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curculio progress

Posted by [Michael Phillips](#)

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[Michael Phillips](#)

[curculio progress](#)

July 04, 2019 02:45AM

Moderator

Registered: 11 years ago

Posts: 621

How are we doing with curculio strategies? I am quite happy with the results of a limited Surround plan integrated with biological kill strategies. Specifically, this means full-rate Surround where this pest first shows up. For me, that's essentially the American-Asian hybrid plums, the pie cherries, and the pears. All these fruits bloom prior to apple and thus have a jump start on fruit set. Curculio notices, and thus that first clay spray *weakens the beast*. The next week I combine Surround with Entrust (spinosad) as this kills approximately 50% of curculio plus apple sawfly in its second instar stage. This goes on first round trees and all bearing apples the week of apple fruit set. The next week I alternate the plan with Venerate, a fermented biology product which lists curculio on its label, on all bearing trees of every type. Definitely still using Surround as well, just because the clay is totally irritating to these persistent weevils. The results are totally satisfactory for me in this place in this belated 2019 season as we enter July.

Here's what cool. If you now post what you have done and the subjective results of such . . . we continue to learn more about one of our most challenging pests. Some of you are possibly frustrated as hell. Share that. There's admittedly less pressure from plum curculio in northern New Hampshire but I have apple curculio to make up the difference. Genuine sharing is the key to growers learning more, whatever the bioregion. And that's how we collectively gain through a shared knowledge base by means of the direct experience of each and every one of us.

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

Edited 3 time(s). Last edit at 07/01/2020 06:26PM by Michael Phillips.

[Reply](#) [Quote](#)

[Peter Fisher](#)

[Re: curculio progress](#)

May 30, 2020 09:46PM

Registered: 10 years ago

Posts: 82

Here is part of a blog by an Iowa organic orchardist, Maury Wills, who I don't think is on this forum:

Plum curculio: Plum curculio are Maury's most staunch nemesis. "We have tried everything for plum curculio management — the gallon jugs cut open with the banana peel; the smelly stuff; the goop; the towers with a water basin and oil with the lights above it; we've lit fires for insects; put bed sheets out and tapped the limbs. You get to a point with scale that you can't do all of that, and they're not quite as effective as you'd hope."

"Now we are using plum curculio traps — the insects like the dark, like the trunk of a tree. They crawl up the pyramid and then get trapped in the top. I've been using a scent above the traps to draw the plum curculio, but I'm not going to do that anymore, I don't want to draw them and we've caught them without having the scent out. A trap will last for five years, and costs \$20. Ideally the traps are spaced every 15 feet; I have them spaced a little farther, but add more each year. One female plum curculio lays 400-500 eggs, and she won't lay them all in one apple. We used mating disruptors this year in the semi-dwarf and high-density orchard; I think they were effective but we need to do more in the high-density."

The traps he is referring to are the tall free-standing pyramid traps.

So I may try those next season if this year's multi-pronged strategy is not successful. I would be curious if anyone else has tried to basically trap them out.

Turkey Creek Orchard

Solon, Iowa (zone 5A)

[Reply](#) [Quote](#)

[Peter Fisher](#)

[Re: curculio progress](#)

May 30, 2020 10:03PM

Registered: 10 years ago

Posts: 82

This year I have tried beneficial nematodes for the first time. Sr (*Steinernema riobrave*) are supposed to have some effectiveness for PC. I sprayed last fall and again this spring. Here's the problem for me. Our orchard is not irrigated, and it is on a hill. The protocol for nematodes is that the ground should be wet when you apply them, and it should be kept wet for 2 weeks afterwards. So I have to watch the long range forecast and order the nematodes when it looks like a rainy period is coming, and then hope I have a rainy day followed by a dry day followed by rain off and on for at least several days, and that this opportunity comes before the nematodes expire. I can't spray when the grass is actually wet because I couldn't get back up the hill with my sprayer. I use an atv sprayer, broadcasting in the aisles followed by using the wand to get close to the trunks.

So what I may try next time is mixing the nematodes in the sprayer and then adding enough Barricade fire retardant gel to make a 2% solution. Then if I spray when the ground is wet I do not need to worry about rain afterwards. The Barricade solution has been shown to work with Sc nematodes against peach tree borers. It keeps the nematodes wet in the cracks of the trunks for LPTB, avoiding the need for plastering the trunks, and somewhat surprisingly has also worked using the same nematodes on the ground around the trunk for the soil dwelling GPTB, avoiding the need for irrigation. I got this information from a chat with David Shapiro at USDA, who has published a couple of articles about the use of nematodes for peach tree borers. So if the barricade works as a substitute for irrigation for borers, why wouldn't it work for Sr nematodes against PC?

