio are still moving around and laying eggs. Check for signs of fresh scars in hot spots before making a perimeter application.

Have I mentioned how much I hate **gypsy moth**? One more reason why:





They sure do make a mess of things!

Ed. note, I am with Hawkeye on this one, be glad you don't have them (if you don't)...

Guest article

Control of the Peachtree Borer and Lesser Peachtree Borer Using Beneficial Nematodes

David I. Shapiro-Ilan,¹ Ted E. Cottrell,¹ Russell F. Mizell III,² Mercy A. Olmstead³ and J.C. Piñero⁴

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²Department of Entomology, NFREC, University of Florida, Quincy, FL

³Horticultural Sciences Department, UF/IFAS, University of Florida, Gainesville, FL

⁴Stockbridge School of Agriculture, University of Massachusetts, Amherst, MA

Introduction.

The peachtree borer (PB), *Synanthedon exitiosa*, and the lesser peachtree borer (LPB), *Synanthedon pictipes* are a major pest of stone fruits including peach in the eastern United States. Current control recommendations for both species of borers include use of chemical insecticides (e.g., Lorsban®) and mating disruption. The



Fig. 1. Peachtree borer damage at the base of the tree (photo by Stacy Byrd, USDA-ARS)

latter alternative is being adopted by peach growers across the U.S.A.

In the southeastern US, the majority of PB moths emerge and mate during the summer and early fall. Females deposit eggs on or near the bark of host plants. Hatched larvae bore into the trunk near the soil surface and tunnel into the roots (Fig. 1). Larvae feed below the soil surface on major roots. The larvae overwinter in the host plant but can continue to feed during warm periods. Emergence of adult LPB typically begins in March and peaks in April and May, and a second adult emergence peak occurs between July and September. Adult moths lay eggs on the trunk and scaffold limbs usually in cracks in the tree's bark or near injured areas.

In addition to insecticides and mating disruption, recent research has demonstrated that entomopathogenic nematodes, also known as beneficial nematodes, can be used effectively to control PB and LPB.

Entomopathogenic (also called beneficial) nematodes (EPNs) of the genera *Steinernema* and *Heterorhabditis* (Fig. 2) are safe and bio-insecticides. Unlike harmful plant-parasitic nematodes, EPNs only attack insects. The nematodes enter insects through natural openings or sometimes directly through the insect's cuticle. Subsequently, the insect dies, usually within 24 to 48 hours. The nematodes reproduce within the dead host, after which progeny nematodes exit the cadaver to find new hosts to attack. Beneficial nematodes are produced commercially by several companies and are used to control a variety of economically important insect pests.



Fig 2. An infective juvenile beneficial nematode (photo by J. Morales-Ramos, USDA-ARS)

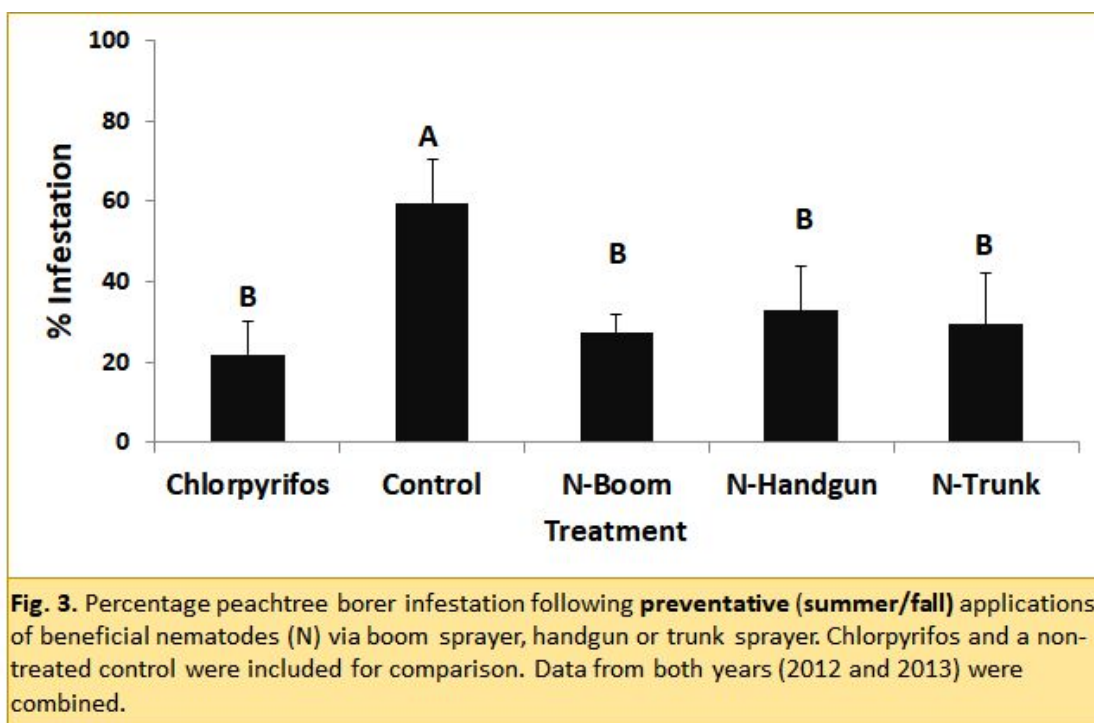
Peachtree Borer (PB) Research: *Summer/Fall Application of EPNs (preventative approach)*

