



The Community Orchardist

February 2011

Michael Phillips, Editor

Warming sun would be melting more snow if we weren't still getting down towards zero at night this far north. Eager pruners are wise to hold off until deep cold ends its hold. . . not too mention the need to wear snowshoes to even go some places! I'll be gathering scionwood in this next week or so in preparation for rootstocks coming in the third week of March. It's always exciting planning a new block of trees, choosing varieties to graft, growing these out for two years in the nursery, then planting, in my case, in spring of 2013. That fits the soil prep plan just right—time to build woody berms across the slope, cover crop successively in what will be the tree rows, ending with a fungal slam bang finish of red clover. Healthy orchards in the prep stage have three elements:

- Stocking the pantry according to biological soil test results,
- Building deciduous tilth with ramial wood chips and more,
- Thereby ending with mycorrhizal-readiness for the tree roots.

Have those shovels at the ready for getting this spring's trees in the ground as early as you can.

Curculio Riffs

This in-depth discussion will interest growers throughout the eastern half of the continent who ponder options for the infamous plum curculio. Read between the lines if you live elsewhere and you will be able to pick up pointers for similar hard-backed pests of the beetle persuasion.

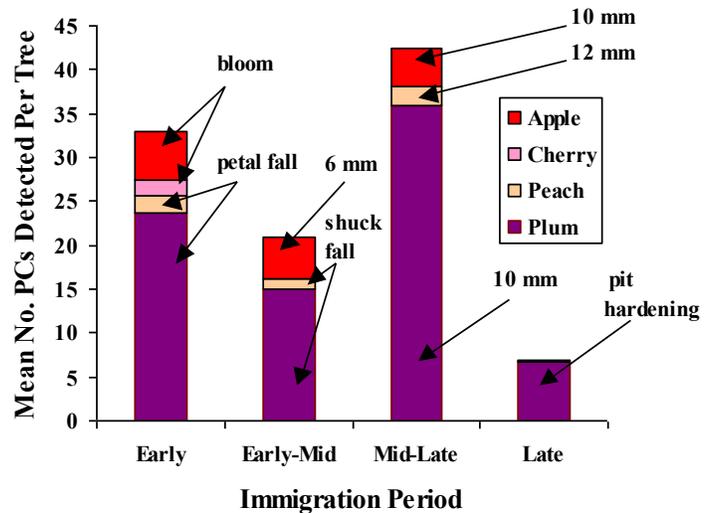
This listing of [Plum Curculio Fact Sheets by State](#) is a good place to start if you're not sure of the life cycle quirks of this orchard pest. The read in the revised edition of *Apple Grower* correlates curc's known points of vulnerability to the use of refined kaolin clay and trap trees. What follows are more recent thoughts to consider for the particular fruit growing reality at your orchard site.

Trap Tree Shenanigans

Picking the "right trap tree" is not rocket science: Plum curculio has definite preferences based principally on regional reproductive history. (Hint: The big clue lies in the first word of its name.) Basically, the grower skips certain trees

when applying orchard-wide repellents. This “pushes and pulls” the pest to untreated locations where ground level strategies can be employed. Two traits of this native insect make this possible: the tendency to hide in grass cover when disturbed, and the need to get down into the soil to pupate to engender the next generation. The best barrier protection going at this point in time is the refined kaolin clay sold under the brand name Surround. The micronized clay particles irritate curculio to distraction—thereby causing these weevil-like bugs to stop feeding and ovipositing—and instead seek out a more reasonable place to be.

The regional “fruit preference map” found in *Apple Grower* shows where different fruit types merge in this respect. Asian hybrid plums are a given throughout. Cherries are especially relevant towards the Great Lakes just as peaches take on more curculio aura as one heads south. Lush-leaved apple varieties find favor in the Northeast whereas everything seems to merge throughout the Mid-Atlantic region. Research gives a particular edge to Formosa and Santa Rosa plums as being 11 times more attractive than apple regardless.



The real story here concerns spring emergence and which fruits are of proper size for unfettered joviality on the part of the curculio hoard. That bar graph reflects West Virginia experience. An early start to the season (think bloom time warmth) will favor activity on stone fruits whereas a late start results in a stronger apple focus. Typically, it’s best to provide clay coverage on peaches, apricots, cherries, and plums earlier than on apple. It’s possible to use medium coverage on stone fruits as “early clay” often ingrains a directional pattern to the untreated trap trees. Southern growers may not even need to treat apple if a follow-up strategy is employed beneath especially appealing trap trees. Other growers can make similar headway shaking curcs out at dawn onto gathering tarps below. Late pruning of trap trees always helps increase volatile draw. Places where apple turns out to be equally favored do require full (heavy) white coverage come pome petal fall week.

