



The Community Orchardist

May 2015

Michael Phillips, Editor

The pollinator scene starts this day with a deep chill. Last night saw temps here in northern New Hampshire drop into the high 20s at ground level. Frost coated the mown aisle ways, and comfrey plants around the drip line of trees were uniformly froze. Higher up, the leaves and blossom petals in the fruit trees were fine. Yesterday's CCB application (read on) included liquid kelp, which being cold-processed seaweed, contains polysaccharides that act as a plant antifreeze. And who knows? Maybe the microbe boost also contributed some 'body heat' in protecting those precious blossoms.

Meanwhile, back to the bees. The bumbles have had three full days on the Duchess, and I'm suggesting enough already. Let's spread out, ladies. All queens, awaiting brood. Bee affinity for certain varieties must be about the appeal of pollen and ongoing richness of nectar ... and I just trust every apple has its moment ... much as is the case come harvest-time when the appeal of crunch and sugars speaks to our tastes. Watching hummingbirds dip their beaks into HoneyGold blossoms strikes a harmonious chord: the deep pink throat of those blossoms, the deep red throat of these delightful birds. The abundance of lightning bug interest in the blossom scene suggests a catchy new phrase for marketing Lost Nation apples, now "pollinated by lightning". The workhorse here continues to be the blue orchard bee, busy filling nesting tubes with mud-capped brood for next year.

Holistic Spray Nuance

Stimulating immune function and reinforcing biology on the plant surface requires some lead-in time. Conversations with Tim Bates in California earlier this spring got me thinking how this *changes certain rules* when thinking about wetting events and protective sprays. What follows weaves back and forth from what we know and sometimes directly intuit. As Jim Gallot has long said when I get going like this, consider a FULL SPECULATION ALERT to have been issued.



Jerry Brunetti taught that nutrition and diverse biology make for real-time health, both ours and the plants and animals we grow for food.

Jerry Brunetti points out in *The Farm as Ecosystem* that inducing systemic resistance through a range of elicitors - seaweed, fatty acids, herbal constituents, microbes - has a 7 to 10 day reach in the field and as much as fourteen days in greenhouse trials. Furthermore, this boost in immune phytochemistry requires a day or perhaps even two to fully come up to speed. Holistic spring applications tied to bud stages in the primary infection window accommodate this.

On the other hand, fruit growers working solely with organic mineral fungicides need to be constantly aware of predicted rain. Micronized sulfur has a place in blocks with high scab loading when applied as a protectant for a targeted wetting event. Conventional organic growers carry this to the extreme, however, applying mineral sulfur as many as 20 to 30 times a season. You can forget about holistic connection when the medicine for the disease only expounds symptom probability.

We need to think about the microbe scene and competitive colonization as regards lead-in time as well. A dilute application of effective microbes and/or aerated compost tea doesn't instantly bring surface colonization up to the 70% level suggested by Elaine Ingham as proving protective against pathogens. Some little time is involved for microbe to eat microbe and release nutrients that further stimulate populations of the good guys. The *fatty acid feed* from tree seed oils (neem and karanja) and sea nutrients from seaweed extract and cold-processed fish offer a charge of deep nutrition that further launch microbial allies.

How do we best accommodate for this? I spray according to bud stage in spring but somewhat stretch this out when an extended dry spell limits actual infection events. Holistic applications made 24 to 48 hours before a predicted rain allows plant phytochemistry and competitive colonization to come up to speed while at the same time projects protection that much more forward. This year that translated to Spring 1 being made at tight cluster, and Spring 2 at latest pink, all based on providing lead-in time for both holistic thrusts prior to a real-time wetting event. We've now entered the week of full bloom with reasonable temps for pollination yet not so hot that fire blight will threaten this far north. Yesterday's CCB (*read on, he again says with a smile*) serves to keep things fully-primed one week after Spring 2. The forecast for a rainy week ahead means a major scab ascospore release can be expected three days hence. My trees here in Lost Nation will face that at full-immune function and colonized to the max with good

microbes. Bloom will wind down during these rains, bringing the right timing for the petal fall spray (Spring 3) a week or so after the interim CCB. That's not how one thinks if any rain at all spells 'SCAB DOOM' and thus sulfur and/or lime sulfur to be constantly engaged.

