

The Community Orchardist

April 2007

Michael Phillips, Editor

This introduction was written several weeks ago but appears to still be relevant. Here it is early April and I see a renewed foot of snow on the ground (with a forecast for more accumulation this Thursday!) and temps below freezing:

Pruning this far north obviously waits till deep snows melts and night temperatures stay above that zero degree mark. Which must be hard to believe for growers down South with apples already in bloom. And down under, friends in Australia are just finishing up their harvest season. The “global apple tree” breathes with the seasons of our individual place on this good earth, but collectively, every bud stage and every tree-ripened fruit is alive and inspired somewhere on this planet in every moment. Which is kind of a cool, eh?

Deep Cold in Spring

Many growers across the Midwest and the Southeast lost their fruit crop this past week due to the unusual cold air being pushed down from central Canada. The winter had been warm overall so trees and fruiting plants were waking up early. Now the sadness is palpable (after five days of deep freeze) in reading friends’ postings about blackened blooms and mushy fruitlets. Time will overcome this lost crop and thoughts will inevitably turn to next year’s fruiting potential.



The advice I would offer in such a year as this is to keep fungal disease in check (despite the loss of the crop) and provide strengthening nutrients to the trees as they unveil reserve leaf buds. Pure neem oil pressed from seeds of the *Azadirachta indica* tree helps in both regards. While the fatty acids in neem make it challenging to spray, these unadulterated plant fats are precisely what make this nutrient spray effective for resisting fungal disease. It’s even said that neem oil (like kelp) imparts a small degree of cold resistance. I’ve been working with pure neem oil primarily in the summer months, while still relying on minimum sulfur applications during the primary infection period for apple scab. It’s easier contemplating taking the more holistic route throughout a season without fruit to risk. A 1% concentration of neem oil made every ten days over the next three months may well reveal unexpected fungal success in this “lost year” that will prove invaluable in fruitful years to come. Keep me posted about any such observations. I’ll try to post updates on the [Research Pages](#) on

my web site that encourage others to take a more systemic approach to fungal disease control.

Beneath the Apple Tree

Our goal for diversity in the orchard can always be “more diversified” than we probably imagine. Understory management implies different things to different growers, of course. Putting the emphasis on supporting the biology of the soil is the fundamental goal for me. Here’s where a holistic grower recognizes that providing fungal foods to feed the beneficial microorganisms in the soil in turn supports and enables tree health.

Nothing suits the orchard palate more than ramial wood chips. This primer on [ramial chips and other "waste" materials](#) by Tom Roberts can introduce the concept for those of you who missed it previously in my writings. [Click that blue link to see Tom’s article.] I’ve come to realize that a good 20% of orchard labor should be dedicated to haphazard mulching in some form or another. And yes, that’s as much time as you usually put into timely hand thinning. Too often we put off understory work in favor of warding off pests and disease . . . whereas if we had our priorities straight, we’d come to understand that a healthy understory fauna is where such “warding off” should begin. Nor does mulching have to be complete in the usual gardening sense of a job uniformly well-done. Herein lays one of the key concepts of orchard diversity on the human side of the equation: you want to be a “haphazard slob” in the biological orchard. Create wood chip piles “hither and thither” so apple tree feeder roots have choices as to where to access humus activity. Some decaying lignins here, a self-mulched comfrey patch there, woody herbs here, a rotting hay bale there, some blooming wildflowers here, some tap-rooted broadleaf weeds there. All under the same tree; all placed “hither and thither”. Wood’s edge ecology works this way naturally and thus it’s the very thing to emulate beneath healthy trees. Being diverse about being diverse makes for preferred understory management.

There are two dangers in not owning a farm. One is the danger of supposing that breakfast comes from the grocery, and the other that heat comes from the furnace.

Aldo Leopold

Soil Pupation

I’m a big proponent of “trap trees” in laying out an orchard as a way to utilize repellent strategies like the kaolin clay spray to its utmost end. The basic premise is simple enough: all species have a place in Creation. If we opt to try to “do in” all the curculio within a certain radius of our trees, such thinking inevitably leads to dangerous chemical propositions that induce harm in numerous other ways. On the other hand, if we recognize that any life form is going to find some way to eat and definitely some way to reproduce— and we “allow” that— then we can funnel

those desires in order to protect the greater portion of the fruit crop that we desire.

All such “generosity” on our part can be taken a step further, of course. A number of key pests of apple share a biological imperative to pupate in the soil, among these European apple sawfly, plum curculio, and apple maggot fly. We have three ways to make some “population adjustments” during this time of pupation vulnerability. Often these means are disparaged as being too expensive to use orchard-wide. True enough, but now let’s get back to where this all started: underneath trap trees deliberately left unprotected by repellents in order to draw unsuspecting pests to an insect’s take on nirvana. Suddenly, using our human ability to outthink certain small insects (but do be humble here– its taken us 200 years to get this leg up) we have weaved an integrated web that allows us to a) protect the majority of the current crop by non-toxic means, and b) use target-specific materials to deliberately set back next season’s pest potential.

