



Fatty Acid Knockdown

Posted by [Craig Bickle](#)

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[Craig Bickle](#)

[Fatty Acid Knockdown](#)

January 28, 2022 04:55PM

Registered: 2 years ago

Posts: 82

I searched the Forum for mention of the term "Fatty Acid Knockdown" and alternatively FAK but didn't find a topic devoted solely to this fall/early spring spray. Hence, after some further digging, I concluded it may be useful to others (as well as myself) to give it some focused attention.

My quest to nail down what goes into this strategic spray began at the "Holistic Spray Framework" detailed in the Secret Tattoo portion of the site. A helpful note directs us to the June 2018 Newsletter for clarification. There, I found a reference to FAK as a "Start Me Up" option, especially advisable if you missed the fall application, which I did. So my task turned to tracking down the recipe for this sprayer tank mix. And that's where my search became convoluted and a bit overwhelming.

One of Michael's posts referred back to earlier Newsletters, possible in 2015. But no luck there. So I expanded my search through the Newsletters and think I finally found the Ur-text (though I can't be positive) in the October 2012 edition of 'The Community Orchardist,' which makes sense since it's for fall application. Here, the rates suggested (per 100 gallons per acre) are:

6-8 gallons liquid fish
2 gallons pure Neem oil
3-4 gallons effective microbes

Next, I need to learn more about activating these microbes using Mother Culture, but that may be a subject for another thread (which may already exist!)

Anyway, referring back then to the 6/18 CO, I find this quote in the discussion of a Spring application of FAK, "Double up the microbe, fish, and even Neem rates."

So, if I could further impose on the collective wisdom of this forum, have you employed this strategy for getting a jump on the matrix of spring pathogens in lieu of copper, sulfur, and dormant oil? If so, is a doubling of the recipe above what you used to get your growing season off to a cleaner slate than you would otherwise achieve by spraying nothing in this window as buds are just beginning to swell and green is peaking through?

Thanks in advance for any insights you feel moved to contribute!

Craig Bickle
Hap Woods
Zone 6a
East-Central Ohio

[Reply](#) [Quote](#)

[Michael Phillips](#)

[Re: Fatty Acid Knockdown](#)

January 29, 2022 10:57PM

Moderator

Registered: 11 years ago

Posts: 621

Looks like we have found ourselves a network archivist!

I'm glad you asked about the "fatty acid knockdown" because it was essentially a concept birthed just as *The Holistic Orchard* entered the production phase back in 2011. Here's the original definition found in that book's glossary:

Applications of fatty acid constituents (found in pure neem oil and liquid fish) at higher concentrations can be used to shift microbe populations. This works against fungal and bacterial pathogens overwintering in bark and bud crevices, especially when followed with biological reinforcement a day later to successfully colonize the plant surfaces under contention.

Further details were buried in endnotes within chapter four:

Applications of fatty acid constituents at higher concentrations in the fall holistic spray 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. 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.

Growers are just beginning to grasp the significance of competitive organisms in controlling some of the more difficult tree fruit diseases that establish in the dormant season on bud and bark surfaces. I want to add one more note in this regard concerning the fatty acids of pure neem oil and unpasteurized liquid fish in these post-harvest holistic applications. *Fatty acid compositions have been shown to disrupt existing microflora, making it more likely that desirable microbes will successfully colonize the surface under contention if applied at the same time or soon after the fatty acid composition.* I took that statement from a patent application looking to secure product registration for biocontrol organisms. The nuance here is to up the pure neem oil concentration to as much as 2 percent, along with liquid fish at the full 4 gallon an acre rate. Make the “fatty spray” on the dormant branch structure separate from the microbes. . . as these can also be potentially disrupted at higher rates. . . then follow in a day or two with the microbe/molasses application. Fatty acid compositions do not persist on the plant at effective concentrations very long. The upshot here is we can treat trees with observed infection susceptibility with a massive dose of a biology-based knockdown before bringing in the competitive microbe reinforcement to eat the leftovers. Any fruit grower ready to grasp these principles gets my kudos for making a very impressive leap on the ol’ learning curve.

I recollect first reading about use of fatty acids to soften the lipid protective coating on pathogen spores to do with peaches in South Africa. That further tidbit suggested in a patent application brought this two-step strategy to light. (I go to unanticipated places sometimes when zeroing in.) I felt at the time that this lipid-directed approach best be done in fall on recently-hardened spore coatings but others expressed late winter (spring) timing could be equally valuable. The upshot here was providing a biological alternative to copper, which is certainly a worthy strategy but becomes overdone if relied upon year after year after year. What's not ascertained is if the effective microbe (EM) crowd are the best choice of organisms for this purpose.

