

# The Community Orchardist

February 2007

Michael Phillips, Editor

Lord knows I wish I could write you all more often about orcharding. But that's what we have winter for, eh? To communicate, to reflect, to plain ol' think about the year ahead. Here you will find a mix of observation and intriguing possibilities on what I have deemed "Organic's Final Frontier". This sporadic newsletter is written for commercial orchardists who ponder the healthiest ways to grow good fruit for their local community. It's cool that over five hundred folks are now reading these words . . . methinks this calls for an opening blessing.

*Help us recognize how incredibly connected we are to these giving trees, and to understand the clear messages that come through when we humbly observe Nature at work. Thank you for this joyous gift of fruit growing and fruit growing friends!*

## **Sulfur Decisions**

Last season went from a relatively dry spring to a sloshing affair by bloom time throughout New England. All of which complicated the "scab dance" immeasurably . . . being the basis by which growers decide when to make sulfur applications to protect susceptible fruit from fungal infection. Holistic growers want to keep in mind that limiting sulfur applications remains paramount to good disease control even in weather like this.

I know, I know. This sounds so contradictory! We are so used to thinking of spraying fungicides as the underlying definition of disease control. Ours is a culture brought up to believe that disease is fended off solely by a medicine, that the right drug will always take care of what ails a body. Taking such a core belief to the orchard is understandable enough. But reality suggests another story, one where soil health facilitates immune function in the fruit tree and beneficial microorganisms out-compete pathogenic fungi. I'm not going to review all the teachings about Holistic Disease Management here (found in the revised edition of [Apple Grower](#) and to a lesser extent on my web site) as much as pound home some thoughts on limiting sulfur applications within the primary infection window for apple scab.

Here's what I think about when it seems to rain forever in spring: Mature ascospores are released at the start of any rain, followed by a slowdown of additional spore maturation as temps stay on the cool side. We want good protectant coverage entering such a drawn-out wet spell . . . but we don't need to renew sulfur each day as the rains continue. The potentially problematic spores are front end loaded, so to speak, into a sulfur-influenced environment. Keep in

mind that sulfur works primarily by inhibiting the production of enzymes needed by the fungal hyphae to penetrate the leaf tissue. That initial sulfur coverage – having been washed deep into the leaf crevices where the spores too will come to rest – weakens the spore’s virility. An acidic leaf pH (the result of sulfur in solution) prolongs the predicted “elapsed wetting period before infection occurs”. While the charts may specify that you have nine hours till infection occurs (if the temps average 52°F, for instance) you have more time to relax about the next sulfur decision with this “crevice coverage” in place. Trees managed in a living soil system are resisting disease in other ways as well.

Depending on season long circumstances as regards spore maturation, I probably will renew sulfur coverage at the tail end of a drawn-out rainy period while the leaves remain moist. This puts closure to that aforementioned prolonged wetting period. The operative word here is “moist” as what I’m doing is renewing the sulfur in solution. Ideally, this dries in place with enough “oomph” to protect going into the next rain as much as a week later. Sometimes sulfur coverage will not need to be renewed, especially at those points in spring when accumulated spore maturation ebbs. Gauging that ebb and flow is what makes the scab dance so damn intriguing.

None of this is easy to capture in words, eh? All confusion aside, the point is that minimal sulfur does more than we give credit for at the height of our fungal fears about scab. Too many growers cancel out the good done by competing organisms against infectious pathogens by overdoing sulfur. Put the emphasis on tree health and you will find that such subtleties apply all the more. I had a relatively scab-free orchard last season (other than the Gala row, but that’s another story) with just three timely applications of micronized sulfur.



Down in Australia, the McColl family at Kalangadoo Orchard are out straight picking their crop (now!) and meeting characters like this tree frog along the way.

### ***Scab’s On-Off Switch***

Apparently fungal pseudothecia (on the fallen leaves from the year before) require a “moisture threshold” to mature ascospores. Research in Europe has made it clear that seven days of dry weather contributes to the spore load, but after that, spore maturation is on hold until further ground wetting occurs.

Warmer weather means degree days accumulate faster, which in turn indicates that the orchard ecosystem is deeper into the accelerated phase of ascospore maturation. However, once this critical number of seven rain-free days is reached, degree day accumulation becomes irrelevant until it rains again. Moisture content in the leaf litter becomes too low to allow further development and maturation of spores. Thus temperature is a rate-determining factor, as seen on the degree day curves for scab, whereas moisture operates as a limiting factor.