Beauveria bassiana (a soil fungus sold under the trade name Naturalis), parasitic nematodes, and a neem oil drench can be economically used to limit insect pupation in the soil. Specific target varieties help here as does understanding the exact timing of application. The disease-immune apple Liberty, for instance, is a real draw for curculio. Any summer apple variety invites a heavy infestation of maggot flies. Each pest species is most vulnerable during those first several weeks after damaged fruit fall off prematurely. The dropped fruitlets allow larvae a fairly safe migration to the soil. As these “fresh larvae” approach “hard pupation” is when next year’s pests are most vulnerable to fungal penetration, nematode consumption, and interruption of the molting cycle due to the azadirachtin concentration from a neem oil drench.

I hope this makes the pieces of the puzzle clearer. Too often growers fail to appreciate nuance in order to achieve the results they might read about in a book. Like that revised [Apple Grower](#) book, for instance.

Curculio Perfume

The trap tree approach for plum curculio can be supplemented further if you use the right perfume. Seriously. Tracy Leskey at the USDA Appalachian Fruit Research Station in West Virginia reports this bit about ongoing chemical ecology work with plum curculio: “We finally have found conditions necessary for males to produce aggregation pheromone in the laboratory,” says Tracy, one of Ron Prokopy’s former grad students. “In conjunction with our chemist collaborator, we hope that we will be able to identify a more precise blend that could be used to create a more powerful bait in the orchard – all very exciting!”

Brut for curculio, who would have imagined?

Spring Spray Review

Every year offers up a few spray products worthy of review. Here's what's on the organic radar for 2007:

GF-120 NF Naturalyte Fruit Fly Bait

Much work has gone into evolving generations of the sticky ball sphere that orchardists use to monitor and trap-out apple maggot flies. One promising idea for a "non-sticky trap" that proffers a sweet taste of spinosad (Entrust) to AMF has yet to reach the commercial market. Now Dow Agro Sciences has come up with a trap-less way to reliably deliver a killing dose of Entrust to immature flies. Growers out West report good results with maggot fly containment using GF-120 NF Naturalyte Fruit Fly Bait.

GF-120 is a protein bait concentrate that emits ammonia-like compounds that attract fruit flies. The flies in turn ingest the bait, laden with spinosad, which has been sprayed onto the foliage of selected cultivars. Applying this product during the fruit fly pre-oviposition period is important for optimal performance. Individual trees are spot sprayed with approximately 3–8 oz. of diluted GF-120 per tree (the mixing ratio being 1.5 parts water to each part bait concentrate). Accurately placing the film on foliage and not fruit—as such apples will be a sticky mess at harvest—allows the grower to coat the undersides of leaves as well, which in turn protects the toxicant from washing off. GF-120 is active for at least 10 days after initial application. It can be stored for up to 2 years without degradation.

"The real beauty of the product for me is it's targeting of only fruit flies. Which is similar in results as BT is for Lepidoptera. It just makes sense to maintain this control over what insects you want to kill and which you don't," concludes Les from the Skagit Valley of western Washington.

The opportunity exists to use this product on spheres dispersed about the orchard for growers wanting to refine this approach for the greater AMF pressure found in the East. Tim Smith of Washington Extension emphasizes that the young AMF must find and eat the bait before they mature and start laying eggs. The bait concentrate is not necessarily as "attractive" as the fruit lures now employed with the trap sphere approach for mature flies. The nearby vicinity of any alternate hosts will provide the pest a chance to mature before flying into the orchard. Small-scale growers have a mix of tools and nuance to think about here but I for one am glad to add GF-120 to the apple tool bag.

GC-Mite

GC-Mite is a natural, contact miticide and insecticide that provides herbal control of pests such as mites, thrips, and aphids at all stages of development. GC-Mite is derived from food grade garlic extract and essential oils cottonseed and clove which cause irritation, asphyxia, and dehydration on contact. GC-Mite imparts neither taste nor odor to the crop. The application rate is 1 gallon GC-Mite

concentrate per 100 gallons of spray water. Spray to cover. Apply no more than once in a 7 day period. Repeat application as necessary. Good coverage is essential for pest control.

This natural miticide product strikes me as especially useful in orchards transitioning to organic where beneficial populations may not yet be in place to handle such foliar pests. Ditto for young orchards where a leafhopper or aphid outbreak can be devastating. European red mite will be a problem in orchards overdoing sulfur and Surround (as both those sprays can prove harsh to predatory mite species when coverage is prolonged) so again GC-Mite may be useful on mite-prone varieties like Red Delicious.