Full credit for the acronym FAK goes to [Tim Bates](#) at The Apple Farm in Philo, California. Maybe he will pontificate more on his experiences. Meanwhile, if you're dealing with bacterial spot or leaf curl, keep this alternative strategy in mind. Limiting populations of overwintering conidia of apple/pear scab in warmer zones enters in here as well.

ADDENDUM: Here's such a patent application <https://patents.google.com/patent/US6103768A/en> as found back then.

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

Edited 5 time(s). Last edit at 01/30/2022 01:58AM by Michael Phillips.

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

February 01, 2022 05:52PM

Registered: 2 years ago

Posts: 82

Wow! You're awesome, Michael. This is exactly what I was looking for, but I hate to ask you to re-state what you've already written elsewhere if I can find it myself with a bit of sleuthing. I didn't think to look at *The Holistic Orchard*, I suppose because I got caught up in delving through the newsletters, but I'll incorporate your comments in the physical texts into my research going forward.

My former career was Professional Librarian. Hence, I crave organization in my information-gathering projects. Unfortunately, I found the job unfulfilling (too much sitting at a desk indoors when I'd rather be outside among trees, wildlife, and weather) so my indexing and cataloging skills have atrophied over time. Also, I only have sporadic internet access (by design, to avoid the distraction.) That said though, I will chime in with pertinent, boiled-down tidbits as I go back through the archives and the annual calendar to further nail down a spray schedule. Excited to try the "competitive colonization boost" now that I finally have some blossoms!

Regarding FAK, I did see somewhere that it could help combat such problems as bacterial spot and leaf curl (both of which confront my trees annually,) which set me on my quest to learn more. Now, I need to synthesize the new info you posted above and make sure I have a plan and the inputs on hand to apply these two sprays when the window opens in my orchard. When I do, I'll report back to hopefully helpfully give others a more concise road map and maybe elicit some further feedback to tweak the process down to its essence.

So until then, thanx again!

Craig Bickle

Hap Woods

Zone 6a
East-Central Ohio

Edited 1 time(s). Last edit at 02/01/2022 07:57PM by Craig Bickle.

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

February 01, 2022 06:02PM

Registered: 2 years ago

Posts: 82

P.S. With all due credit to Tim Bates for coming up with "Fatty Acid Knockdown," when I told my partner about it, she said she finally had the perfect name for her band, if she ever starts one. ;)

Edited 3 time(s). Last edit at 02/01/2022 10:53PM by Craig Bickle.

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

February 02, 2022 06:11PM

Registered: 2 years ago

Posts: 82

Okay, did some more research and calculations based on MP's response to my initial post about FAK. Here's the plan (including recipe) I came up with, posting for my own ability to reference but maybe for others' benefit as well.

The recommended rate for the FAK application basically results in 4 times the amount of the ingredients used in the standard spring tank mix, less the liquid kelp/seaweed. I converted the published quantities for community orchard rates to amounts appropriate for a 4 gallon backpack sprayer since my orchard is still small and young enough to spray this way (for now.) The 100 gallon batch quantities are listed in my initial post above. Just add a couple pints of molasses to the second day mix.

FATTY ACID KNOCKDOWN (Spring)

(Apply at budswell through first showing of green tissue. Coat tree surface and ground out to drip line.)

DAY 1: 10 ounces Neem oil, 1 Tablespoon Seventh Generation dish soap, 40 ounces (1/3 gallon) liquid fish

DAY 2: 24 ounces activated effective microbes, 1/2 cup molasses

I mentioned earlier I had yet to brew a batch of E.M. but was confident the instructions were out there. And indeed they are! Written up in *The Holistic Orchard* and also available on the SCD-Probiotics web page. Looking forward to growing a soup of the critters in about 6 weeks. My fermentation chamber (for fall cider starting, now empty) should make a great place to keep them warm.

No need to decide now, but I'm thinking I'll make this same spray application in Nov/Dec when the majority of leaves have fallen. Then, will I do it again next year? Something to think about. Probably don't want to double up the FAK every year, but better to do it annually at the beginning or end of dormancy? Hmm...

Again, if you have any corrections or things to add, I would gladly welcome the feedback!