This "on-off switch" of the scab being does not enter into our spray reckoning in many years since spring rains come frequently. Growers should understand that extended dry spells, on the other hand, push back the DD countdown as regards the final release of ascospores in the primary infection period. We've been taught that the whole shebang ends after the first daytime rain following 760 DD . . . but a very dry spring may well find the fungal ecosystem has a curveball up its sleeve.

### ***Effect of Stimulants on Spiders***

Just for fun, check out this video short: <http://www.glumbert.com/media/spiders>

But don't try any of this . . . spiders are among the best allies we have in the orchard ecosystem. The more you embrace species diversity in the understory, the more such good guys will be on the scene, with or without that hammock!

### ***Pulsing Agents***

Ground applications of a carbon source and omega-3 fatty acids just prior to bloom play a helpful role in launching orchard mycorrhizae. Such "pulsing agents" serve to jump start the nutrient-gathering network of the feeder root system just as it begins to renew itself as soils warm.

Fish hydrosylate has great merit here, whether as a ground spray or absorbed into a finished compost pile prior to spring application. A premium liquid fish fertilizer is different from "fish emulsion" in two respects: It consists of genuine fish parts and not just squeezed run-off, and, most importantly, it has not been pasteurized. Heat destroys the fatty oils that act as fungal biostimulants to the soil food web. The buzz to do with omega-3 fatty acids in human health jives here: a living ecosystem given the right nutrients at the right moment in the growth cycle optimizes health. Use 1–2 gallons of liquid fish concentrate per acre, with application directed beneath the drip line.

Molasses proves useful as a ground spray catalyst where soils are making that all-critical transition from bacterial dominance to a greater fungal presence. Orchard-wise, this applies to recently planted ground or where light tillage alongside the tree rows is part of a high density system using dwarfing rootstock. Use non-sulphured, blackstrap molasses as a carbon source for orchards as it retains complex sugars with humic-like properties that are a fungal food.

Research feedback is needed here to determine the right rate, but generally speaking, try 2–4 quarts of blackstrap per acre, directed on the cultivated strip.

Aerated compost tea can be applied directly to the ground in late spring and again just before and after harvest to prime the system. These latter applications are timed for that second flush of tree feeder roots that takes place after terminal bud set in August and continues through the fall months. The tree is storing nutrients at this time in the bark which, come spring, will sustain the unfurling buds. I resume ground sprays of fish at this time, lacking the requisite equipment to go the aerated compost tea route.

Lastly, let's note the approach of an avocado grower with similar biological goals:

The trees receive a foliar application of compost tea & kelp every two weeks.

The orchard is given a soil application of humic acid, fish & kelp once a month.

The timing here is season-long, not as specifically tied to the cycles of feeder root growth that I'm talking about above. But the point remains the same: Optimal tree health flows from a biologically-based system that focuses on the microorganisms both in the rhizosphere (soil) and the phyllosphere (leaf canopy) that in turn support and protect the tree.

Bringing these cutting edge notions to the orchard is exciting work. I want other growers to initiate such "ground catalyst programs" and then report back to me whatever you observe as regards tree health, hardiness, return bloom, disease pressure, pest inclinations, fruit flavor and all such apple jazz.

### [H&A Research Pages](#)

Click on that blue heading now. Have you perused the Holistic Orchard Research pages at my HerbsAndApples web site before now? These are intended as a way for fruit growers to share insights gained in small orchards wherever you be. Meaningful results flow foremost from growers hooked into a network of independent thinkers like we have here. I appreciate university-based research, indeed, but have always taken it with a proverbial grain of salt: So often the tenured professors ignore the holistic connections that only a healthy, integrated, diverse orchard ecosystem can offer.



I love doing what I can to further the cause of community orcharding. It's an honor to serve as a hub of holistic understanding and, I sincerely hope, apple inspiration. But every effort requires support so that the burden isn't all on one set of shoulders. I know we can accomplish even more together. There's one more link on those research pages which I hope you'll take a moment to ponder, and that's the somewhat witty tale of [Hercules and the Golden Apples](#).

Stay in touch, think deeply, and enjoy those venerable trees!  
Michael Phillips