Sonata Bio-fungicide

Sonata is reported by its manufacturer (AgraQuest) to provide excellent control of powdery mildew and rusts. And if this proves to be true under orchard conditions, then growers throughout the central zones who have to deal with cedar apple rust will want to be tuned in.

This bio-fungicide contains a patented strain of *Bacillus pumilis* that produces an antifungal amino sugar compound. This compound disrupts cell metabolism and prevents the formation of new cell walls, leading to the destruction of the cell and death of the plant pathogen. Sonata also creates a bacterial barrier on leaf surfaces, preventing pathogens from establishing on the plant.

Like its sister product Serenade (which features yet another soil bacterium, *Bacillus subtilis*, reported useful in preventing fire blight), Sonata features an isolated micro-organism found in most soils. Growers should keep in mind that such patented effects can indeed be replicated in properly-made compost tea.

You can find more information about GF-120, GC-Mite, and Sonata at the [Agecology \(IFM\) web site](#) in their pest and disease control section.

Price Comparisons

Deirdre Birmingham of the [Upper Midwest Organic Tree Fruit Growers Network](#) recently posted a price comparison of organic products available from Wisconsin's United Agriculture Products (UAP) supplier. It's a good basis for your own comparison shopping. Some of these materials are available from bioregional organic suppliers, so please remember we should never forget the little guys!

Aza-Direct (neem extract) 1gal @ \$173.99
 Champion WP (copper) 12lb bag @ \$5.25/lb
 CYD-X (granulosis virus) \$343.57/qt
 Deliver (Bt) 2.5lb bottle @ \$20.16/lb

Dipel DF (Bt) 1lb bag @ \$16.05/lb
 Entrust (spinosad) @ \$403.42/lb
 Kaligreen (potassium bicarbonate) 5lb bag @ \$8.92/lb
 Kumulus (micronized sulfur) 30lb bag @ .87/lb
 Lime sulfur 2.5gal jug @ \$12.05/gal
 PureSpray Green Horticultural Oil (lightweight oil) 2.5gal jug @ \$15.64/gal
 Pyganic (pyrethrum) 1 gal @ \$150.27/gal
 Retain (growth regulator) @ \$251.40/ pouch
 Serenade (bio-fungicide) 12lb bag @ \$12.45/lb
 Solubor (foliar boron) 50lb bag @ \$1.15/lb
 Sonata (bio-fungicide) 2.5 gal jug @ \$20.63/gal
 Golden Pest Spray (soybean oil) 2.5gal jug @ \$17.90/gal
 Surround (kaolin clay) 25lb bag @ \$0.75/lb

Question of the Month

I was told by a University horticulturist to be careful not to add too much wood ash to an already high pH soil as it will raise it more. Would you agree?

I've never totally gotten my head around wood ash because there's so much variability in wood species and burn completion. Compared to fertilizer, on average, wood ash would probably be about 0-1-3 (N-P-K). I always look at cation ratios more than pH, and here, on average, wood ash stacks at 15:1:3 (calcium/magnesium/potassium). I like all that calcium but recognize that on low magnesium soils this will only compound the imbalance in the potassium direction. It's said that ash varies from 10% to 90% in its liming effect. So a wee bit of homegrown ash may make little difference; tons coming from an industrial source had best be analyzed before spreading. Wood ash contains various trace minerals, including boron and zinc, which have value for fruit trees in moderation.

The following came from a long-ago *Mother Earth News* article I kept in my files all these years:

It appears that slow-growing, dense hardwoods yield ashes that are best used as liming materials. Based on Frase's research, such ashes can be expected to contain about 2% K, 0.3% P, and 30% calcium (Ca). Their soil-neutralizing value relative to pure calcite (NV/CaCO₃) should approximate 100%.

Fast-growing, low-density hardwoods yield ashes that are typically balanced in their levels of calcium relative to their levels of potassium and phosphorus: They contain about 4% K, 1% P, and 20-25% Ca, and have a liming equivalent of 85% NV/CaCO₃. These ashes can thus be used as liming or fertilizing materials for soils with low or near-neutral pH.

Softwoods are likely to yield ashes with low levels of calcium and high levels of potassium and phosphorus: about 5-10% K, 1-2% P, 17% Ca, and 60-70% NV/CaCO₃. These ashes are best used as fertilizing materials only and present little risk of raising soil pH excessively.

Network Support

The research pages at the HerbsAndApples web site and this Community Orchardist newsletter are the result of hard work and personal investment. Both are intended as a way for commercial fruit growers to share insights gained in small orchards wherever you be. Meaningful results flow foremost from growers hooked into a network of independent thinkers like we have here. And I certainly love doing what I can to further the cause of community orcharding! But every effort requires support so that the burden isn't all on one set of shoulders. There's one more link which I hope you'll take a moment to ponder, and that's the somewhat witty tale of [Hercules and the Golden Apples](#). An occasional donation from growers who are benefiting from these efforts is required now to help keep this work alive!

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