An experiment was conducted to determine the efficacy of EPNs in controlling PB in a preventative manner, i.e., with summer/fall applications. This follows the same approach commonly used by growers to manage PB whereby insecticides are sprayed in the later summer or fall to prevent damage to the tree. For EPN application, a boom sprayer, trunk sprayer and handgun were compared.

Methods: The experiment was conducted in a peach orchard in Byron, Georgia. The EPN *Steinernema carpocapsae*, used in all applications, was obtained from BASF Corporation. Nematodes were applied at 1.5 million per tree (applications only need to target a 1 to 2 ft

radius from the trunk). Application of chlorpyrifos (6 pints per 100 gallons) and a non-treated control were also included in the evaluation. Each treatment was applied to three blocks of seven trees. Treatment applications were made in two consecutive years, September 2012 and September 2013. Following application all EPN plots were irrigated for two weeks post-treatment. The effectiveness of treatments was assessed in the spring (April) following each application; the percentage of trees with PB infestation was compared.

Results: Results were combined for both years. All nematode treatments and chlorpyrifos reduced PB infestation relative to the non-treated control; there was no difference between chlorpyrifos and the nematode treatments (Fig. 3).



Key message: The EPN *Steinernema carpocapsae* can be applied as a **preventative** control of PB in late summer or fall applications (the same timing that chemical insecticides are used).

Peachtree Borer (PB) Research: *Spring Application of EPNs (curative approach)*

Although PB is generally controlled in summer or fall applications, missed applications, poor application timing or other factors may result in high levels of PB infestation through the following spring. Curative treatments applied in the spring to established infestations would limit damage to the tree and prevent the next generation of peachtree borer from emerging within the orchard. However, prior to our research, such curative measures for control of

peachtree borer did not exist. Thus, our objective was to measure the efficacy of the beneficial nematode, *Steinernema carpocapsae*, as a curative control for existing infestations of PB.

Methods: Treatments were applied in peach orchards (Fort Valley, and Byron, GA) in May 2014 and May 2015. Applications of *S. carpocapsae* (obtained from a commercial source) were made to infested trees and compared with chlorpyrifos and a water-only control. Additionally, types of spray equipment were compared: nematodes were applied via boom sprayer, handgun, or trunk sprayer. Treatment effects were assessed 3-6 weeks later by determining the number of surviving peachtree borer larvae per tree. In lieu of irrigation, a fire gel Barricade® was applied to keep the nematodes moist following application.

Results: All nematode treatments provided significant curative control. In contrast, chlorpyrifos failed to significantly reduce the number of surviving PB larvae (Fig. 4; only data from 2015 are shown; 2014 results were the same).