Turkey Creek Orchard
Solon, Iowa (zone 5A)

[Reply Quote](#)

[Jason MacArthur](#)

[Re: curculio progress](#)

June 22, 2020 01:48PM

Registered: 6 years ago

Posts: 28

Here in my orchard Plum Curculio presents itself as a deafening wave of destruction battering down both my defenses and my morale from before the end of bloom until about now.

I think my orchard is particularly susceptible for several reasons-

- 1) it is small and surrounded by both old unsprayed trees and hardwoods
- 2) growing a wide range of varieties, from European bittersweets to Hewe's Crab, means that petal fall on one tree often coincides with Pink on one neighbor and full bloom on another.

I start applying Surround early, but even in a dry year like this, where maintaining coverage is not so challenging, the Curculio seem willing to crawl through a thick layer of clay to make their little crescent tattoos on fruit barely the size of a large pea. By the time I can apply Entrust they have stormed through leaving little untouched in their wake- an average fruitlet on some varieties might have 4 or 5 scars on it!

This year I applied Surround 3 times in a week, combined with Entrust on the the 3rd spray, and another Entrust application a week later. The damage is intense though it remains to be seen how the fruits will react- I'm watching now for signs of widespread drop.

I have to say that of all the obstacles I face in the orchard this is truly the most challenging. I also question the balance of impact between all of that Surround and Entrust vs. a single Imidan (gasp!) or Avaunt application. I picture doing this with a backpack sprayer in a highly localized manner to minimize over spray. I am not certified organic, but I am committed to growing my apples in as low impact a way as possible- but it is not always clear what that might be!

I have also pondered:

1) planting trap trees which could be treated in some way, perhaps a plum in the right spot would attract the attention of the amorous beasties?

2) the pyramid traps, which don't seem to have a great track record but might be able to help quell the onslaught...

I know we all face challenges which are demoralizing at times and force us to examine our principles and choices of how we grow fruit, this is mine.

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 22, 2020 02:40PM

Registered: 10 years ago

Posts: 298

Hi Jason,

Yes, PC damage can be disheartening and difficult to assess "what the next step" is. So to start let say these two things: 1) Entrust is not even registered for PC and 2) I've found Surround by itself of limited value, so it must be tank mixed. With Surround, start application 25 lbs/acre at tight cluster. Make two application before bloom (but not during) and the third at PF and a fourth at Fruit Set (5-10mm). The first two applications are made without any additions. The second two are made with additions of some insecticide. These can be Entrust (though any applications will be off label) or PyGanic (highest rate). As well, I would encourage the use of any repellents such as Thymegard or a KeyPLex product like Ecotrol 2 in addition to the insecticide and the Surround. Expensive, yes. But with such high pressure, there aren't any feasible insecticide options except Imidan or Avaunt. Assuming we move past the Imidan discussion, then we can look at some other options.

- sanitation - pick up all the damaged fruitlets from your orchard as soon as possible. The PC egg has hatched into a larva that burrows its way into the fruitlet. The fruit drops, the larva pupates and exits onto the ground where it starts its life cycle all over again. If you have an orchard sweeper, then you could sweep the damaged fruitlets to the row middle and chop with a flail chopper or rototiller or disk.

- animals - chickens are good at eating the PC (of all stages I presume) from the orchard floor. Ditto for pigs, especially after the damaged fruit drops. That said, livestock is yet another headache of sorts, but there are good breeds of pigs (AGH) that can be beneficial without doing damage to the trees.

- nematodes - beneficial nematodes are also an option. It takes a while for these to get established and they do need to be applied annually, but they do work. This option is way more technical to get into on a Monday morning, but if you are interested, please contact me directly. That said, there are companies that make concoctions of ready to apply nematodes. And it is fairly easy - though another task - to raise your own. Imagine a nematode petting zoo!!

The trick with any of these options is that work ONLY where you make the applications or treatments. They are constantly coming into an orchard from outside and so being vigilant on the inside doesn't do anything for the outside populations. Which brings me to two last thoughts:

1. Trap trees - I like this approach, though like anything else they'll need to be more attracted to that tree than your apples. And if you have no crop on your plums, then there's no reason for them to go there. But when they are there - or in any other tree - they can be collected and.....

