



The Community Orchardist

November 2011

Michael Phillips, Editor

The hail that struck here at the tail end of bloom, back in late May, transcended what I think of as hail damage. Three minutes of golf-ball sized hail struck the section of Lost Nation where our farm is located. This was an event to take personally . . . and my trees sure did. The majority of the 2011 crop disappeared in a blink. Leaves covered the ground, giving me pause about the development of flower cells for next spring. The hardest and weirdest thing about this has been the extreme bark damage. Hail seemingly exploded the wood upon impact on both horizontal scaffolds and vertical trunks, and that in turn sent a pressure tremor in both directions from the injury that also opened up the cambium. This sort of damage goes substantially beyond losing fruit in a given year. The orchard entered a warm, wet June with numerous openings to the vascular system of each and every tree lying fully exposed. The odds were good for fire blight bacteria to wreak havoc. That I write now in late fall with some confidence is thanks to the fascinating world of competing microbes.

Dealing with Bacterial Opportunists

Bacteria literally take over from within once an entry point has been successfully colonized. It's all about the numbers as an array of microbe species compete for food resources and ultimate dominion. Keep that distinction in mind as we ponder the best approaches to dealing with opportunist disease organisms.

Possible actions against bacterial disease in the holistic orchard fall along three lines, often used in conjunction:

- Pruning out visible affliction and overwintering cankers.
- Eliciting specific anti-bacterial response for and by the plant.
- Enhancing competitive colonization.

But first let's do a roll call of the possibilities growers might face in different orchards given the right conditions. Pome fruits have fire blight, blossom blight,

and blister spot with which to contend. Stone fruits engage bacterial spot and bacterial canker (aka bacterial gummosis). Brambles can come with crown gall, but that's very unlikely if planting stock comes from a reputable nursery. Timing may vary but the *creeping-into-the-ecosystem* and *point-of-entry* mechanisms remain paramount.

Reading descriptions of these various bacterial woes reveals the entry mechanism clearly. Driving rains typically play an early role in how bacterial spot afflicts the leaf tips on stone fruit trees. Blossom blast to apple and pears on the West Coast follows on the tails of frost injury at bloom time. Fire blight can take advantage of untimely pruning cuts, open blossoms, hail injury, sucking insects, even strong winds tearing leaves.

Early surgery is one answer to limiting fire blight, as it's easy to spot. Infected blossom clusters look a bit water-soaked, then quickly wilt, shrivel up, and turn brown. Snapping off the entire spur as soon as possible prevents the bacterium from getting farther into the tree. Fire blight can strike through the growing tips of succulent shoots almost as readily and then move down toward the limb, making the shoot turn black. Almost as if someone came along and scorched the shoot, hence the name of this disease. A shepherd's-crook bend to the end of the shoot provides another telltale sign. Prune out infected shoots going back along the limb to make the cut at least 8–12 inches beyond the place where the blackening stops. Don't be hesitant; the disease can eventually prove fatal as it progresses farther and farther into the main scaffolds, trunk, and roots. Nor is this the time to be concerned about thinning cuts versus heading cuts. In fact, the latter can be helpful on bigger limbs, as chances are good the cut itself will be infected on the rebound by blight bacteria in those weeks immediately following fruit set. The resulting "ugly stub" can be marked with flagging tape and then properly pruned away at a branch juncture in the cold dormant season, thereby removing lingering fire blight prospects safely. If you need to make multiple cuts in the growing season, especially when going from tree to tree, sterilize your pruners with rubbing alcohol. Otherwise you might help spread the disease.

A summer spent dealing with fire blight means you will want to be on the lookout for cankered bark tissue when dormant pruning time comes around again. Such cankers appear as slightly darker, water-soaked areas in the wood, with flaky bark along the edges. These produce amber-colored bacterial ooze, offering up tens of thousands more bacteria when the growing season resumes. This new army of infection will subsequently be spread by rain splash and leaf-feeding insects to other parts of the tree, all waiting for that point-of-entry moment when conditions are right for a new round of fire blight. Limbs with visible cankers obviously need to be pruned out, removed, and destroyed.

The pivotal question to be asked here is what can be done to prevent blight bacteria from gaining this upper hand in the first place. The growing season arrives in all its glory. Bloom is in full swing, and you're rightfully concerned about warm, wet weather. The second holistic spring spray at pink will not

necessarily deliver full colonization to flowers that open several days to a week later. The race is on as to which microorganism species will claim that tantalizingly exposed opening into the heart of the tree. Supplemental sprays during bloom time have biological components that can direct the odds in your favor against fire blight.

Plan A involves a spray product called Serenade. This biological formulation contains anti-bacterial compounds derived from a natural fermentation of a particular strain of *Bacillus subtilis* bacteria found in a California peach orchard. These *iturins* are capable of destroying pathogenic bacterial cells directly as well as stimulating the immune response of the fruit tree itself. I would definitely include seaweed in such bloom-time sprays for the cytokinin boost.