Craig Bickle

Hap Woods

Zone 6a

East-Central Ohio

[Reply Quote](#)

[Michael Phillips](#)

[Re: Fatty Acid Knockdown](#)

February 03, 2022 06:03PM

Moderator

Registered: 11 years ago

Posts: 621

Let me be clear about potential confusion related to suggested rates for a FAK application. Originally, when *Holistic Orchard* came out, the "four sprays of spring" were presented as the heart of the plan. That very first application, referred to as SPRING1, was presented as going on around quarter-inch green (on apple) at "double rates" and to be directed at the ground as much as the tree structure. Flash forward to the [June 2018 edition of Community Orchardist](#) where I made it clear that SPRING1 was better done around the time of tight cluster/ open cluster and this to be the standard holistic core recipe as far as rates go.

That revised overview introduced a spray category referred to as 'Start Me Up' applications to address specific site challenges like leaf curl or bacterial spot. (Play that Rolling Stones song as you think about all this!) Suggested use of the fatty acid knockdown comes up in this context.

Apparently the rates of SPRING1—which were initially doubled—got doubled again for purposes of the FAK in some earlier conversations. Ground rates for liquid fish hydrolysate are the goal in a FAK tank mix. That would amount to 20 ounces in a backpack for a starting point... though who's to say 40 ounces will do no harm (if there's no tissue showing as yet) and prove all the more effective. My main point is these rates are not set in stone. I think the 2% neem concentration for this purpose is right on but a 1% concentration may better suit the budget when applying to acreage. I think the ground rate of effective microbes on day two is right on... while noting what I

said earlier about organism diversity may well mean other players beyond lactobacilli might be wanted on the knockdown team.

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

February 08, 2022 12:12AM

Registered: 2 years ago

Posts: 82

Ahh. That clarification is helpful, Michael. I thought 40 ounces of liquid fish in a 4 gallon tank seemed excessive. I already get complaints about the smell of 10!

I think I'll experiment with 30 ounces to start. Then maybe scale back to 20 going forward since I plan to add FAK to my annual spray schedule. Still have to figure out whether to make it part of a fall or spring regimen, but there's time to make that decision later. This year in my orchard it's clear: hoping to have found a method that knocks down the leaf spot and curl that persistently plague my trees.

I'll try to report back as the years progress and the orchard responds.

Cheers!

Craig Bickle

Hap Woods

Zone 6a

East-Central Ohio

Edited 1 time(s). Last edit at 02/08/2022 12:15AM by Craig Bickle.

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

March 28, 2022 04:30PM

Registered: 2 years ago

Posts: 82

Just a quick update... I applied the FAK spray last week. Buds were clearly swollen here in Ohio with a few precocious trees showing green. Temperatures had suddenly jumped up into the sixties, and even touched the seventies a few times, over the course of at least a week. The trouble: sporadic rain! I picked a couple back to back mornings to accomplish the two-day process, but by evening of each day we saw showers. Hopefully, there was enough dry time for the fats and then beneficial microbes to get established before the trees got a wash, but the vagaries of annual weather events will do as they will.

The kicker: this week we're back down into the thirties with overnight lows dipping into the bottom of the twenties! Bud development appears to have stalled, thankfully, but wanted to spread some pre-emptive commiseration. Climate change is a challenge to us all.

Craig Bickle

Hap Woods

Zone 6a

East-Central Ohio

[Reply Quote](#)

[Brittany Kordick](#)

[Re: Fatty Acid Knockdown](#)

March 28, 2022 05:49PM

Registered: 4 years ago

Posts: 211

Hey Craig,

Thanks so much for doing such a great job as resident archivist. As material on the forum expands, we sure need someone in this position. It is not uncommon for me to search for info I know is here, but come up empty. Especially when it comes to basic stuff like the fatty acid knockdown concept, it is really helpful to cut through the here-and-there references and have a devoted thread to go to.

For our mature orchard this year, we ended up taking a different approach than the FAK to start our year (we had planned to, but time, weather, and subsequent spray plans conspired otherwise), but I actually just sprayed our young orchard with a FAK later than intended. We're all over the place from greentip to bloom, but no adverse effects discerned from hitting the open blossoms with this heavy dose of oil (wasn't a big deal if it did since we don't want fruit on these young trees yet anyway, but just fyi).