2. biodynamic peppers - ...ashed. This is a scientifically unproven but acceptable biodynamic approach to "ward off" the insects from within and without (channeling my best George Harrison right now). Again, more technical that I have time to get into, but call me if you want to try this.

But PLEASE avoid synthetics if at all possible. Yes, they do work, but once you're on that path, its hard to get off unless you are determined that you will.

Anyway, this is about the best I can offer sans details for nematodes and ashing. Hope this helps somewhat going forward.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Peter Fisher](#)

[Re: curculio progress](#)

June 22, 2020 04:42PM

Registered: 10 years ago

Posts: 82

Mike, I would be interested in your thoughts on an issue with nematodes for PC control. There was an article in the winter 2020 issue of NY fruit quarterly: [\[nyshs.org\]](#). that reported on research showing that permanent populations of native nematodes could be established in an orchard. I was interested to see that the Sf nematodes persisted much better than Sc nematodes at the study sites. I had been told by the folks at Arbico Organics, where I purchase nematodes, that Sr were the ones to use against PC, though Sc might also have some effectiveness. Here they didn't even test Sr. The Sr are much more expensive.

Which do you use for PC, Sr or Sc?

Do you know if this research is generalizable to the commercial strains of nematodes that can be purchased from Arbico or elsewhere, or if the NY orchards where this research was conducted used native nematodes, and that is why they were able to establish permanent populations?

Turkey Creek Orchard

Solon, Iowa (zone 5A)

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 22, 2020 07:33PM

Registered: 10 years ago

Posts: 298

Hi Peter,

My understanding the reason that Sr (*Steinernema riobrava*) isn't used in more northerly climates is that it doesn't survive well in the cold weather. It is however the most effective of the three main species. Sf and Sc (*Steinernema feltiae* and *S. carpocapsae*) are hardier but less effective. It is the Sf that is more mobile in a soil environment, and that's why it is more effective. But the Sc only works where you put it (i.e., it doesn't move very far). The other thing I've learned is that you need a mix of all life stages for the greatest benefit and most manufactured products only have a single life stage. That's why rearing your own can be both fun and beneficial. Lastly, they can't be allowed to dry out or they go dormant and then don't do anything. So, my approach and recommendations are to find a product, combine others, or rear a mix of the three with Sr included, repeat the applications each year, and apply when rainy and cool (but not cold), prior to PC emergence, and then keep the irrigation at close hand so the soil can stay fairly moist. Eventually a stable population of Sc and Sf will establish, but Sr will be an annual renewal event. I have not seen a comparative study of different commercial products.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Liz Griffith](#)

[Re: curculio progress](#)

June 22, 2020 08:07PM

Registered: 7 years ago

Posts: 46

Thank you for continuing this discussion, most especially the thoughts on the recently released study as I have been wondering the same things as Peter asked above.

I would, however, like to re-ask Peter's earlier question about application with Barricade as a solution for orchards without irrigation--we don't have irrigation either, and this has been giving me pause when considering pulling the trigger on applying nematodes.

So...thoughts on this?

Door Creek Orchard
Zone 5a in Wisconsin

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 22, 2020 09:17PM

Registered: 10 years ago

Posts: 298

Hi Liz,

I guess I can't argue strongly enough against applying Barricade fire retardant gel. The SDS sheet doesn't indicate what it actually is and apart from the fact it says it's not harmful, I have to assume that it is. I am not sure what each person's individual situation is, but I would suggest making sure you get some sort of irrigation system. The other options would be a barrier of wood chips or compost applied AFTER the nematodes to hold moisture in. Compost with biochar especially will do a great job of holding moisture in. Even white plastic sheeting or cardboard would be better. But who knows what Barricade will leave behind or how it will affect the soil environment. You could also try applying something like VaporGard instead. But it would have to be applied after a rain and after the nematodes are applied.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Liz Griffith](#)

[Re: curculio progress](#)

June 22, 2020 10:00PM

Registered: 7 years ago

Posts: 46

Thanks, Mike! You've articulated my hesitation about the Barricade; I was unable to figure out exactly what it was too. Peter, I scanned briefly through the pecan/peach study at the USDA, but it doesn't list what Barricade is. Did David Shapiro at the USDA share with you what the material is made of?

