



The Community Orchardist

February 2015

Michael Phillips, Editor

A pilgrimage of sorts takes place every year at this time. A flock of Bohemian waxwings alight in the ornamental crab apple trees around the farm to claim a long overdue harvest. One can plan on their coming, just about the time realization hits that the days are indeed getting longer. Spring will be here sooner than you know it. Time to knuckle down and make plans, draw up budgets, order supplies, awaken such great hopes. We are like surfers in that last regard, eh? Riding a new crest no matter how inglorious the tumble of a previous fall. Bohemians in our own right, cruising with the seasons, tree people loving every minute of the ride!



Windows on the Season

Fruit growers are familiar with the orchard calendar as defined by bud stages. Apple trees, for instance, go from silver tip to quarter-inch green to tight cluster to pink to bloom to petal fall. The management timetable becomes considerably less defined beyond that.

Growers of yore spoke about ~~cover~~ cover sprays+made every 7 to 14 days once fruit set, all depending on the residual toxicity of what was being sprayed. The idea being that one *covered the orchard* with lead arsenate and bordeaux spray and subsequent chemistry to get a marketable crop. Things are better today thanks to Integrated Pest Management (IPM) recommendations that help conventional growers determine ~~economic~~ economic thresholds+to justify the expense of toxic spraying.

A number of disease organisms are keen (to say the least!) during that time when bud stages so clearly mark orchard happenings. Growers often refer to this period as the **primary infection window** to stress the importance of preemptive measures against diseases prone to infect young tissue.

The **fruit sizing window** takes off once fruit has set, immediately on the tails of petal fall. This 35 day period (give or take) sees certain primary fungi+continue infection odds a while longer, fruit-focused pests come on the scene, and the need for effective thinning to balance crop load.



Fruits crack due to too much rain. Strengthen the cuticle (skin) with calcium and silica teas.

The **fruit ripening window** carries us through the rest of summer. Fruits now have heft and more color, all the while developing sugars and flavor. Rots unfurl their *moist tentacles of destruction* close to harvest; cherries crack; surface-feeding fungi mar apple appearance. Maggot flies and multiple generation moths are at work, drawn by the volatiles of ripening fruit. Growers read poetry while waiting for picking to begin.

Spray Intervals

These three windows+help pinpoint particular challenges at every orchard site. Junctures of pests and disease have a direct correlation to what's happening with the trees growth cycle and fruit stage. Boosting green immune function in a timely manner,

keeping up competitive colonization on leaf and fruit alike, and throwing curveballs right back at pests requires that savvy growers *fine tune* the frequency of biological sprays accordingly. Insistent times require more intervention; cruise control times are more relaxed. Particulars must be recognized in addressing challenges like fire blight, cedar apple rust, and brown rot.

Spring Holistic Sprays

You know the drill, as this first part of the story is detailed thoroughly in *The Holistic Orchard*. The **core holistic recipe** consists of fish hydrolysate, pure neem oil, seaweed extract, and effective microbes and/or aerated compost tea. Applications are made the week of quarter-inch green, pink, petal fall, and seven days later (which we could call %st Cover+and indeed still do) to straddle the primary infection window. Growers who grasp weather dynamics underlying scab diseases will tweak the timing here to better anticipate wetting periods ã but

home orchardists can run with the basic plan. Stone fruit growers play this forward to accommodate quicker bud progression of *Prunus* species.

Equally important in this window can be a **competitive colonization boost** (or two or even three) during bloom. This is fire blight %ed alert time+as defined by nectary opportunities into the vascular system of apple and pear trees. Bacterial disease does not like a crowd, period. Making sure flower surfaces are properly colonized with benign organisms when conditions warrant is critical. This becomes all the more paramount the further south you live. Those days with temps in the 80s and high humidity are when *Erwinia amylovora* strikes hard. A well-timed %CB+just beforehand assures there's no room at the inn. These applications consist of karanja oil, higher rates of competitive microbes, seaweed extract for its flavonoid boost, and a dollop of blackstrap to stock the troops.

