# The Community Orchardist

***February 2008***

***Michael Phillips, Editor***

I had a good chance to be a *confused apple grower* recently, standing in a "dormant orchard" in late January with lush green grass and flowering mustard at my feet. Pruning was in progress; buds were at that brink-of-swelling point; the sky was gray with cloud. Things made sense looking up . . . but not down. The understory looked like it does here in New England when fruit trees come into bloom. And yet these California trees maintained their winter sleep, having not quite obtained the requisite chilling hours to awaken.

Tim Bates' Apple Farm is located in Philo, a bit north of San Francisco in Mendocino County. I was impressed by Tim's three-year understory rotation: a third of the orchard undergoes a shallow harrowing and cover cropping every fall; "off-year blocks" receive a woodsy biodynamic compost the following spring. Here was that ideal of a diverse farm with an in-house fertility loop featuring many animal and plant components.

My contribution was to add a proper wassail ceremony to the mix. It was the right time of year, people were enthused, we had plenty of cider to drink. (Extremely important that last bit!) The idea of going out into the orchard to acknowledge the blessings of the trees – to wassail – goes back hundreds of year in the British Isles. Each time I lead such an earth ceremony I seem to discover a new element of the underlying spiritual connection found in any heartfelt ritual. There's a point in the ceremony when we drink a proper toast to the apple tree, and obviously "everyone" must be included. Tradition holds that the tree itself partakes when we pour cider on the ground to serve the roots (so to speak) and thus the tree. This time I realized far more was a foot here: we were also "serving" the mycorrhizal fungi that permeate healthy orchard ground and colonize every apple root. What a powerful insight to back the lesson that we always need to be thinking of our orchards as integrated biological systems!

## *Lessons Observed from the 2007 Season*

Part of the process of deciding what to do in the orchard year ahead is looking back at what went right (or wrong) in the season just past. We had a phenomenal harvest in Lost Nation Orchard last year, the best I've seen in twenty years. Undoubtedly the "climatic fates" decided it was time for northern New England growers to experience bliss – good fruit set, manageable fungal infection periods, lessened moth pressure, and practically non-existent maggot fly. Still, there are some pivotal moments for every grower in any given season.

I'll be writing about the Four Phases of Holistic Disease Management in detail in future newsletters, starting now with those first weeks of the growing season. There's a "fungal convergence" going on as the fruit buds approach tight cluster. Decomposing fungi on the ground are at work sucking up the last decaying leaves, the mycorrhizal network is waking up along with the tree roots themselves, and beneficial fungi (and bacteria) are colonizing the greening canopy surface now unfolding. The first phase of warding off pathogenic fungi like apple scab is all about supporting all three groups of these biological allies. Take note that we can interfere with a healthy biota in many ways: be it a copper spray or even dormant oil back at quarter-inch green, by starting any fungicide program too early to compensate for not practicing good sanitation back in the fall, and through high-test NPK fertilization. My first spray of the season consisted of raw neem oil, liquid fish, seaweed extract, and Dipel (for budworms) at tight cluster /early pink to boost "fungal health" prior to the certain release of scab ascospores with the next good rain. My first sulfur spray followed five days later when that rain indeed shifted the "fungal energy" towards pathogenic infection. I'll add that I made but three sulfur sprays last year and had the cleanest fruit ever . . . but those details all come when we discuss the next phase! I'm giving more emphasis than I have in the past to this first phase: the neem oil contributed to stimulating the immune function of the tree as well as a complex of polyunsaturated fats that boost fungal nutrition; the hydrolyzed fish (more on this ahead) contributes vital fish oil chemistry that serves as a catalyst to the mycorrhizae. That in turn is critical to balanced nutritional intake by the root system in order to provide the leaves with the building blocks of an internal phytochemistry used to ward off fungal disease.