Unfortunately I don't foresee irrigation in our future, but we could try some of these other ideas. I just looked briefly into VaporGard - the label states it should be applied to plant tissue, and it doesn't seem to mention soil application. Were you envisioning it as applied to the soil as a barrier (after rain and nematode application as you state)?

Door Creek Orchard
Zone 5a in Wisconsin

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 23, 2020 12:35AM

Registered: 10 years ago

Posts: 298

Vaporgard is normally used on the foliage, so I am extrapolating usages here. But it is an anti-transpirant, so it will likely have some effect, but probably not lasting. If I had a mountain top to shout from I'd shout, "if you're going to plant fruit trees, you need to have a way to bring water to them in appropriate quantities." Water relations is the single most important element of orchard management that any grower can effect to create a resilient farmscape and combat the effects of climate change. This can be irrigation, barriers, anti-transpirants, etc., but it needs to be dealt with proactively.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Peter Fisher](#)

[Re: curculio progress](#)

June 23, 2020 03:53PM

Registered: 10 years ago

Posts: 82

The ingredient is a trade secret. The MSDS has little information. It is alleged to be more environmentally friendly than previous formulations. David Shapiro said they are testing other products in the hope of finding one that can be OMRI certified.

In the meantime I guess one strategy in a non irrigated orchard is to try to apply in between rains, which is what I have been doing.

I do have drip irrigation that I can set up if we enter a drought. But that is a major effort and then gets in the way of mowing. I also had assumed that you want to apply it throughout the orchard, aisles included, not just under the trees so it seems like drip irrigation lines would not keep everything moist.

Turkey Creek Orchard
Solon, Iowa (zone 5A)

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 23, 2020 04:05PM

Registered: 10 years ago

Posts: 298

In between rains is good as long as the soil doesn't dry out which means that any irrigation is better than no irrigation. The row middles (aisles) are not as critical since you aren't (or are you?) applying the nematodes there. You can also hang the drip tubing above the mower height to avoid having the install/uninstall each time you need to use it - or maybe I misunderstand the issue. But drip is usually a permanent install.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Peter Fisher](#)

[Re: curculio progress](#)

June 24, 2020 12:27AM

Registered: 10 years ago

Posts: 82

Surely this is not the vaporgard product you have been referring to:

ACORNBELT® VAPORGARD™ + DRA

CORNBELT® VAPORGARD™ + DRA is a Drift Reduction Agent that contains patented TRANSGARD® polymer technology designed for use with nozzles (such as AI, Turbo-T nozzles, etc.) which deliver coarse spray quality droplets. This system balances drift mitigation with properly sized droplets so as not to interfere with herbicide activity.

ACTIVE INGREDIENTS:

Betahydroxy Tricarballylate, Alkyl Polyglucoside, Monocarbamide Dihydrogen Sulfate and Acrylamide Sodium Acrylate Linear copolymer: 34.75%, Inert Ingredients: 65.25%, Total: 100.0%

Turkey Creek Orchard
Solon, Iowa (zone 5A)

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 24, 2020 12:46AM

Registered: 10 years ago

Posts: 298

Absolutely not! Mine is Miller [Vapor Gard](#) . Also not organic but less egregious, I guess. And just so we're clear I wasn't trying to push a non-organic alternative, just present it since someone also suggested Imidan (hmm...). The best approach is irrigation or compost or some other cover that can keep the soil moist. Miller does make another organic product called NuFilm P, though it is not an antitranspirant, it can hold things in place better than nothing. Not appropriate for the nematodes, just sayin'.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Brian Caldwell](#)

[Re: curculio progress](#)

June 24, 2020 05:06PM

Registered: 10 years ago

Posts: 69

As far as establishing beneficial nematodes goes, Elson Shields at Cornell has produced native strains of the Steinernema and Heterorhabditis nematodes that have established in NYS by simply spraying them--no irrigation or adjuvants; no two weeks of wet weather. This has been done on hundreds of acres of alfalfa with success. We have hand-applied them with watering cans from large barrels, which goes quickly and helps them to soak in with lots of water.

But the real issue is, do they work? Yes, the recent article (using the Shields strains) shows that they can persist, but the data I've seen from Cornell shows no evidence that they reduce PC. We applied them in our orchard 2 years ago and see no reduction of PC pressure. Too bad, I wish they did work! We also have applied them under our chestnut trees for chestnut weevil, and Cornell is doing work on that as well. No results on that yet.

