



The Community Orchardist

June 2012

Michael Phillips, Editor

The erratic weather of early spring has settled down to hot and dry across North America. Some folks have a full crop (Washington with its good apple karma), others more like half, and then there are those of us searching for individual apples on tree after tree. I start off thinking this must be some sort of penance . . . what did I do now, pray tell? . . . but quickly revive and let my inner farmer convince me that next year will be *oh, so good*. After all, how could we possibly see temps in the 80s in midwinter waking up buds that early ever again? HA! Nevertheless, having hope means my job continues to be stewarding tree health. The heart of holistic orcharding involves spraying nutrients and beneficial organisms that do just that.

Core Holistic Recipe

The “active ingredients” found in the core recipe for maintaining orchard health are **green immune stimulants** and **competitive colonization**. The use of pure neem oil, unpasteurized liquid fish, seaweed extract, and a diverse complex of microbes (be it a probiotic culture or aerated compost tea) achieves many things. This is primarily a nutritional brew for surface microbes and direct leaf uptake that also happens to stimulate the production of phytochemicals which plants use to ward off disease. Maintaining a competitive arboreal environment is an absolutely beautiful means of sealing the deal: Leave *no room at the inn* and pathogenic organisms have little chance. The primary infection period for many fruit tree diseases is effectively straddled by four applications of this core recipe on both sides of bloom. Summer rots and aesthetic fungi will require ongoing attention by community orchardists and those growing in more humid climes.

Home orchard rates. This assumes a 4-gallon backpack sprayer is used to cover so many trees to the point of runoff. Mix 2.5 ounces of pure neem oil with a generous teaspoonful of soap emulsifier to achieve a 0.5 percent neem concentration. Add 10 ounces of liquid fish and 6 ounces of mother culture of effective microbes to the water filling the spray tank. Dissolve as much as a half cup of blackstrap molasses to launch those hungry critters. These backpack applications also should include 5 tablespoons of liquid kelp or 0.5 ounce (dry weight) of the seaweed extract.

Community orchard rates. This assumes a 100-gallon spray tank capacity to cover up to a full acre of trees to the point of runoff. Half a gallon of pure neem oil mixed with ¼ cup of soap emulsifier mixed into 100 gallons of water achieves a 0.5 percent neem concentration. Seaweed extract is a must: 8 ounces (dry weight) goes in the tank. Two gallons of liquid fish and 1 gallon of activated effective microbes completes the brew.

Holistic Exploration

A number of options can be included in the core holistic recipe. You would do this in addressing particular situations or because it simply makes sense to use a farm-derived resource. Fuller detail on what's summarized here can be found in the [Holistic Orchard](#), and all the more so by those who explore endnotes.

Upping the effective microbe rate

Face it. *That book* was written by a cheap Yankee who's always seeking to keep costs down. Recommended rates for effective microbe application (as provided by reputable manufacturers) range from 1 to as much as 4 gallons per acre. Efficient brew activation of purchased mother culture makes for outstanding economics, allowing a savvy grower to go with higher rates. I now use 2 gallons of activated em in my spring sprays as a matter of course. A peach grower facing severe brown rot challenges might wish to double this again for foliar applications made at split shuck and a week later. Biological reinforcement really can't be overdone.

Show me the whey

Calcium has been shown to inhibit fungal spore germination. Foliar sprays of milk, diluted 1:10 with water, can reduce powdery mildew on grapes. Whey can be used instead if more available. David Bruer is a chemist who owns a 67 acre vineyard in Australia where some of the milk/whey trials were done. He notes that under the influence of ultraviolet light, a protein in whey (ferroglobulin) produces an oxygen radical that is extraordinarily toxic to fungal spores.

Similar observations come from South America, where the teachings of a brilliant French biologist were brought to growers' attention. Francis Chaboussou proposed that susceptibility to pest attack is intimately tied to protein synthesis

in plants. Long story short, disgust with the cost of chemicals left fruit growers willing to try an all-out nutritional approach. Herbicides, fungicides, and excessive N-fertilization were let go in favor of spreading rock phosphate and whey applications (at a 2 percent concentration) made every two weeks. Different growers of different crops used fermented manure tea, trace minerals, liquid fish, molasses, and humic and fulvic acids as well. Various fruits, from guava to apple, turned out impeccable and delicious, free of blemishes and infestations alike.