Ground Level Strategies

Curculio pupates in the soil. Blocking egress can take the form of a barrier or very hungry scouts. Old carpets are quite effective at snagging fruitlets to shrivel in the hot sun (just be sure to take up the carpet sometime in July to prevent vole build-up). Running piglets ala Jim Koan in Michigan to devour June drop has its own intensity. Chickens do it for me, brought in for trap tree duty, held in place with a portable electric fence. All such plans depend upon effective push and pull.

Allies Down Below

Work in Michigan focuses on parasitic fungi while the take in Georgia peach country goes with a particular strain of parasitic nematodes to go after curculio pupae. Timing corresponds to those immediate weeks around “June drop” when falling fruitlets bring the larvae within down to ground zero.

The biopesticide strategy being used by Mark Whalon and company in Michigan involves infecting grains of rice with *Beauveria bassiana*. These are seeded into the soil beneath varietal vectors (trap trees!) prior to larval drop from fruit. The fungus then goes on to kill the larvae-becoming-pupae. . . the stage that appears the most vulnerable of all.

At ARS’s Southeastern Fruit and Tree Nut Research Station in Byron, Georgia, entomologists found that soil applications of the nematode *Steinernema riobrave* can suppress plum curculio larvae by 78 to 100 percent. “Nonfeeding infective juvenile nematodes seek out larval hosts,” says Dr. Shapiro-Ilan. “When one finds a larva, it penetrates its body. Once inside, it releases a bacterium that multiplies rapidly and kills the host. The nematode then reproduces while feeding on the bacteria and insect tissues.” Again, note the larvae-becoming-pupae timing.

The Black Towers of Mordor

I first played around with funnel traps some twenty years ago, seeking to use slices of apple as an odor draw. That wasn’t the right lure nor did I understand exactly what needs to be seen by the eye of the beholder. Curculio has its own nuance to go with extrapolated “pecan weevil thinking” from two decades ago.



Tracey Leskey at the Appalachia Fruit Research Station in Kearneysville, West Virginia, has taken these notions further. Currently, she is working to identify compounds that can be used to improve the attractiveness of lures for plum curculio. The antennae of our friend are hooked to an electrode to directly measure which odors elicit a response. Selected compounds are then targeted for more rigorous behavioral studies. Volatiles like benzaldehyde and the “aggregation

pheromone” grandisoic acid are high on the list. Pure plum essence that’s naturally-derived is the surest draw yet but harder to stabilize. Tower rigs for the funnel trap can be purchased from Great Lakes IPM or cut from plywood sheets and painted black. Position is equally important—parallel to the silhouette of an actual tree trunk prods curculio upward to expected fruiting prospects—only it funnels straight ahead into a “no backing up” trap design instead. Ka-plink!

Weakening the Beast

Harry Hoch in Minnesota uses Surround in a slightly different manner. He has varietal blocks favored by curculio and watches for first signs of activity. Now the clay serves to dissipate curculio stamina. . . there’s no safe haven provided in the

form of trap trees. . . leaving the pest more worn out and thus subject to neem applied with the clay. Azadirect is a patented formulation of the azadirachtins found in pure neem oil (the other good stuff has been removed). New England trials indicated little effectiveness with curculio in the past. And yet, in this orchard—with woods nearby filled with wild apple and wild plum—it’s enough to drive back the hoard. “The more PC moves around, cleaning themselves, looking for a place to oviposition, the more of their fat reserves get burned up,” reports Harry, “means far fewer apples get hit overall.” This insight ties directly to orchard architecture, moderate PC pressure in the Upper Midwest, and a degree of grower tolerance to hand thin out damaged fruit.



The crescent cut marking each egg, gumming response, and numerous feeding stings tell the grower curculio are active.

Nail in the Coffin

Growers in other places have definite need to end the game. Using PyGanic orchard-wide is not ideal, however. This natural pyrethrum works as a lethal contact poison on quite a few species, including beneficials. Typically, it can take several twilight-applied doses to make significant impact on curculio. Here’s where trap trees or untreated border rows can be used to congregate PC to spare the ecosystem as a whole. Come those first “curculio nights” when temps hover near 70°F as the sun sets—once fruitset scarring is evident—PyGanic proves a singly effective whump for migrating bugs already drained by the repellent plan on other trees.

Coverage Overlap

We’re about to enter “*dangerous territory for the unthinking*” so please be entirely respectful of the context being shared with this next bit.