If we think about it, these nematodes are already in our soils, at low natural levels. If we boost their levels a lot higher to target pests, they will also be hitting all other susceptible non-target insect species in the field. That may be worth it to control PC, but we need to keep it in mind.

I agree that Surround sprays need to go on before bloom, to build up a good layer. The PC adults are present in the orchard early, and it is good to start repelling them before they damage the fruit. Once fruit sets, adding Pyganic or Entrust (targeted at CM, of course), etc. is a good idea. I see no problem with spraying Surround during bloom, we get super-heavy pollination every year.

In the past, we have removed hand-thinnings (by thinning into picking buckets) and burned them. Most of our thinnings have PC scars. That was probably a good idea, but we stopped doing it. We had heavy PC pressure this year. Next year, I plan to again remove and burn the thinnings. That will interrupt the reproduction of many thousands of PC in our orchard.

[Hemlock Grove Farm](#)

Zone 5 in New York

[Reply Quote](#)

[Peter Fisher](#)

[Re: curculio progress](#)

June 24, 2020 05:36PM

Registered: 10 years ago

Posts: 82

In my conversations with David Shapiro at USDA he argued that nematodes are best used for control of peach tree borers, both lesser and greater. The Sc nematodes were very effective in reducing populations, in part I suppose because we know where these borers are, in cracks in the trunks and crotches of trees (LPT👌cool smiley and in the ground (GPT👌cool smiley around the base of the tree. So we can focus the applications there. The labor intensive part is packing the cracks with clay slurry afterwards to keep the moisture in, which is what led him to the use of Barricade instead.

I suppose the argument for continuing to try the nematodes for PC is that no one thing is very effective so you throw everything at it you can in the hopes of reducing populations and damage to tolerable levels.

Turkey Creek Orchard

Solon, Iowa (zone 5A)

[Reply Quote](#)

[Jason MacArthur](#)

[Re: curculio progress](#)

June 25, 2020 03:48AM

Registered: 6 years ago

Posts: 28

I'm the one who mentioned Imidan, though not because I intend to use it nor because I am trolling! I guess I'm simply frustrated.

I do wonder though about the impacts of the application of Surround at the rates we are talking about. This is clay which has to be mined, sifted, heated, packaged, shipped, and finally sprayed. In a wet year how many applications are needed to maintain adequate coverage when pressure is high, easily 6 or 7. While some of those might coincide with other spray needs, in my experience, and again I mean in a very wet year, Surround becomes the sole reason for getting out there. That's a lot of diesel fuel...

Again, I don't think Imidan is the answer, I just don't know what is. It may be that nematodes are effective, but I am dubious in my case that application within the orchard (1/5 of an acre) would have any real impact on the resident population.

In my case I'm still waiting for curculio drop, and hoping that many of the scars won't result in successful egg hatch.

And I'm certainly humble and frustrated, and appreciative that I have a community like this to reach out to!

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 25, 2020 04:16AM

Registered: 10 years ago

Posts: 298

Hi Jason,

I hear you. PC sucks, for sure. And in total transparency, I spent years on the commercial side of things. I still work with some growers, but only those willing to transition to a more sustainable model. And you make a very good point - the real cost of Surround or any other organic approach vs powerful synthetics. Look, Imidan works, so does Avaunt, Actara, Besiege, etc. One spray at petal fall and bye-bye PC. But that's not the conversation we're having here. We're looking for a truly more sustainable way and Surround may or may not be part of the solution. Ditto for nematodes. I think part of the problem is that we're still (within this thread for sure) looking for a singular, allopathic solution - something spray. We need to go back to being good farmers, smart farmers, observant farmers. And we need to look beyond the typical solutions. Orchard sanitation, chickens, Surround, pyramid traps, all of the above, etc. are all pretty available to everyone. But what about nutrition? What about changing the optical frequency of plants through optimal nutrition so they are less attractive to insect pests like PC? What about biodynamic peppers? What about entomopathogenic fungi? Birds, bats, predators, etc? What about something we haven't even thought about? I am not saying I have the answer, nor that any one else should. But I am saying we need to think broader. For now, I have had very good luck working with most of my growers as follows: Surround/Entrust at tight cluster-> pink, Surround right before first bloom, Surround/Pyganic/Thymegard at Petal Fall, and the same at PF +10 days. Once you hit 309DD base 50 after PF, PC is basically done. You'll have applied 100 lbs Surround, 8 oz Entrust, 48 oz Pyganic, 2 qts Thymegard. What's the environmental cost of that spray regime? What the real cost? Around \$350/acre. What's one spray of Imidan? \$35/acre. But there's also a heavy environmental price tag with the use of Imidan, a powerful organophosphate (same class as chlorpyrifos or Lorsban) - but we can't hang a price tag on that. I am not trying to be preachy, because you are exactly right Jason. But we have to keep pushing and trying and failing, trying and failing, all the while trying new things. Otherwise, we will be stuck with what Bayer and Syngenta and Gowan send our way. I had a beautiful thing happen the other Sunday. I was out back - eating waffles, because that's what I do on Sunday mornings - but also watching a chickadee flit around the tree eating something from around the open blossoms. It wasn't PC, but they were eating something. How do we encourage and nurture more of that? The one thing farmers in general, but not in this group, have forgotten how to do is observe. Stop and watch what's happening around them. Just take the day and watch. Therein lies the answer I believe. So anyway, I hear you Jason, its frustrating, but don't give up and regardless try something new and different next time. And when you least expect it, expect it.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Peter Fisher](#)