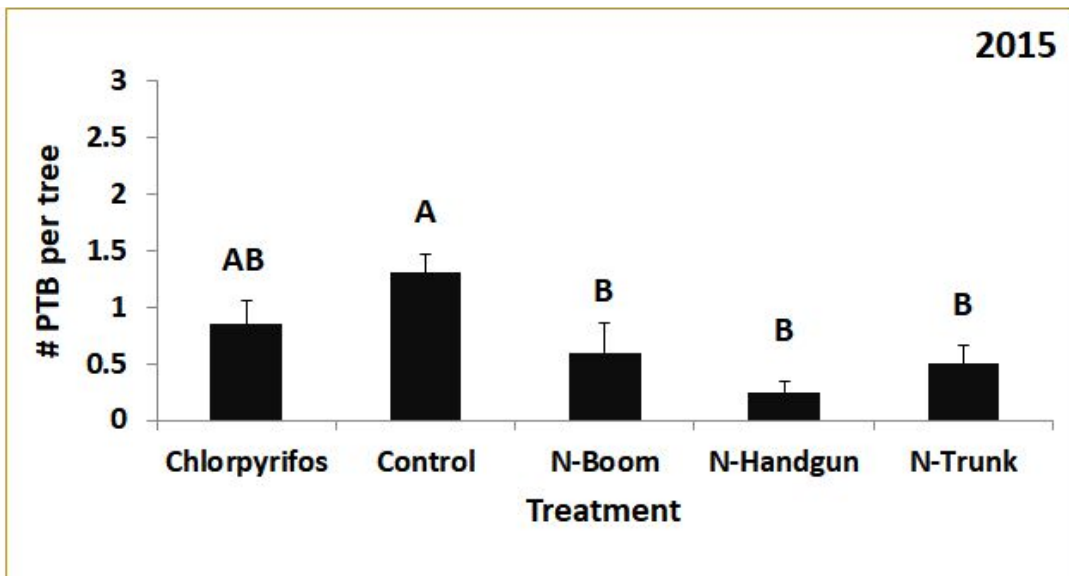


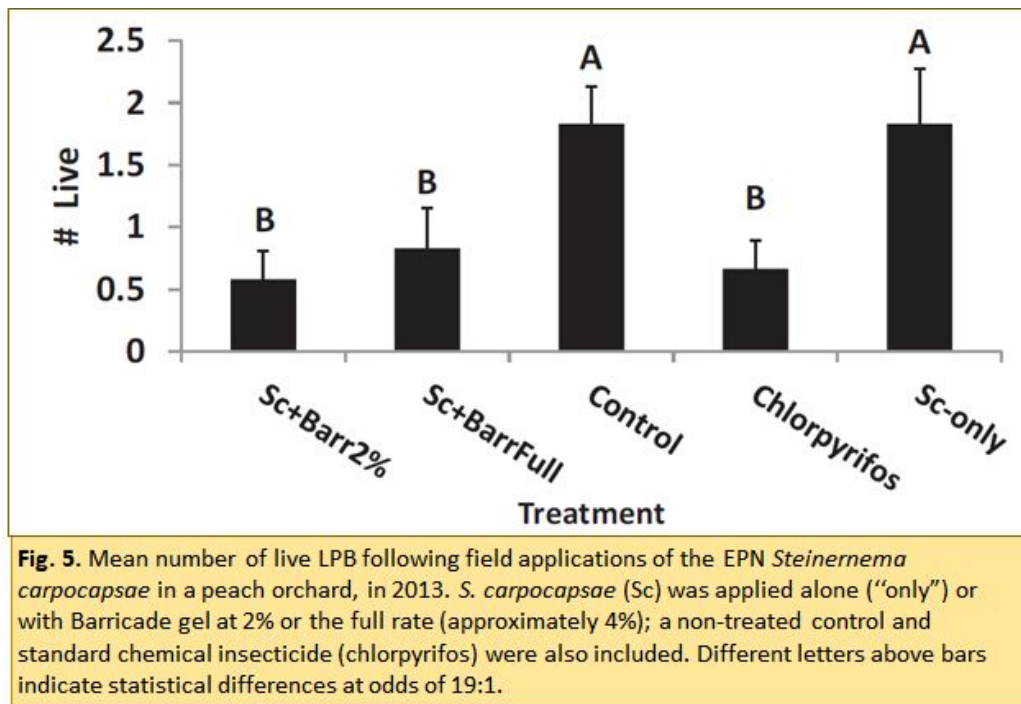
Fig. 4. Percentage peachtree borer infestation following **curative (spring)** applications of beneficial nematodes (N) via boom sprayer, handgun or trunk sprayer. Chlorpyrifos and a non-treated control were included for comparison. Only results from 2015 are shown, 2014 results were the same.

Key message: The EPN *S. carpocapsae* can also be applied in the spring as a **curative** control to clean up any remaining PB larvae and prevent the next generation of moth adults from emerging.