Promote health within and the rules really do change.

Synergistic Mix

The other seed oil from Ayurvedic tradition comes from the Indian Beech tree, *Millettia pinnata*. Karanja oil has several bitter flavonoid constituents, including karanjin and pongamol. Flavonoids stimulate plant immune function in a similar fashion to the terpenoids in neem oil. More to the point, certain flavonoids are produced in white plant parts (others are associated with deep berry coloration) suggesting a particular tie-in to blossom time fortitude.



Substituting one part karanja oil to two parts neem oil in the core holistic recipe maintains the fatty portion of the mix at a 0.5% concentration for foliar application. Only there is important synergy to be gained, as now we're working on two phytochemical fronts. I regularly use 20 ounces karanja with 40 ounces neem (give or take) now in a 100 gallon mix. Karanja disperses into water slightly better, and costs a wee bit less — should motivation towards synergy be needed.

Other attributes of karanja worth noting quickly. Insect repellency with foliar feeding pests like aphids, but not from azadiractins, thus karanja won't affect pollinators like neem *might*. Karanjin has nitrification inhibitory properties, which can be relevant in the root zone (if soil applied) where the right nitrogen assures complete protein synthesis in fruit trees. Finally, karanja oil impedes a number of bacterial diseases in Ayurvedic medicine for people, so why not fire blight?

Effective Microbe Dynamics

Let's distinguish between "mother culture" (which you purchase) and "activated effective microbes" which you brew from the mother culture. Those *second generation microbes* in activated em are freshly awakened those first 30 to 40 days and in that sense ready to hit the tree running, so to speak. Activation involves a molasses feed and there's possibly even some carbon-rich residues still in the brew. The pH continues to drop during this period, eventually bringing the awakened crowd back to full dormancy. Add a shot of humates and such

brew gains months of additional shelf life, just like the mother culture, which typically comes with a nine month expiration date.

The thinking behind adding blackstrap molasses in the spray tank when using mother culture directly is to provide some immediate fuel to get dormant microbes started on the leaf surface. Activated em, on the other hand, has an edge in this regard, given enough lead time.

Competitive Colonization Boost

Three scenarios happen during bloom that are best addressed nutritionally and biologically. The amount of time between %pink+ and %petal fall+ (averaged across apple varieties) can be substantial, as much as two weeks if not more, depending on the pace of spring warming. Competitive Colonization Boosts (herewith designated as CCB) are designed to work in all three cases, though timing and frequency shift according to the need at hand.



This holistic spray mix leaves out the heavy-hitting fats of neem and fish in favor of more microbes and flavonoid stimulation of plant immune function. Here's the recipe for community orchardists per 100 gallons of spray, enough to cover an acre:

- 1 quart karanja oil (0.25%)
- 4 gallons effective microbes
- 1 pint blackstrap molasses
- 12 oz. *seaweed extract*

Home orchardists can divide things out by 25 to get rates for a four gallon backpack mix. (Or whatever number for the tank size you may be using.)

Preventing Freeze Damage. Try to get this CCB on late morning, once things warm up, in anticipation of a predicted freeze coming that night. Make one *important substitution* to the mix: Use one gallon liquid kelp instead of dry seaweed extract. Only cold-processed kelp contains the polysaccharides that boost blossom freeze tolerance by 2°F to 4°F.

Ascospore Release during Bloom. High levels of scab ascospore maturity often coincide with a wetting event during bloom. If this occurs more than a week out from the pink application, get on a CCB the day prior to predicted rain.