[Re: curculio progress](#)

June 25, 2020 04:39PM

Registered: 10 years ago

Posts: 82

.Mike you mentioned birds. We have Bluebird houses, and they are active searching for insects to feed their young right during the prime time for PC activity. But I have thought about trying to establish a purple Martin colony. Each bird eats thousands of insects a day. I imagine they are just as happy eating beneficial as pests, but it seems like it is worth a try, for the side benefits alone. We have never had more than one bluebird house occupied in a given year but with a large purple Martin habitat I think you could maintain the presence of a substantial number.

Turkey Creek Orchard
Solon, Iowa (zone 5A)

[Reply Quote](#)

[Laura Sieger](#)

[Re: curculio progress](#)

June 30, 2020 03:51PM

Registered: 3 years ago

Posts: 13

Mike! Will you say more about ashed biodynamic peppers? What's that all about...? Another question (for anyone) how many buckets of thinned fruitlets can an american guinea eat (bright to his pen instead of running him through orchard offsite) before he's ineffective? this is really a hypothetical for this year, i have virtually no fruit. but damn those plums had some serious curculios several weeks ago.

and has anyone had success with the pyramid traps? do they really just serve to monitor and slightly diminish the population or can they make a difference in damaged fruits

Good tip about Purple Martins, Peter. I'll be keeping an eye out for them up this way. Might king birds and robins eat curculios? they nest in our orchard trees most years.

Maine Heritage Orchard
Zone 5a Unity, ME

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

June 30, 2020 04:14PM

Registered: 10 years ago

Posts: 298

Biodynamic ashing is essentially where you collect the adult females while they are actively laying eggs (this is where the pyramid traps can serve a valuable purpose). You don't have to catch them in the process, though - LOL. Then slowly burn (ash) the insects and collect the ash. This ash is then homeopathically diluted to an appropriate dilution (d9 seems a good place to start) and spray over the land where you want to control the pests. Energetically it keeps them at bay by filling a void in the ecosystem where they "want to be." By filling this void with their essence (the diluted ash) the living adults do not go there since they sense there are others already there. That is my interpretation of this process. You can do it for anything - weeds, voles, insects, diseases (I am making one for cedar apple rust this year from collected galls), etc. I am not clear that the dilution is the same for all peppers - it has to do with the stars and planets etc., something I am not well versed on in regards to biodynamic theory.

Traps work, but like we've discovered with AM traps, you probably need to saturate the orchard with them in order do a trap out, especially the perimeter. They (PC) are always flying in from the woods that surround the orchard and that makes it more difficult since they can fly over the traps. But it is good for catching enough make an ash.

Hope this helps.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Mike Biltonen](#)

[Re: curculio progress](#)

July 01, 2020 05:06PM

Registered: 10 years ago

Posts: 298

Brian, Do you have any evidence of what susceptible non-target species may be affected? I find it difficult to believe the parasitic nematodes will affect "all" SNT species. I always start Surround apps at tight cluster->pink, so you're rec of early is spot on. Lastly, my understanding is that soil moisture is critical to nema-activity. If the soil dries out, they go dormant. Not sure where the 2 weeks of wet weather came from. If there are any scientific reports or articles that illustrate any my questions re: SNT species and soil moisture, can you link to them here. Thanks, Mike

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Brian Caldwell](#)