Plan B involves specific antagonistic colonization of the opening flowers. A particular strain of *Pseudomonas fluorescens* bacteria are known to aggressively outcompete *Erwinia amylovora* (fire blight) bacteria for the nutrients on flower stigmas. These benign *Pseudomonas* rapidly claim the flower as their own, thereby preventing fire blight from becoming established. There are sprayable versions of this treatment, including one called Blight Ban.

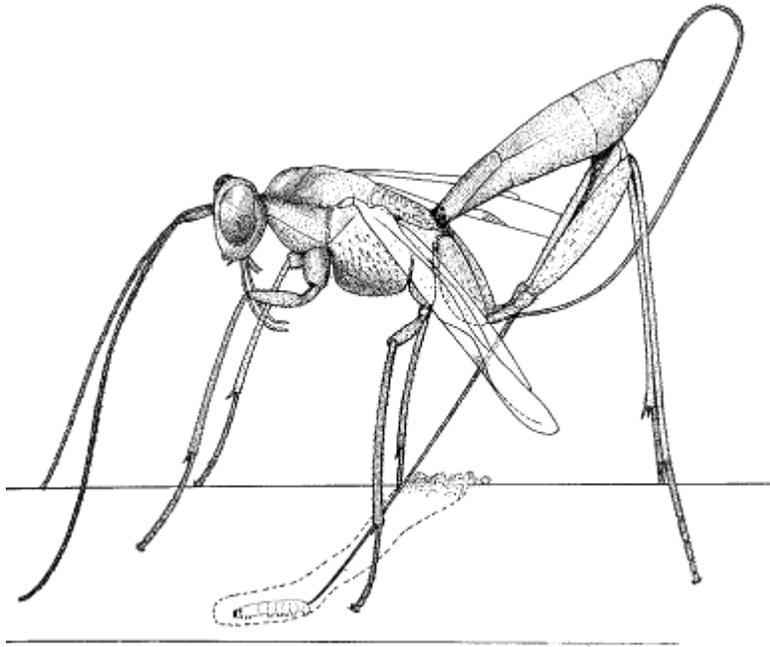
Plan C takes an entirely different tack. A nutrient-based tree wash consisting of hops extract and a vegetable oil (along with kelp, molasses, and yucca extract) is applied as buds swell in spring and then every two weeks thereafter throughout the bloom period. Resin acids found in hops are known to be anti-bacterial. Commercial growers in the lower Yakima River Valley in Washington were the first to discover the synergy of these plant-based ingredients in keeping both fire blight and bacterial canker from occurring on apple and cherry, respectively. Advocates explain that “the bacteria are deprived of their food source,” which to my mind is just another way of saying that the arboreal food web—given deep nutritional support—does indeed outcompete bacterial pathogens.



My first action back in early June was to apply biodynamic tree paste to the worst of the bark wounds. This was followed by double-rate sprays of effective microbes in my core holistic brew. I'm certain the fats in neem oil and liquid fish were good for forming healing tissue. Fire blight never showed. The wounds are indeed closing. Opportunists can be dealt with quite effectively when growers emphasize balanced nutrition and competitive colonization. Whew!

Macrocentrus ancylivorus

This braconid wasp is a dedicated parasite of oriental fruit moth larvae and peach twig borer larvae. Parasitism can reach levels of 80 to 90 percent by August and September to help provide long-term control of this pest. Now the pivotal question: How many of you have even heard of *Macrocentrus ancylivorus*.



This parasitoid native of the northeast was first noted as a parasite of strawberry leafroller. This is a beneficial ally that will attack many other caterpillars as well, such as fruitworms, stemborers, and other leafroller species. It rapidly adapted to the Oriental fruit moth after that pest was introduced from Japan in 1913.

M. ancylivorus was reared in large numbers and released

in many areas of the East, Midwest and Canada in the 1930's, where it was not present or abundant, in an attempt to combat the oriental fruit moth infesting peaches and late-season apples. It was also later released in Western orchards. It is most effective in the area roughly from Massachusetts to Michigan and south to eastern Missouri, Arkansas and northern Georgia.

Life cycle specifics can be garnered from a great web article by Susan Mahr of the University of Wisconsin: www.entomology.wisc.edu/mbcn/kyf507.html

California studies indicate that growing a small plot of sunflowers can provide these braconid wasps with an overwintering host (the sunflower moth) which allow its populations to build more rapidly in the orchard the following season. Similarly, strawberry leafroller serves as a food host for *Macrocentrus*. The ragweed borer, which bores in the stems of ragweed species, is yet another alternate host. There's a stunning conclusion here: A great diversity of plants near to the orchard helps to address pest challenges like OFM !