Retroactive scab tracking can help a grower develop a better sense of wetting periods, the pace of ascospore maturity, and when to spray fungicides – micronized sulfur being my choice – as little as possible. One handy way to do this is to download the relevant monthly weather calendars available at Weather Underground for the site nearest your own. Start a daily degree day countdown for scab from the day you first observed green tissue in a mid-season variety. Correlate this DD pace to precipitation and the spore maturation curves, knowing that it takes greater than 0.10 inch of rain and temps above 50°F to see release of 90% of mature ascospores. (Have your copy of Apple Grower open to pages 184-5 so you can flesh out such details.) Now pencil in the days you made scab sprays. Do they make sense in terms of the overall seasonal weather patterns and the pace of scab maturation? You should be able to recognize the days of high pathogen release when you should have taken action . . . look for warmer, dry stretches of weather when spores matured en masse and then finally had rain enough to burst out. This is the beginning of the *scab dance* that we all must do if we want to learn to spray in moderation so that the supporting biology can continue to be in place to help us grow good fruit.

I found curculio pressure last season to be minimal. I never know if this is a result of certain winter chilling events or if perhaps my "curculio understory management" the year before succeeded outrageously. We had successive rains at

the tail end of bloom when Surround kaolin clay coverage becomes paramount for this unpredictable pest. I put on a light base coat of the clay on a sunny May 27, only to see light to moderate rains over the next 8 days straight. Ah, the conundrum of needing thorough clay coverage despite the rain – refined clay works precisely because it can flake off onto problematic critters, which means it can also be washed somewhat readily off leaves! I got out with the sprayer again on June 2, this time to curtail scab with a last sulfur dose and begin the Surround coverage in earnest. Another inch of rain fell over the next 2 days and thus that single coat of white was essentially gone. The clouds dried up by midmorning of June 5. My first spray that day was a combination of raw neem oil (shifting fungal gears now), Entrust (*the way* to clean up a sawfly infestation), seaweed (the ol' megavitamin for any plant), and a very light touch of Surround. The clay and neem oil are likely to clog generally speaking, but in this case, 5#kaolin to 50 gallons $H_2O$ and a half gallon of neem came through the spray gun and allowed me to "stick" an initial base coat of Surround to the leaf surface. That dried in place, and I immediately sprayed Surround twice again, this time at the 25# per acre rate. Now I had "loose clay" on top of the "lightly stuck clay" and felt adequately caught up in my petal fall coverage. I renewed the clay at the high rate a week later, then that was it for the season.

Due to the lack of any evidence of bugs run amuck on fruit, I found myself making a couple all-herbal sprays in the summer months directed primarily at tree health. Which of course ties into disease resistance! These tank mixtures consisted of fermented horsetail tea, fermented nettle tea, and the raw neem oil. Not quite all homegrown but definitely as holistic as it gets.

The fruit at harvest time are the ultimate gauge of how an orchard has benefited from a thoughtful spray program . . . I was one satisfied grower in 2007.

## *Lepidoptera Updates*

Winter months are also good times to touch base with holistic-minded researchers and see what they've been up to in the past year. Two bits add to our current understanding of moth options.

Granulosis virus is a targeted ecosystem toxin with a proven high impact on codling moth larvae. Two formulations are available in North America: Cyd-X and Virosoft. A spray formulation with multiple low-dose applications throughout the first and second generation windows makes this virus far more ubiquitous that it might otherwise be in the orchard. Mortality for codling moth generations turns out to be on the order of 96% when the grower adheres to the recognized nuances of the virus. I always understood granulosis to be "species specific" but recently learned that the manufacturers mean this only in terms of "acceptable control." It turns out that these viral formulations also

affect oriental fruit moth, more along the lines of 60% mortality. What a boon for small-scale orchards where both moth populations eventually build up and become more of a problem! When "ordinary measures" no longer seem adequate to provide reasonable balance, we need to act to lessen population pressures. Granulosis fills this need on at least two counts. It's quite likely this same "unsatisfactory mortality" could be found with lesser apple worm as well, as OFM and LAW have genetic similarities. The truth is that holistic fruit growers need to rely on overlapping approaches that should vary from year-to-year to account for moth influx. It's helpful to recognize that granulosis virus has virtue beyond codling moth.