Product manufacturer’s list targeted pests on spray labels based on reasonable efficacy. I am now going to speak about spinosad, specifically the commercial organic formulation known as Entrust. The active iturins contained in spinosad are produced by aerobic fermentation of the actinomycete, *Saccharopolyspora spinosa*. These fast-acting, somewhat broad-spectrum compounds act through ingestion or by direct contact to activate the nervous system of the insect, causing loss of muscle control. Entrust is known to be very effective on leafroller caterpillars, fly larvae, leafminers, and thrips. Those pests are highlighted on the label. Entrust has less impact on internal-feeding caterpillars (like codling moth) and apple maggot—direct contact being less likely—yet enough that those pests are on the label as well. Entrust provides poor control of sucking leafhoppers and true bugs. Curculio would seem to be included in this last grouping, as these insects are not on the label.

But hold those horses. A fruit advisor friend in Maine was told by a product rep that “even though spinosad lacks efficacy enough to put curculio on the label, it does indeed have substantial activity against PC.” The rep then went on to say spinosad gave about 50% control. That said, Cornell rates Entrust a big fat zero for PC. Penn State gives it a “poor” rating meaning it does have a tad of recognizable impact. A fresh dose applied on a warm humid evening when PC are moving back into the trees for a night’s work is what makes the difference.

Here’s the thing you absolutely need to understand about spinosad. As in absolutely. Entrust comes with resistance issues. Use it too often and you favor super-pests with inbred resistance. This product must be rotated so as not to treat back-to-back generations of the same pest with the same mode of action. Those of you using spinosad responsibly in dealing with sawfly and certain Lepidoptera immediately following petal fall should know that evening timing can have impact on pest numero uno as well.

Stirring the Depths

Growers choosing to engage in weed control (rather than mulching) use a WeedBadger or similar device to stir the soil beneath the dripline. The spring root flush finishes up just about the time of June drop when infested fruitlets fall to the ground. A week or three passes, shallow cultivation gets done, exposing curculio to destruction as most larvae only go 1 to 2 inches deep to pupate. This must be thought about long and hard, I believe, as such a management tool works directly against establishing fungal dominance in the soil. Curc is dealt a mortal blow, yes, but the trees are less able to deal with pathogen pressure in return.

Curculio Grange

Feels like we just had a grange meeting like was done 150 years ago to discuss the state of the art around a major orchard pest. Take what’s useful here in the context of your orchard layout and observed pressure patterns. Other techniques laid out in the



book only add to an integrated perspective. Nor should we neglect the intercepting contributions of ground beetles and wolf spiders. Every orchardist weaves a web made from threads like these to get a handle on this rather confounding pest. This is the scope of what we know. . . so let’s just hope there are no curculios listening in!

Understory Connections

One of the fun sections in the coming book (*The Holistic Orchard*, to be published by Chelsea Green this fall) details all sorts of biodiversity connections in the fruit tree ecosystem. Here's a few tantalizing tidbits to get growers thinking more broadly.

Olfactory Confusion. Bitter herbs like wormwood, southernwood, rue, hyssop, pennyroyal, and gentian have long been used for tree protection in the Old World. These highly aromatic plants are sensed by fruit pests, creating olfactory confusion within the fruit guild. Such plant allies can be used more effectively in smaller fruit plantings than in more extensive commercial blocks. Plant knowledge like this can come into play in protecting highly desirable fruit or even funneling insects towards sacrificial trap trees. Tansy and sage have a high camphor content that has been observed to deter codling moths. Nasturtium has a similar influence on woolly apple aphid, so if you happen to have susceptible rootstock, plant several around your apple and pear trees.



Pollen Glue. Dogbane is a common pink flowered shrubby herb that flowers in July and August. Dogbane flowers are designed to attract butterflies. When these long-tongued pollinators visit the flowers of dogbane, only their tongues become coated with pollen from the flower. Flies and weaker insects are not so lucky. These lightweight visitors often become glued to the flower in a cement-like mixture of pollen, leading to a slow death from starvation. Is this helpful to an orchardist? Or is it not so good? Native habitat holds its own mysteries.

Friendly Braconids. Let's look at one specific interaction around apple maggot fly. This ubiquitous pest lays its eggs in July and August into ripening apple fruit, resulting in interior destruction of the flesh. Certain flowering shrubs—winterberry, dogwood, and blueberry among them— attract a range of other fruit feeding flies not interested in apple. Braconid wasps parasitize these flies as well as the resident apple maggot fly. Braconid numbers rise with prospects of increased host resources, leading to reduced apple maggot fly pressure overall.

The Short Peach

Consider this a classified ad from a northern peach breeder:

Persistent White Male seeks the elusive northern peach. Enjoys canoeing, sleeping beneath snow cover through the winter, and a more northerly exposure than you might expect.