[Re: curculio progress](#)

July 02, 2020 12:13AM

Registered: 10 years ago

Posts: 69

Hi Mike and all,

Here is a quote about the range of nematode host species:

Infections were carried out in the laboratory to determine the host range, specificity, and virulence of *Steinernema rarum*, *S. feltiae*, and *Heterorhabditis bacteriophora* that were isolated from different regions of Argentina. All insect orders showed a remarkable susceptibility to the three nematode species, showing mortality values higher than 66%, except for Anoplura. The mortality of the insects of agronomic

interest was more than 90%. As for insects of sanitary importance, *S. feltiae* and *S. rarum* caused 60% of mortality, whereas *H. bacteriophora* caused 80%.

from de Doucet et al. (1999) Host Range, Specificity, and Virulence of *Steinernema feltiae*, *Steinernema rarum*, and *Heterorhabditis bacteriophora* (Steinernematidae and Heterorhabditidae) from Argentina

***fortunately, they don't go after humans!

[Hemlock Grove Farm](#)

Zone 5 in New York

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[Jason MacArthur](#)

[Re: curculio progress](#)

July 09, 2020 12:48PM

Registered: 6 years ago

Posts: 28

Thank you Mike for so eloquently framing this conversation in a larger framework.

One of the enduring mysteries in apple growing is why there are wild/feral/untended trees which seem to, with minimal human input, produce such bountiful crops of beautiful fruit every other year or so. I am convinced that there is more to genetics than this, that these trees have found their place. Even within my orchard I have individual trees which consistently outproduce their genetically identical neighbors, usually with fewer pest and disease issues as well.

I consider these my lodestars, and I know I am not alone in this amongst this group. Perhaps from careful observation of these trees we can begin to unravel the solutions Mike so sagely reminds to us to keep foremost in our minds!

Jason

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[Mike Biltonen](#)

[Re: curculio progress](#)

July 09, 2020 04:05PM

Registered: 10 years ago

Posts: 298

Thanks Jason, so much, for the kind words. After having spent so many years working with commercial growers, I've come to realize - as we all have to some degree - that allopathic farming is the wrong approach, relatively speaking. Not that we as farmers don't have a role to play, we do. But we're basically conductors in a large orchestra and that good land stewardship is really about ecosystems, bio interactions, and energy. I think the reason that you see wild trees that have survived so well and go relatively unscathed is that they had the genetics to survive the myriad attacks from deer, PC, scab, marsonina, etc. over the years. The narrow genetic field that we have bred popular dessert varieties from has led us down a dark alley with no way out. Fortunately, apples have their own tool to get around our shortsightedness - they don't breed true to type from seed. So every apple from seed is different from either of the parents - though the genetics are still limited to "what's available from mama and papa." At least they're scrambled in a way that allows for diversity to break its way out. And after enough generations, you get what you get - resilient trees. But beyond the genetics - our orchards are what they are - our management plays a huge role in allowing the trees we have to express themselves fully. The more we spray or fertilize anything allows the trees to "relax" by muting whatever genetic advantages they may already have. Its kind of a 'use it or lose it' strategy we need to allow them to have. Manage appropriately - we can't just send them back off into the wilderness - but only just enough so they have to use their own resources to fend off pests or nutritional deficiencies, while relying on us for the things they can't fend off. Any management by our hand "mutes" the plants' own innate abilities to take care of itself via bioenergetics. And that leads me to the thing I don't quite know very much about - what optical frequencies that plants give off that are either attractive to or unattractive to pests. We need to realize that everything we do - even though we live and act in the macro - has an effect on the micro and that's where the real action is - at the quantum level. So there you have it. This comment probably doesn't even belong in this thread, but so be it. I trust Michael to place it where it belongs. Now, I would like to hear from others about their thoughts along these lines.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply Quote](#)

[Michael Phillips](#)

[Re: curculio progress](#)

April 24, 2021 08:18PM

Moderator

Registered: 11 years ago

Posts: 621

Marrone Biological Innovations is now claiming greater curculio efficacy with Grandevo (powder formulation) than with Venerate (liquid formulation). I'm sticking this update onto this rather lengthy thread so as not to overly excite expectations. Both of these biologically-derived toxins work best applied with Surround at the kaolin base rate of 25# per 100 per acre. Grandevo is applied at 1-2# per 100; Venerate is applied at 2-4 quarts per 100; either tank mixed with the clay.