Mating disruption technology is constantly improving. The "combo pheromones" that target both CM and OFM in the same dispenser (kind of a twist-tie loop) were first reported to be not quite as effective as single species dispensers. Research by Art Agnello at Geneva now shows these dual-species lures have come up to speed. This represents both time savings and cost savings for those orchardists with large enough block-size (five acres is considered the starting benchmark) to find mating disruption a viable strategy. One acre's worth of disruption coverage takes approximately 40 minutes to install at a rate of 200 dispensers per. And true to our hopes, LAW falls for this sleight of hand with female moth scent . . . as its pheromone is nearly identical to that of OFM. Thus dual dispensers are showing effectiveness with three species of internal feeding Lepidoptera. Growers with substantial blocks of tree fruit may want to investigate the Suterra Puffer (which now uses organically-approved aerosols and will soon feature dual CM/OFM applications). This disruption technology does away with the need to hang those 200 dispensers per acre up high in the tree. Instead, a single battery-operated puffer (per acre) releases pheromone every 15 minutes throughout the twilight and night time hours when mating moths are active. Now labor investment drops to 5 minutes per acre with extremely good results promised at the recommended 40-acre minimum block size (and quite acceptable results at as little as 10 acres).

What we all need to do is keep reporting in about the moth dynamics on our own unique sites. I'm especially interested to hear from growers using mating disruption on smaller-than-recommended blocks who deem the results worthy of the cost. Please be particular in describing the lay of the land and surrounding environment if you do send a "moth strategy" report to me at michael@herbsandapples.com.

## *Push and Pull Curculio Management*

Curculio can be "herded" to appointed trap trees in the orchard where its future population can be made to suffer a serious dent.

Basically, a "push and pull" effect results from the strategic use of a organic repellent against curculio. I think of Surround kaolin clay as one such repellent factor, but where population pressures are lighter, some folks use a combination of garlic extract and raw neem oil. Orchard architecture also enters in here:

certain varieties tend to be a draw for curc, one side of a sheltered orchard may see the invasion coming from a consistent wintering ground, etc. Lastly, delayed pruning of trap trees till just prior to pink releases volatile odors that bring curc to those preferred varieties all the more.

Two things are going on here when you take the above into account. One, curculio exists, and thereby it wants to feed and it wants to reproduce. These are the biological imperatives of any species. An all-out toxic approach (be it organophosphates or nicotinoids or what have you) works by seemingly ending this biological imperative by eliminating the species in question, leastways in the orchard. A holistic grower does not have the toxic option, so let us shift our mindset to acknowledge the ramifications of a repellent approach. If we choose to "protect" the entire orchard, curc either needs a neighboring location to which to go to feed and lay eggs, or it simply waits. And waits and waits. The latter case results in an extended need to keep the trees protected, maybe up to 8 to 12 weeks, till curc gives up the ghost. On the other hand, if weather conditions favor curc activity, you may find this species quite delighted to accomplish its thing in as little as 2 weeks. But this means you as the grower have to "accommodate" the biological imperative of "your enemy" and allot it some space in the ecology. Thus you don't spray the trap trees – curc goes there and stings fruit with abandon. Now comes the second stage of a push and pull strategy: your choice of "curculio understory management" eliminates the majority of curc larvae reaching the ground to pupate. This includes chickens, carpeted ground, and rooting piglets. Given time, the curc pressures at your site could come into a more reasonable balance after several seasons, making this an even easier strategy to execute.

## *Question of the Month*

I am not sure I caught all the "nuances" about fish. You talk about several things: fish fertilizer, fish oil, living fish, premium liquid fish fertilzer, fish emulsion, fatty acids in fish. I guess I am not familiar enough with fish to know all the differences.