Timing-wise, it was also pre-immediate rain event, but the imminent precipitation was a big part of the reason why I decided to push ahead with the FAK application. The oils adhere very well to the tree surface, and the flavonoids inherent to the karanja oil, in particular, should hopefully provide some lingering action against any pathogens that were immediately washed in with the warm rain, then (if the bloody wind wasn't blowing gale-style for three days straight) I could have followed up as planned with beneficial bacteria to colonize. That's the thinking anyway . . .

[Kordick Family Farm](#)

Westfield, NC

Zone 7a

Edited 1 time(s). Last edit at 03/28/2022 05:51PM by Brittany Kordick.

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

March 29, 2022 02:49PM

Registered: 2 years ago

Posts: 82

Yes, my thinking too: better to have sprayed even if there's rain in the forecast later in the day than to have not sprayed at all. And there are always scheduling conflicts that have to be balanced with the weather, which reminds me...

I'm sure it's a common practice, but it also seems to be a solitary one: keeping an annual calendar of when tree actions are taken. Mine is finally starting to fill in now that I have a few years behind me, but as a beginning grower starting from scratch, it's been a frustrating experience getting to this point. There just aren't specific dates I could find in the literature for when to do what.

This makes sense, of course, because every locality is different. So cues for spray applications are tied to what the trees are doing rather than the annual climate, which differs everywhere. The problem for a newly planted orchard is that trees don't blossom for several years, in my case four. So at the beginning, I was flying blinkered, if not blind. I gauged when tight cluster to petal fall was happening based on what the wild apples in the woods were doing rather than the trees in front of me.

I don't think this is too big a deal. The spraying I did accomplish got my whips to the maturer juvenile state they're at now, just beginning to produce a crop. But it really clued me in to the importance of record-keeping. Which got me further thinking, maybe my, or your, calendar data could help others figure out when it's common practice to undertake various tasks in the "holistic orchard."

I'll just leave it there for now. Maybe this kind of info already exists, maybe even on this forum, and I'm just not aware of it. So rather than propose something complicated and technical, if you have any thoughts about approaches to keeping track on an annual basis of when you do what, feel free to chime in!

Craig Bickle

Hap Woods

Zone 6a

East-Central Ohio

[Reply Quote](#)

[Shane Patrick](#)

[Re: Fatty Acid Knockdown](#)

April 01, 2022 01:50AM

Registered: 2 years ago

Posts: 22

Our orchard has a long history of IPM growing strategies and we are transitioning to the holistic method. Fireblight and scab are historically present but had been controlled in the past with "traditional" sprays. Bud swell is apparent, even the pollinators who keep banker's hours buzz around on the nice days. I want to get the FAK sprays going early to help reset the playing field for an orchard that will be without the medicinal crutch it leaned on in years past. However, the soil is still soft in some areas. What does the Collective think? Wait? Spray the firmer areas and stay off the rest? Spray it all, throw some mud? To rut or not to rut, that is the question.

shane patrick

pleasant pond orchard

richmond, maine

5b

[Reply Quote](#)

[Todd Parlo](#)

[Re: Fatty Acid Knockdown](#)

April 01, 2022 05:58AM

Registered: 10 years ago

Posts: 301

Getting out early and getting out in the wet depends a lot on that soil type. Sandier soil is much more forgiving than heavy ones. Regardless, we are not just talking about ruts and a mess, but really compaction. A bit off topic from fatty acid knockdown maybe, but I am a firm believer that soil is king. So let's not pump up the canopy cover at the expense of that soil. This is where the smaller orchards out there, and those with smaller machinery or draught animals can prosper- activity in the wet early spring. Although those with large orchards will eschew this, a backpack sprayer and the extra time can fit in when the alternative may be problematic. My opinion is that smaller volumes can fit in a program of sprays that address nutrient boosting, colonization and general nuance. Big volumes play a bigger part with things that need dripping coverage (like fungicide treatments). I am reacting here because I visited a few orchards last year that were being made an absolute mess due to "having" to be active out there, when maybe they shouldn't have been.