The coconut protocol

Give heed to fatty acids as these are what fuel biological connection. Both pure neem oil and liquid fish are loaded with oily fats like linoleic acid, palmitic acid, and oleic acid. The medium-chain fatty acids found in coconut milk are a reasonable substitute for the fish portion of the core holistic recipe for those wanting a vegetarian alternative.

Bloomtime coverage

Open bloom can last for a considerable spell. A holistic spray made at pink was five days prior, say, and it's been sunny and warm since. Now a significant rain event is expected. Scab spores have been maturing all that time, meaning the coming wetting period will bring a significant probability of infection. You can't make the petal fall spray yet, as fatty oils may prove detrimental to flower viability. Innovation suggests a spray consisting of effective microbes, seaweed, and molasses. Such will renew competitive colonization, kindle resistance mechanisms in the leaf, up Brix levels, and who knows? Pollinators might just decide bloom on late varieties has become especially attractive despite the rain.

Fermented herbal teas

The *cuticle defense* of both the leaf and fruitlet surface must be overcome by enzymes put out by rot organisms and summer disease fungi. Strengthening that cuticle can be achieved by boosting foliar levels of silica. Fermented herbal teas of horsetail and nettle are premium sources of bioavailable silica when added to the core recipe for summer application. In similar fashion, foliar calcium and other good minerals can be found in a fermented tea of comfrey. Add a handful of garlic scapes to any of these brews to enhance absorption capability.

Fatty acid knockdown

Applications of fatty acid constituents at higher concentrations can be used to shift microbe populations. Pure neem oil can safely be upped to a 2 percent concentration and fish applied at the full ground rate of 4 gallons per acre once trees have shed the majority of their leaves. This works against pathogens like peach curl fungi and *Xanthomonas* spot bacteria overwintering in bark and bud crevices. Biological reinforcement in the form of effective microbes and/or compost tea then has a leg up in colonizing those surfaces under contention when applied a day later. A molasses feed of 1 to 2 pints per 100 gallons per acre with this competitive colonization application will help the "new guys" establish for the winter ahead.

Lengthening the Wetting Period

Here's a brief bit from [The Holistic Orchard](#) concerning seaweed:

Cold-processed liquid kelp has been enzymatically digested to preserve the complete range of hormones and proteins that go with all the important trace minerals in seaweed. A quality dried seaweed extract, on the other hand, still retains a significant share of those growth regulating hormones while saving considerably on shipping costs. Researchers have noted that it's the cytokinins that allow the fruit tree more time to increase its resistance response to disease-causing organisms. Both seaweed products contribute in that respect.

The product literature for Stress-X (a dried seaweed extract available from North Country Organics) points this out. Cytokinins are known to increase the natural synthesis of flavanoids which are a key part of the plant immune response. Higher phytochemical levels “functionally lengthen” the wetting period that the disease organism requires in order to establish infection. Tell me that doesn't tweak the Mills Wetting Chart (so familiar to growers dealing with apple scab) in our favor! It makes complete sense that a healthy tree with engaged resistance mechanisms is going to be able to outlast fungal hyphae penetration that little bit longer. Holistic growers using seaweed in a foliar spray can thereby count on drying breezes all the more.

Neem and Phytotoxicity

Pure neem oil can potentially cause brown spotting and even burnt edges on leaves when temperatures are high. The oily nature of liquid fish, when tank mixed with neem, adds to this prospect. Pears seem to be especially sensitive, with damage beginning at around 75°F. Most any fruit tree will see definite damage at 85°F and higher. This can be exacerbated with a hand-held spray application as the concentration of oil on a surface will be made higher when the sprayer (that would be you!) gets overly enthusiastic. Such damage generally appears within 24 hours – thus it's those first several hours immediately following a spray application of neem oil when temps are relevant. This sort of damage does not occur if temps rise later in the week. A hand-pump backpack-sprayer may be an issue here as well: The nearly empty tank sees a rise in fatty acid concentrations (over the recommended 0.5%) due to the oily portion floating on top of the water portion. Good agitation makes a difference, so remember to “bounce” now and then if using this type of sprayer.