Fire Blight Unleashed. The goal here is to colonize the open blossom with a flood of double-rate microbes that will in turn outcompete *Erwinia amylovora* bacteria. I add blackstrap molasses to a CCB to enhance floral attractiveness,

but more so to quicken the pace of colonization in the face of an immediate threat. The lighter rate of karanja oil in a CCB aims to stimulate flavonoid production in white blossom petals yet not gum up fragile flower parts. Seaweed stimulates flavonoids as well, be it dry extract or liquid kelp. CCBs for fire blight conditions are made when temps are in the 80s and the air is moist, possibly as many as three times during the bloom period. Blossoms continue to open and these need to be colonized anew when conditions warrant. Much is afoot in taking on this mega-threat to apple and pear trees in a warming climate.

Foliar Mineralization

There are many ways to skin a cat \bar{o} but when it comes to boosting calcium and silica levels in the cuticle (waxy exudate coating on leaf and fruitlet alike) \bar{o} we're talking either home brews or purchased product. This brings us to the fruit -sizing window, being the 30 to 40 days beyond petal fall when the entire season is literally often at stake. I deliberately use the term "comprehensive holistic" to stress the incredible value of mineralization in the spray tank during this complex period of pest challenges and numerous disease thrusts, not to mention the formation of flower cells for the next growing season.

The calcium and silica ferments described in the **January 2015 edition** of *Community Orchardist* are home-grown means of getting biologically-available minerals to the trees. Petal fall marks the time of the season to get these microbe-rich brews going, as the herbs used to make orchard teas are often in the desired stage of growth by this time. Some say these brews smell $\%i\text{ch}+$ but when you see the results in terms of clean fruit \bar{o} *only your barber will know for sure.*



Plants like stinging nettle are rich in calcium in the green phase and silica in the seeded phase. Herbalists gather nettle greens in spring, setting up multi stages of growth for orchard brews.

Two foliar products of note for calcium and silica respectively are available from **Advancing Eco-Ag** in Ohio. $\$PHT$ Calcium $\$i\text{s}$ derived from multiple sources of calcium and formulated into a highly available liquid suspension that includes micronutrients to enhance performance. $\$Sea$ Shield $\$i\text{s}$ a pure crab and shrimp shell concentrate which has not been chemically processed, and retains bioactive silica compounds known to enhance plant vigor and immunity. Shipping costs for liquid suspensions like these unfortunately make importing off-farm minerals more than daunting.

Variations on a Theme

Attract-and-Kill Trapping

Matt Greishop and the folks at Michigan State University have developed an insecticide treated pouch that draw male moths to a certain death. A mere four seconds in contact with the faux female is all it takes. The draw is a minute amount of female pheromone of the chosen moth species impregnated in the pouch material. The following comes from a recent article in **Good Fruit Grower**:



Droplets of polymers containing both pheromone attractant and a quick-acting toxicant make these "love pouches" a death trap for codling moth males. It's a tough world to be a guy!

"Mating disruption functions by distracting males for a limited time," Grieshop said. He used codling moth as an example. Each male potentially has three hours of mating time per night during a four-day lifespan, so each false approach uses about one twelfth of a male's mating lifespan. "Attract and kill uses all of a male's remaining lifespan," he said.

The device the MSU team developed uses very low rates of pheromone, making it cheaper to use. Moreover, it appears that 50 lures per acre will be enough, a quarter of what orchardists use in mating disruption. On the other side, the deltamethrin insecticide used to treat the pouch is less diluted—about ten times as potent as dilute spray material. In the tests, this resulted in 100 percent knockdown within an hour of contact.

Certainly not organic, but on the other hand, no insecticide is sprayed directly onto trees or fruit. All to the good. There will be no insecticide residues on the fruit. Another prime candidate for this technology is Japanese beetle, as this notorious pest secretes a grouping pheromone that can be synthesized.

The non-sticky trap for apple maggot fly developed at the Appalachian Fruit Research Station features a starch cap impregnated with spinosad. These red ball traps, wetted by rain or morning dew, supply a coating of sweetness with a lethal dose of spinosad. This curveball trap could be organic if anyone comes to an agreement with Dow-Agro for patented use of Entrust as the spinosad.

Which brings this discussion to GF-120 Naturalyte Fruit Bait, be it for maggot flies, cherry fruit flies, or spotted wing drosophila. This ammonia-smelling spot spray draws flies to the undersides of treated leaves, who eat the starchy residues again laden with spinosad. I'm working on a home recipe for this so stay tuned.