Comprehensive Holistic Sprays

The fruit sizing window demands particular attention. The fact that fruit now exist . pea size and up . means curculio, sawfly, and internal-feeding moth larvae can do %their thing+. Scab gets a last aggressive shot at young tissue as shoot growth resumes. Cedar apple rust and black rot (frog eye leaf phase) ramp up during this same time. Rots mobilize on twig cankers at the base of infected blossoms in preparation for the fruit assault to come.

The NimBioSys label for pure neem oil comes with EPA registration for certified-o growers.



Those %^{2nd}, 3rd, and 4th cover sprays+ of yore are better thought of today as comprehensive applications made every 7 to 10 days during this period. Calcium and silica brews are included with the core holistic recipe to begin building cuticle strength on leaf and fruit surfaces alike. The kaolin clay strategy must be applied separately from fatty oils (the day after a holistic app will do) so as to keep fine clay particles %unstuck+on plant surfaces. It's critical that every grower dealing with curculio understand this. Biological formulations (like spinosad or granulosis) for additional insect challenges gain a tad of overlay protection (from ultraviolet light degradation) when tank mixed with Surround. Add in that first borer trunk spray, and we are out in the orchard 7 to 8 times with the sprayer during this month after petal fall. Plus thinning crop load by hand to boot!

Summer Holistic Sprays

Summertime and the livin' is easier, thank goodness. Summertime applications are made biweekly, same core recipe but without any nitrogen-rich fish, and definitely including foliar calcium of one sort or another. Make milk part of your holistic mix if dealing with brown rot of peaches and the like. Traps directed at maggot flies indicate if additional actions are necessary. Second generation moths in a neem-maintained orchard are often not a factor at all.

Fall Holistic Spray

More takes place with this fatty microbe application than meets the eye. The fall holistic spray is foremost about leaf decomposition, both on the ground and whatever portion of the canopy is still holding on above. Higher rates of liquid fish and neem oil up the fatty acid ante making for more digestible organic matter, thus reducing potential scab overwintering sites. Spend time with this spray to saturate all tree surfaces, from bud to twig to the thicker bark on tree trunks. Insect eggs and larvae hidden away will be hindered from further development thanks to the action of the azadiractins in neem. The higher rates of microbes in this app help consume certain disease pathogens otherwise overwintering in bud scales. Lastly, those good fats stimulate mycorrhizae at the peak of the fall feeder root flush . now taking in nutrients to trade with roots for photosynthate sugars, those nutrients stored in the cambium, all purposed for spring green-up.

Mason Bees

Make this the year you get involved with supporting native bees. The book, [Attracting Native Pollinators](#), shares important detail about creating habitat and specific nesting opportunities. One species that all orchardists can foster are blue orchard bees, aka mason bees. And here's a visual treat not to be missed ð [Episode 503](#) of the public television gardening show, *Growing A Greener World*, features



You will fall in love with ðthese girlsð once you create nesting habitat for mason bees. What a dawn-to-dusk crew!

amazing footage of mason bees in action. Joe Lampq interviews Dave Hunter in this episode, and boy, will this man get you inspired to work with these top notch pollinators. His [Crown Bees](#) in Washington State rears the western species of *Osmia*, along with offering all sort of nesting supplies and advice.

Spray Review

Organic spray products can be grouped into categories which help us better understand mode of action and potential homegrown alternatives.

Immune Stimulants

A range of elicitors of **induced systemic resistance** were listed in the January edition of *Community Orchardist*... many of which get included in holistic sprays precisely for this reason. Here are similarly-acting products on the marketplace:

Regalia is a botanical extract of giant Japanese knotweed that stimulates plant immune function, largely due to increased phenolics. Applications need a few days to activate.
<http://www.marronebioinnovations.com/products/brand/regalia/>

Agri-Fos is quickly absorbed by plant foliage and roots and is distributed systemically throughout the plant. Once inside it turns on the natural defense mechanisms of the plant to resist invasion by disease causing pathogens. If diseases are already present it helps the plant to kill the pathogen invaders by curative activity while protecting new growth. High in soluble phosphite salts.
<http://www.agbio-inc.com/agri-fos.html>

Biology Ferments

Patented formulations derived from specific soil microbes don't necessarily contain the living organism. More and more, these feature byproducts produced by those microbes when subject to fermentation. The resulting compounds may act on disease pathogens; others deter insect pests in varying ways:

Serenade came on the scene a good dozen years ago, truly the first of the ferments. A series of microbe byproducts give these formulations both fungicidal and bactericidal attributes against a range of tree fruit disease.
<https://www.bayercropscience.us/products/fungicides/serenade-opti>

Sonata has proven effective against downy and powdery mildews and rusts. Contains a patented strain of *Bacillus pumilus* that produces an antifungal amino sugar compound that inhibits cell metabolism.
<https://www.bayercropscience.us/products/fungicides/sonata>

Grandevo is powered by a number of microbial compounds that create complex modes of action, resulting in a potent biopesticide that is highly active against labeled insects and mites. Control of pests is achieved by unique combinations of repellency, oral toxicity, reduced egg hatch, and reduced fecundity (ability of pest to reproduce).
<http://www.marronebioinnovations.com/products/brand/grandevo/>

Entrust now comes in a liquid formulation of spinosad. Much ado here with assorted moths, sawfly, and even curculio (50% efficacy) but damn this is pricey stuff!
www.dowagro.com/en-us/usag/product-solution-finder/insecticides/entrustsc

Biology Straight Up

Double Nickel is a naturally occurring strain (D747) of the beneficial rhizobacterium *Bacillus amyloliquefaciens*, which colonizes roots, leaves, and other plant surfaces.

Noted for preventing the establishment of blossom blast, pm, bacterial spot, and so on.
http://www.certisusa.com/pest_management_products/biofungicides/doublenickel55_fungicide.htm

Zen-O-Spore features the fungal species *Ulocladium oudemansii* as a biocontrol agent against the blossom stage of brown rot in stone fruit. Here's that alternative to copper!

<http://46.137.246.190/botryzen/wp-content/uploads/2014/05/Zen-O-Spore-Brochure.pdf>

Cuticle Defense

Sil-MATRIX introduces a novel active ingredient—soluble silica—that forms a physical barrier within the leaf cuticle that prevents penetration of fungal diseases.

http://www.certisusa.com/pest_management_products/biochemicals/sil-matrix_fungicide_miticicide_insecticide.htm

Sil-Guard is a liquid mineral supplement that contains soluble potassium silicate and potassium phosphite. Use to harden the leaf against fungal disease and strengthen xylem vessels. Nutrient uptake thru leaf and root tissues is increased by addition of humic acid.

http://rcpm-hosting.com/client_sites/dairydoo/wp-content/uploads/2014/03/GP-SilGuard.pdf

Foliar calcium products are a big part of the cuticle scene as well. Stay tuned!

Drones Over Pomona

Zero-one-niner, we are detecting scab in the fourth quadrant. Request authorization to go in and eradicate. Over?



The plant pathology folks at the University of New Hampshire are working to bring precision agriculture to orchard management by developing a low-cost unmanned aerial vehicle (UAV). With a camera loaded with GPS and infrared technology, the UAV can see pests, nutrient stress, or early infections caused by the apple scab fungus. The multi-spectrum images produced by the camera on their UAV shows chlorophyll in variations of red, the interpretation of

which can lead to a clearer understanding of what problems may be present.

Wait one earthly minute here! Scouting in the orchard for goings-on is an important part of what growers do. Observing insects, fungi, and healthy leaves is downright compelling. We are connected to our trees in ways computerized eyes will never grasp. And now research funds are being used to develop drones to take our place? This world certainly comes with a staggering range of perspective concerning what's worth doing.

Question of the Month

Cedar Apple Rust Conundrum

I have a serious problem with cedar apple rust in my small home orchard. Cedar trees are ubiquitous in this area. There is a fairly new product being offered as an organic fungicide known as GreenCure. I understand that it has been tested in orchards and have been told by its marketers that it is effective against CAR. GreenCure is a Potassium Bicarbonate based product. Do you have any experience with it?

Rust diseases are a challenge, especially with a variety as prone as GoldRush. This fungus causes distortion of twigs, buds, and fruit. Severe leaf spotting . orange circles are a telltale sign of CAR . can lead to defoliation on weaker trees by summer's end.