Question of the Month

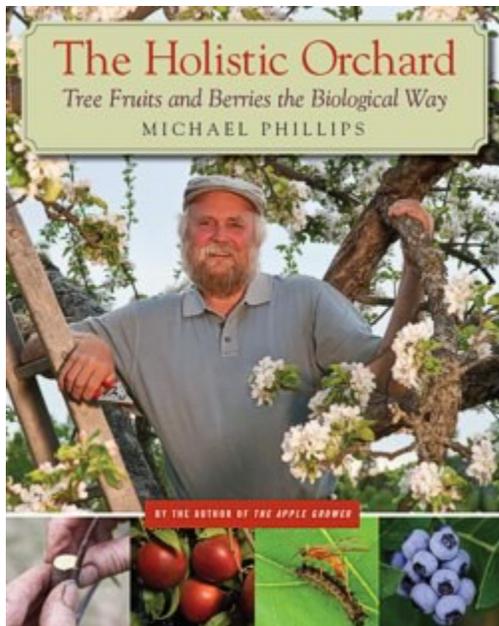
I was just going to order some raw neem oil and thought about ordering more than I need for this season, but wondered how long the stuff keeps for and how it needs to be stored?

I typically have a gallon or two leftover from the previous season, knowing its totally suitable for the first ground/trunk spray of the season (just in case my new spring shipment comes after the fact). However, I tend not to store neem oil for the long haul. Ideal storage temperature is 40 F to maintain the full range of constituent activity. You may see stearins start to develop as constituents convert over time. The azadiractins are considered the least stable, especially at warmer temps and if the oil is thawed again and again and again to tap off smaller amounts. But I hear what you are saying and it may very well be reasonable to obtain a two-year supply for economic reasons. I do that with liquid fish. Let's take this a step further, to Usha, at **Neem Resources**:

I have customers who have used their stock of neem oil for 2 to 3 years and sometimes more – if stored cool and dry. High quality oil has over 3000 ppm azadirachtin so even if there is some reduction in aza content, there's plenty left to do the job. Plus all the other liminoids like meliantriol, salannin, and nimbin, that do their own synergistic bit. I don't think the stearin separating from the oil takes anything away from the oil. Just that with repeated solidifying and thawing it deposits at the bottom and then that portion can't be used. The best approach is to rebottle into smaller containers when the neem liquefies that very first time.

Our Bookshelf

Now you can shop on the Holistic Orchard Network website! Gawd. But really ... our new **Orchard Bookshelf** offers titles to get the ball rolling. Proceeds from sales help support the website in turn. *Attracting Native Pollinators* and the *Tree Fruit Field Guide* are must-have reference books for every savvy fruit grower.



And that leads to another announcement: My three year slog (or so it feels) has come to an end! My new orchard book emphasizes the biological approach to healthy fruit growing. **The Holistic Orchard** will be available by year's end. All orders for a signed copy placed before December 31 will be shipped for FREE by priority mail.

Michael Phillips's *Holistic Orchard* is a seminal work, to be compared with Sir Albert Howard and J.I. Rodale's classic books on soil and organic gardening. This is deep horticulture at its best, showing just how and what we must do to orchard sustainably and ecologically."

Bill MacKentley, St. Lawrence Nurseries

Network Support

This year has been a stretch, I'll admit that. My goals for writing considerably more newsletters fell to the pressures of getting a book written, edited, and through a lengthy illustration/design process. That hail storm didn't exactly boost personal cheer either. And then there were computer issues, made quite apparent by my only being able to write now, post-harvest, on a new desktop HP. All of which hopefully makes 2012 a far more promising year on the networking front.

Folks came through with \$3415 to grow this network in 2011. Investing in inventory to set up the Orchard Bookshelf will create future cash flow for covering site hosting costs and taxes. Most exciting of all, we now have \$500 set aside in a long-awaited Research Fund which the Advisory Board will oversee. The next big project will see a revamped discussion forum up and running.

Things take time. Like growing a strong tree structure to support a bountiful crop load for many years to come. Being entrusted by all of you with the funding to do this work means a lot to me. Look for some exciting things to happen in the year ahead as you once again **kindly consider how you might best support this network** of health-minded fruit growers.

Hearty thanks go out to the folks below who made a network donation throughout the rest of the year:

Judith Maloney - NEW MEMBER
 Ben Applegate
 Seth Yentes
 Linda Cody
 Jon Place - RENEWAL
 Al Yelvington
 Cassie Tharinger
 Anne Small
 Lucien Hinkle - RENEWAL
 Hank Parker
 Jassy Bratko - NEW MEMBER
 Katherine Sullivan
 William Oyler - NEW MEMBER
 Don Kretschmann - NEW MEMBER
 Marsha Lindner - RENEWAL
 Greg Mund - RENEWAL
 Autumn Stoscheck - NEW MEMBER
 Deirdre Birmingham - NEW MEMBER
 Chuck Shelton - NEW MEMBER
 Dianne Flint - NEW MEMBER
 Peter Baldwin - BUSINESS MEMBER
 Linda Hoffman - RENEWAL
 Usha Rao - RENEWAL
 Sam Edwards
 Celine Caron
 John Munson
 Michael Merner - NEW MEMBER
 Richard Frost
 Steve Gougeon - RENEWAL
 Debby Williams
 Gordon Tooley - RENEWAL

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

Michael Phillips