> It's never so simple as reading the words put on a promotional label, eh? Each fish company shouts the benefits of its product over all others. But there are definitive biological differences that are imperative.
>
> The bottom line is you want "unpasteurized" fish fertilizer made from the first pressing of genuine fish parts that thus contains the fatty acids of the fish oils. I have been using **Squanto's Secret** liquid fish as a mycorrhizal catalyst spray; other brands I can recommend include **Neptune's Harvest**, **Eco-Nutrients**, and **Schafer Freshwater Fisheries**. These processors all use an enzymatic, low heat process to insure that organic compounds are left intact while eliminating bacterial breakdown (and thus strong odor) by adding a trace amount of citrus extract or phosphoric acid. Just keep in mind that heat destroys the vitamins, amino acids, enzymes and growth hormones that act as biostimulants to the soil food web. Powdered versions of hydrolyzed fish (drying anything to a powder involves heat) and fish emulsions are not in the same biological league.

I wanted to ask you what kind (or brand) of foliar seaweed do you use in all your sprays? You also speak of using a fish oil to help prolong the activity of certain biological toxins. How do you know what rate to use in a mix like this?

Let's do a rundown from the sea:

Seaweed extract - I have used **Stress-X** from North Country Organics for many years, every spray tank, 3/8# per 100 gallons per acre. Stress-X can be bought in bulk and stored on the farm for years, however . . .

Liquid Kelp – Shipping costs enter in here as a big concern, but there's something to be said for cold-processed kelp being more biologically active. Eco-Nutrients Liquid Kelp (available from **Peaceful Valley Farm Supply**) is especially intriguing: The seaweed is enzymatically-digested at 60°F to preserve the full range of auxins, gibberellins, enzymes, and proteins that go with all the important trace minerals that any seaweed product provides. The rate is 1-2 quarts per acre per spray.

Fish Oil - Crocker's is the brand name; **Organic Grower's Supply** carries it among others. I use this as both a sticker / spreader and as an ultraviolet light inhibitor (to slow down the degradation) of biological toxins like Bt and Entrust. Use 1-2 cups per 100 gallons in such a spray mix. This same fish oil is used with lime sulfur for thinning a heavy fruit set, but now at a much stronger rate of 1 gallon per acre. OmegaGrow's **SeaCide** is a fish / cottonseed oil product said to have pesticidal and fungicidal properties but I know little about it.

Fish emulsion - Generally a waste of money as this has been pasteurized and is often from a second pressing of the fish parts.

Liquid fish fertilizer - "Unpasteurized" fish fertilizer made from the first pressing of genuine fish parts that thus contains the fatty acids (fish oils) intact. Sometimes called hydrosylate. I spray up to 2 gallons per acre on both the foliage and the ground.

Powdered fish fertilizer - A dry fish extract no longer contains the oils that are useful to soil fungi. Some growers use this as a "foliar nitrogen boost" going into bloom . . . but I have to repeat myself here: Why not go for the living gusto of biologically-active liquid fish when the mycorrhizae need an enzymatic boost!

## *www.GrowOrganicApples.com*

We recently registered a separate name for the orchardist pages on the HerbsAndApples web site to help others publicize a direct link to healthy orchard information. Someday we may make more of a separation between Michael's Lost Nation Orchard and the networking pages, but for now, this is a move that suits a lean budget. Please use this new web site name when providing a link to these pages on your own web site.

## Network Support

The networking web site and the *Community Orchardist* newsletter are the result of hard work and personal investment. Both are intended as a way for commercial and backyard fruit growers to share lessons learned in small orchards. Meaningful results flow when holistically-minded growers both participate and support in this mutual networking. 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 intriguing tale of Hercules and the Golden Apples. An occasional small donation from growers who are benefiting from these efforts is required now to help keep this work strong!

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

Michael Phillips

**Hearty thanks go out to the folks below who made a Golden Apples donation in the past year!**

**Joseph Steuer**
**Alan Suprenant**
**Deirdre Birmingham**
**Raymond Beaudoin**
**Linda Hoffman**
**Ruth Sample**

This network funding supports the direct costs of keeping the orchard web site up and running. Quite honestly, I need Sienna (our talented webster) to do the "voodoo speak" that makes it possible for y'all to see updates to the **Research Pages** and read those cutting edge articles on holistic orcharding. This same moola provides me more space to write newsletters and keep tabs on integrated research that has value for community orchardists everywhere.