The cycle of primary infection for rust follows the scab timeline closely, starting at bloom but then EXTENDING LONGER into the fruit sizing window, as much as 3 weeks beyond petal fall. All depends on when rain triggers release of the final round of basidiospores from cedar tree galls.

A more alkaline leaf pH . specifically the moisture on the surface of the leaf as a result of rain . alters the prospects for these basidiospores. This can be achieved with a potassium bicarbonate product like GreenCure. One tricky aspect here is that scab ascospores are hindered by an acidic pH yet rust correspondingly seems to be hindered by an alkaline pH. The approach detailed in *Holistic Orchard* takes an entirely different tack: priming the immune function of the tree, along with sending in biological reinforcements with plenty of deep nutrition to insure competitive colonization defeats pathogen intrusion. Using sulfur for scab then becomes a moot point. Prior to this, orchard consultant Doug Murray in Michigan long contended that acidity and alkalinity were best rotated in a fungicide program where both these diseases were at play. Sulfur alone does seem to exacerbate problems on thin-skinned varieties.

Potassium bicarbonate acts very rapidly to cause dehydration and total collapse of spores and mycelium of susceptible fungi. Concentrations of 0.5% showed no stunting and no other phytotoxic symptoms to leaf tissue. These applications act in solution and must be applied during the wetting period once rust spores are ACTIVELY GERMINATING, approximately 6 to 8 hours beyond the start of the rain.

Potassium bicarbonate efficacy increases dramatically when applied with an organic spreader/sticker. Apply bicarb on its own+because of the precise timing of basidiospore germination on the leaf surface. (Besides, most other spray ingredients work best with slightly acidic spray water.) Choose wetting events wisely (the big ones!) as overdoing bicarb sets back the good biology. Product names include Armicarb, Kaligreen, and Milstop, along with GreenCure.

An Apple Tree Was Concerned

An apple tree told me . . .
it was concerned about
a late frost and losing its gift that could help
feed a poor family close by.

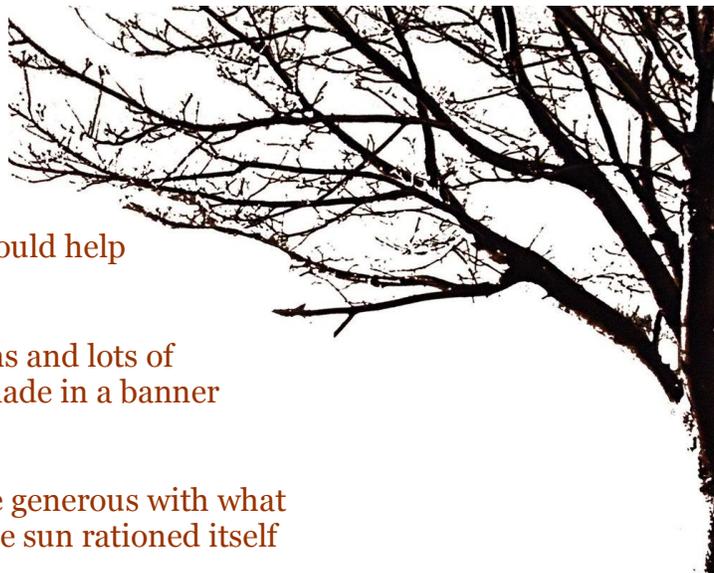
And then there were the jams and lots of
apple butter that could be made in a banner
crop year

when the clouds were generous with what
fell from them and the sun rationed itself
with precision.

They can speak, trees, they can say the sweetest
things, and can even tell a joke.

but it takes special ears to hear them,
ears that have listened to people . . . with great care.

Hafiz, the 14th century Persian mystical poet, translated by Daniel Ladinsky



Network Support

Hearty thanks to the growers -- and those friends who want more good fruit grown . listed here. These are the folks who have stepped to the plate with financial support for this network since the last newsletter.

Our funding mechanisms work much like public radio: **You decide a pledge amount that works for you.** Meeting a funding goal of \$1000 a month will make things happen.

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

Michael Phillips

Linda Hoffman - RENEWAL
Steve Hamblin - NEW MEMBER
Anne Small
Paul Loftness - RENEWAL
Greg Mund - RENEWAL
Pete Tischler - RENEWAL

Join Us!