This [trial comparison chart](#) on the Marrone website (halfway down the page, and then click for a full screen view)) shows Grandevo with Surround to stack up pretty impressively against standard IPM approaches. Note, however, we are not provided with spray frequency details or where this trial took place as regards low-medium-high curculio pressure.

Don Kretschmann is seeing early season bud damage from curculio in western Pennsylvania and so asked me what might be done in the bloom window. Entrust (spinosad) is definitely not an option as that will kill pollinators. Steve Bogash from Marrone told Don that

Grandevo might repel bees to some extent but not prove toxic.

I will include Grandevo in my first clay spray on Prunus fruit set, and then split applications in round three between Grandevo and Venerate (in different blocks) to see what might be learned. Refer to my opening post in this thread for those details.

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

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[Don Kretschmann](#)

[Re: curculio progress](#)

January 25, 2022 04:49AM

Registered: 1 year ago

Posts: 11

Well as far as I'm concerned, the result is in: Grandevo works for curculio!

I've ignored this ugly looking critter for decades, having observed that it never seems to eliminate the crop. Actually, since I have never done anything except hand thinning (and little of that!), I consider the curcs are my thinners.

But a few years ago I was alarmed to see the buggers chewing up emerging apple leaves so severely that it appeared they would do serious damage to the photosynthetic potential of the trees. Further scouting revealed it was only one end of one block--maybe a dozen or so trees. So I let it go. Trees affected for the rest of the season had much reduced leaf cover. Didn't see that again until spring 2021 and it was much more widespread. Hence call to Michael. Tip for Grandevo, call to Marone.

Sprayed 2#/A Grandevo at bloom and then about 2 weeks later did the trick. I was amazed! They were gone. Over the years, I'd tried all sorts of things. Lots and lots of Surround. I'm really looking forward in the future to green apple trees in the spring instead of white ones! I see a place for Surround, but more for sunshield in extremely hot dry summers.

Now who's going to thin?

P.S. Since Grandevo label also says it controls CM, OFM, and TAB, I thought why not continue. Not that expensive--6# \$133 Ohio Earth Foods. Far cheaper than Entrust. I'd always used CM/OFM mating disruption--which is a fantastic product and so so convenient. But it's hard to justify the expense to treat the minimum of 5 A for only 2 A of trees on one hill, then either severely under treat a distant tree block, or not at treat at all.

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[Eliza Greenman](#)

[Re: curculio progress](#)

January 25, 2022 01:00PM

Registered: 9 years ago

Posts: 23

Thanks for posting this, Don, as this is the first time Grandevo has come across my radar. I took a look at the only ingredient, Chromobacterium subtsugae, for about 10 minutes this morning and it appears it's in extract form (aka "bioactive metabolite"). Unless this is incorrect and it's not an extract, I'm guessing this is why Marrone was able to commercialize it. Much like Bt

It's a native soil bacteria to Maryland and appears to be easily cultured (originally cultured by a high school student). I wonder if having it in live form, rather than extract, would be a great thing or problematic. Seems like a "one and done" spray isn't a financially viable strategy for most companies, so I'd love to get to the bottom of it, as I have a distaste for buying and applying the non-living in my orchard.

I'll look into it

Eliza

Edited 3 time(s). Last edit at 01/25/2022 01:59PM by Eliza Greenman.

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[Mike Biltonen](#)

[Re: curculio progress](#)

January 25, 2022 05:13PM

Registered: 10 years ago

Posts: 298

All life is a cycle of life and death. Without death there can be no life and without life there can be no death. Grandevo is simply a fermentation by-product of Chromobacterium subtsugae strain PRAA4-1. I supposed an argument could be made that it is manufactured death, but then so are the myriad alcoholic drinks and other fermented products we consume and use. How do plant teas or composts sit with anyone? The point is not that something is dead or alive, but how it is made and used, the intention behind the product. Sure, Marrone was able to benefit from the isolation of these bioactive compounds (not the bacteria itself), so what. Bottom line is that Grandevo is a safe replacement for more toxic (and in some cases less effective) insecticides. Even if you were to culture it yourself (via IMOs or some other process) you'd still have a life/death cycle as you build a population, but with Grandevo it is the fermentation process and production of the secondary metabolites that are the real "muscle" behind the product. In many ways I think this is the same "product" process from any type of fermentation we may do, in addition to the live organisms, there are spent bacteria and their by-products.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

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