Question of the Month

Sigh. I think one of my apple trees has a bad advanced case of borers. It looked a little sad last year, and today I noticed a lot of damage. Well, I'm kicking myself, should have been paying better attention. Anything I can do now? I put a wire into the holes ó one was about four inches long ó the wire inserted in the top came out the bottom. I think I'd have to take a hatchet to it to open it up. Should I do that?? Or maybe it's too late?? If it is unhealthy this spring, should I cut it down?

There's probably even more damage that I can't even see. *Sigh.*

You have only just begun to get you PhD in borer, Rachel. I've lost something like sixty trees over the past thirty years to be able to share the ins and outs of Roundheaded Apple Tree Borer (RHAB) to the nth degree.

All this sounds painful and given it's a youngish tree (I'm guessing) there can't be much trunk circumference to support more surgery. Especially hatchet surgery!

Odds are you are tracking a big grub in its second year (the egg hatched two summers ago). This means it has now bored upward through inner wood where it will pupate just below the bark ó anywhere from several inches to two feet above the soil line. The damage below is a fait accompli.

Neem oil is my means at getting to young grubs within, done as a trunk spray, so the neem constituents soak through the bark into the cambium. You can up the concentration of neem to 1%, even 2%, when it's not being applied to foliage. Timing is middle of June and again in July so as to deter the female beetle from laying additional eggs. Come fall, get down on your knees and check every trunk. Egg slits can be smushed with the blunt tip of hand pruners. Orangish frass indicates a grub already at work, so don't be afraid to use a sharp pocketknife to unveil the relatively small damage zone and find the borer. Undoing the culprit at the start of its first year is what gets young trees to the bearing years.

I've started applying neem thick, right from the jug, with a butter knife, where ever I do such surgery in early fall. Plant fats are good for callusing; and the azadiractins in neem will affect any grubs that go unfound. Wrap this zone with fresh comfrey leaves as the allantoin in that herb helps regenerate cells. This medicinal poultice got tucked into a spiral trunk guard which I was putting on for voles at the same time.

The fate of this particular tree is not promising. Severe damage to a young tree tends to be structurally significant. You can add soil and/or compost around the trunk in hopes of generating some higher root development. But mostly such trees linger and never become what was intended. It's a hard call now but replacing this tree will probably be best in the long run. Whatever you do ó get outright psychotic about checking for borers. That grub now pupating just below the bark will emerge as an adult to lay eggs anew, sometimes in the very same tree and definitely its neighbors.

***Put your faith in the two inches of humus
that will build under the trees
every thousand years.***

Wendell Berry

Network Support

Hearty thanks to the growers listed here this month. These are the folks who have stepped to the plate with financial support for this network since the last newsletter.

Give me twenty contributors in ~~that~~ that box+ and you will always see a next edition of *Community Orchardist* coming your way.

Our funding mechanisms are much like public radio: **You decide the level of support you can afford.** Click that link and then do your part to keep the ball rolling.

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

Michael Phillips

Peter Fisher
Kevin Frank
Nicholas Casale - NEW MEMBER
Josh Klatt - NEW MEMBER
Fedco Trees - SPONSOR RENEWAL
Debbie Larrimore - RENEWAL
Jon Place - RENEWAL
Lucien Hinkle - RENEWAL
Marty Bell - RENEWAL
Brian Caldwell - RENEWAL
David Kemp
Walden Heights - BUSINESS SPONSOR
John Snowdon - RENEWAL
David Maxwell - RENEWAL
BioOrganics - SPONSOR RENEWAL
Tim Bates - RENEWAL
Ahimsa Organics - SP RENEWAL
Aaron Burr Cidery - SP RENEWAL
Fabio Chizzola - RENEWAL
Jack Matrianni - RENEWAL
Hal Palmer - RENEWAL
Tooleys Trees - SP RENEWAL
Charles Jahn - RENEWAL
Jim O'Laughlin - RENEWAL
Don Engstrom - RENEWAL
Alan Surprenant - RENEWAL