Dave Griffin in Minnesota seeks the peach cultivar 'Compac-Redhaven' for breeding low growing peaches that can be more easily covered in winter. Here is a brief description:



This cultivar is a compact version of Red Haven with short internodes, 20-30% shorter than standard height, and a spreading tree form with wide crotch angles - in other words, a “peach bush” about 8 feet tall. The fruit ripens early like Red Haven and is the same in size and quality but the tree is not as productive. Many trees were sold, mostly to backyard orchardists, in the 80's and 90's by Van Well Nursery, Stark Brothers, and Bountiful Ridge. Unfortunately, the mother trees have been removed at all three and the variety was not put into any of the repositories nor retained by any of the breeding programs that studied and used it.

There has to be lots of these in backyards all around the country, the question is where. Any shrubby peach that ripens with Red Haven would most certainly be it. Let's network here, folks. If you know of such a tree, contact me so I can put you in touch with Dave about providing him with viable budwood. Dave is definitely “the man” when it comes to peach prospects in zone 4.

Question of the Month

Winter moth is on the move here. What options do I have to save my fruit trees?

Both coasts are seeing major issues with this moth immigrant. The first telling moment comes not long after harvest: Wingless females emerge from pupae in the soil during November to January. Each mother-to-be climbs up the tree to lay eggs on the buds, twig wood, and under loose flaps of bark on the trunk. The larvae subsequently emerge in early spring to devour the sizing buds and rapidly-growing green tissue. European growers apply “grease bands” atop heavy felt cloth around the lower portion of the tree trunk to prevent this trafficking. Saran wrap coated with Tangletrap would work as well. . . just be sure to never apply tacky compounds directly on the bark as cambium death will result.

Feeding by the larvae continues all spring and as late as early June. These are surface feeders—ingestion of exposed leaf material is what winter moth larvae do. This makes Bt a good choice, applied the week of quarter inch green and again at tight cluster. Use fish oil to limit ultraviolet degradation and molasses “to help the medicine go down” as a bait attractant. A year or two of such actions on your part should turn the tide back towards reasonable balance. Additional caterpillars can balloon in on silk threads from nearby oak and maple trees so continue to be vigilant regardless. And do tell the chickadees how much you appreciate their support!



Board of Advisors

The next step here at the Holistic Orchard Network on the way to “organizational prowess” is the formation of a grower board of advisors. We’re delighted to announce that the following members have agreed to help provide Michael with feedback in determining network priorities:

Brian Caldwell, New York
Neil Collins, California
Linda Hoffman, Massachusetts
Dan Kelly, Missouri

David Doncaster, British Columbia
Marty Bell, Connecticut
Michelle McColl, Australia
Gordon Tooley, New Mexico

Bringing regional perspective to this board should help in formalizing ties with various efforts going on across America and indeed the world. Several others have been asked as well to meet the initial goal of a twelve member board. Nominations of people you’d like to see involved here can always be sent to michael@groworganicapples.com. To repeat, membership in the network is a requirement for becoming more involved.

Adam and Eve ate the first vitamins, including the package. ~E.R. Squibb

Network Support

Our **extensive website** is a place for dedicated community and backyard fruit growers to share lessons learned in human-scale orchards. Together we are finding the ways to grow healthy fruit. All good work requires support so that the burden isn’t all on a few. Regular small donations from growers who are benefiting from these efforts—**along with full-fledged membership!**—is required now to help keep this effort strong.

Watch for **research updates** in the months ahead as we find time to weave in reports from growers across the continent on successful nuance.

Hearty thanks go out to the folks below who made a network donation this past month!

Scott Overby, WI
Don Hess, CT
Steve Lisbin, NY
Lynetta Carnes, MI
Martha Cownap, MA
Nathaniel Brock, MI - **NEW MEMBER**
Jeffrey Corbett, ALB - **RENEWAL**
Dan Kelly, MO - **NEW MEMBER**
Ed Anthes, VT - **RENEWAL**
Blanche Wadas, NE
Maureen McGraw, MT
Anthony Varriano, NJ
Ray Beaudoin, ME
Steve Gougeon, MA - **RENEWAL**
Michael Flynn, CA
Erika Rogoff, MA
Andrew Felger, OH - **RENEWAL**
Bill MacKentley, NY - **NEW MEMBER**
Richard Frost, ME
Rob & Cheri Bowers, NC
Jesse Shapiro, VT
Nate Darrow, NY - **NEW MEMBER**

Stay in touch, think deeply, and treasure those venerable trees!

Michael Phillips