Virosoft

Granulosis virus will be used mostly on a commercial scale, but it's a biological tool that home orchardists should know. This baculovirus encapsulates itself in the natural environment until it is eaten by codling moth larva. Product formulations like Virosoft contain more than a trillion viral capsules per ounce of product, allowing orchardists to make this a surer encounter. Applications are necessary every 10 to 14 days beginning at first-generation egg hatch until oviposition ceases (two sprays per generation).

Granulosis virus kills a hefty majority of codling moth larvae—on the order of 96 percent—along with half of the Oriental fruit moth larvae present in the same time frame. Each infected insect dies and subsequently “melts” apart on foliage, thereby releasing more virus into the ecosystem. Treatments aimed at reducing in-season codling moth numbers result in significant mortality in overwintering larvae as well. Such a reduction in the emergence of next season's population is what makes granulosis virus an excellent *precedence strategy* for softer control methods to follow in the next growing seasons.

The recommended rate is 2 ounces per acre. Still, growers commonly treat anywhere from 10-20 acres with a single quart. Virosoft can be tank mixed with nearly everything from Surround to the core holistic spray mix. Keeping the spray tank solution near to neutral will prevent the natural protein coating of virus particles from degrading. Far better it degrade in the codling moth gut where the pH tends to be high!



Who would have guessed? This close-up of codling moth reveals our orchard nemesis has blue eyes. Photo courtesy of Jay Brunner, Washington State University.

"Water, soil, and the earth's green mantle of plants make up the world that supports the animal life of the earth. Although modern man seldom remembers the fact, he could not exist without the plants that harness the sun's energy and manufacture the basic foodstuffs he depends upon for life....The earth's vegetation is part of a web of life in which there are intimate and essential relations between plants and the earth, between plants and other plants, between plants and animals. Sometimes we have no choice but to disturb the relationships, but we should do so thoughtfully - with full awareness that what we do may have consequences remote in time and place."

- Rachel Carson (1907-1964) *Silent Spring* 1962

Question of the Month

I continue to battle the round headed apple borer. I have some larger trees where the borer entered at a branch crotch with the tree trunk and is in that area, much higher than usual. They are beyond my digging out with a grafting knife and my stabbing them with a wire, or at least I can't tell that I got them. I wondered about injecting some Bt with molasses with a syringe. Will they eat Bt and be killed by it like a lepidoptera?

That higher entry occurs now and then. I see more of it now that I do a thorough soaking at the base of my trees when applying a botanical trunk spray of pure neem oil at 1% concentration in the summer months. This makes the soil line zone feel wrong to the female beetle. Spraying the trunk higher up (as far as the first lateral branches) tends to be more variable, especially on the back side of the tree if you're not spraying from both sides. That's where the female may find a "suitably desperate" spot. The biological toxin Bt will have no effect whatsoever as it is fairly specific to moth larvae. (Yes, there are different strains, including *Bacillus thuringiensis*, var. *tenebrionis* for potato bug, but I've never seen anything regarding effectiveness against borers per se). PyGanic would be a better choice for a syringe dose. Chances are you got the grubs with your surgery. The occasional borer frass pushed out through the bark that I find, usually when scything around each tree in the month following petal fall, typically turn out to be an unoccupied hole. That shows neem is at work: The borer grub gets off to a roaring start but then gets locked into a juvenile instar stage by the azadiractins in neem (which inhibit the molting cycle) causing the life force to dissipate, thus resulting in a *going-nowhere* borer hole.

Network Support

Hearty thanks to the growers -- and those friends who want more good fruit grown -- listed here. These are the folks who financially supported the efforts of this network these past few months. We couldn't do a thing without you!

Our funding mechanisms are much like public radio: **You decide a pledge amount that works for you.** Click and then you've done your part to keep the ball rolling. Part of every donation from here on in will automatically be designated to go to our Holistic Orchard Research Fund.

Paul Townsend - NEW MEMBER

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David Doncaster - RENEWAL

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Jason MacArthur

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FEDCO Trees - RENEWAL

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

Michael Phillips