Lesser Peachtree Borer Research: Summer/Fall Application of EPNs (preventative approach)

Methods: Field experiments aimed at comparing the efficacy of fall applications of *S. carpocapsae* with chlorpyrifos were conducted in Florida over a 2-year period (2013 and 2014). Four treatments were evaluated: (1) EPNs applied alone (“only”), (2) EPNs applied with Barricade® gel (an anti-desiccant and UV blocker) at 2%, (3) EPNs with Barricade® gel at the full rate (approximately 4%), (4) standard chemical insecticide (chlorpyrifos), and (5) untreated control. All treatments were applied in the fall to wounds infested with LPB. Infested wounds were identified and marked prior to treatment application. For EPN nematode applications, one million infective juveniles were applied to each wound. EPNs and chlorpyrifos were applied as a single spray using a 7.6 L handheld pump sprayer.

2013 results: Compared with the non-treated control, lower LPB survival was observed in wounds receiving EPNs with Barricade® (2% or full rate) or chlorpyrifos.



2014 results: EPN application with 2% Barricade® was the only treatment that resulted in lower LPB survival compared with the non-treated control.

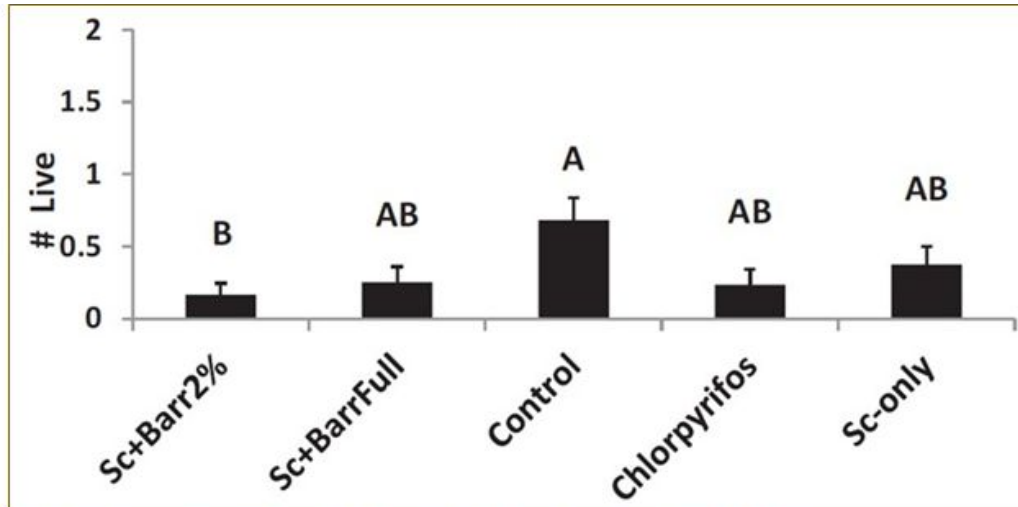


Fig. 6. Mean number of live LPB following field applications of the EPN *Steinernema carpocapsae* in a peach orchard, in 2014. *S. carpocapsae* (Sc) was applied alone (“only”) or with Barricade gel at 2% or the full rate (approximately 4%); a non-treated control and standard chemical insecticide (chlorpyrifos) were also included. Different letters above bars indicate statistical differences at odds of 19:1.

Key message: The EPN *S. carpocapsae* applied in the fall is as effective as chlorpyrifos in controlling LPB. The Barricade® (2%) gel is recommended because EPNs desiccate easily and are affected by UV light when applied above ground.

Conclusions

The beneficial nematode, *Steinernema carpocapsae*, can be applied effectively for control of peachtree borer (PB) and the lesser peachtree borer (LPB). Applications can be made preventatively in the summer/fall or curatively in the spring (only tested against PB). Nematode efficacy is similar to chlorpyrifos in preventative applications in the fall. For PB, curative control in the spring can be achieved with EPNs but not with chlorpyrifos. The nematodes can be applied using standard agricultural equipment. It is important to keep the soil moist for at least two weeks after applying nematodes. Alternatively, if irrigation does not exist in the orchard, a gel can be applied to the soil surface to keep the nematodes moist.

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What lovely and great people!!! Great orchards!! Thanks Georgian Bay Apple growers ❤️ @ The Blue Mountains, Ontario



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José Itamar Boneti Modern Orchards....beautiful..

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Jon Clements Been there, very nice place, they were lucky to have your expertise there!

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The next Healthy Fruit will be published on or about June 5, 2018. (Although it may be a little late next week as I will be off M-W.) 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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