[Reply Quote](#)

[Brittany Kordick](#)

[Re: Fatty Acid Knockdown](#)

April 03, 2022 09:46PM

Registered: 4 years ago

Posts: 211

Ah, to spray or not to spray. Just quickly wanted to chime in to add that one of the really nice things about growing the way we do is that, in spending our time on cumulative holistic orchard health, we get away from the conventional "spray or pay" paradigm, wherein you really are in trouble if you miss a targeted spray because the trees are truly dependent upon the inputs. So, concurring with Todd, I would add that, as you struggle with difficult to spray or not to spray questions, keep in mind that the effects of what you're doing are really more

cumulative rather than targeted, and factor that in, as well. It's tough when you are transitioning or starting out and you really want to get off on the right foot and start that cumulative process. It's slightly easier when you're ten years in and have done a FAK and other holistic apps enough that missing one doesn't seem like an epic tragedy. I emphathize completely with Shane's situation, and particularly in my vegetable-growing days, there were plenty of times where I would, say, go ahead with a tilling when the soil really was on the wet side because I didn't feel I had a choice (maybe more rain was expected and I was already late, etc.).

[Kordick Family Farm](#)

Westfield, NC

Zone 7a

Edited 2 time(s). Last edit at 04/04/2022 02:23AM by Brittany Kordick.

[Reply Quote](#)

[Brandt Schisler](#)

[Re: Fatty Acid Knockdown](#)

April 05, 2022 05:52PM

Registered: 5 years ago

Posts: 28

I love when I am able to come onto the forum and find a thread that pertains to the question I have at that exact moment... and this one is a recent conversation to boot!

So I just completed our FAK spray yesterday before a morning rain today. Beyond the liquid fish (Schafer's to be exact since I am here in the midwest), I have also added TNT Hi- Energy Fish [TNT Hi-Energy Fish](#), which is a whole salmon fermented for 18+ months and they claim it has a high volatile fatty acid content, 70%+. I used it last year with success and it actually works as a surfactant too. Therefore, it seems to pair well together with the liquid fish helping it stick and stay on the tree, even after a rain. From my understanding (or lack thereof), the Hi-Energy Fish is already in it's simplest form and increases biological activity right away all while helping with the liquid fish breakdown as a biological food source over a longer period of time.... this helps me with the 'should I spray before a rain or not' question that always seemed to nag me years prior.

The one thing that I cannot quite wrap my brain around is the impact on Fatty Acids on beneficial microbes if all sprayed at once. I understand the concept of waiting a day or two for pathogen's to take a hit before colonizing with the beneficials, but is there reason to believe that we can't give the pathogen's the ol one two hit in the same spray tank to prevent from making another orchard pass with heavy equipment?

[Hickory Ridge Orchard](#)

Mexico, Missouri

Zone 6a or 6b, depends who you ask!

[Reply Quote](#)

[Brittany Kordick](#)

[Re: Fatty Acid Knockdown](#)

April 05, 2022 06:59PM

Registered: 4 years ago

Posts: 211

I have struggled with these concepts, as well, and actually, your question of whether or not to tank mix beneficial bacteria or fungi with this higher oil content spray came up for us this year. The high concentrations of neem and karanja in this spray should have action against microorganisms (but shouldn't at the lower core holistic spray concentrations, when many of us do tank mix beneficial bacteria/fungi with the oils, etc.), and unfortunately, it's not as simple as great-for-beneficials, bad-for-pathogenic-types. Somewhere in this thread, Michael talks about shifting populations with the fatty acid spray, and how the oils start to break down fairly fast in the environment, and by the time you apply bacteria 24 hours later, the oils are a safe food source. I would love to be able to tank mix the fatty acid knockdown and beneficials for the reasons you name . . . but I don't. Still, I would love to have a better understanding of these concepts.

[Kordick Family Farm](#)

Westfield, NC

Zone 7a

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

April 06, 2022 03:12PM

Registered: 2 years ago

Posts: 82

I wondered the same thing, Brandt, when I was dodging raindrops to get my FAK sprays applied a couple weeks ago. After all, in the Core Holistic Recipe fats and effective microbes are applied at the same time. Sure would help if I only had look for one day's promising forecast to time this application rather than two. I swear we get more frequent rainfall in Ohio springs than we used to when I was a kid.

So I looked back at Michael's notes about this strategy for knocking out pathogens overwintering on trees, leaves, and the soil surface below the trees. Here's what he said (just a couple months ago) above: "Make the "fatty spray" on the dormant branch structure separate from the microbes. . . as these can also be potentially disrupted at higher rates."

Apparently then, separating the oils and fats from the EMs when the former is used at a higher concentration gives that much more likelihood for success against problems like bacterial spot and leaf curl, which my trees have shown evidence of since I planted them. So now I'm waiting to see. I'll try to report back this summer, which is when these problems have cropped up in past years. I suppose a better test would be to make the FAK on separate blocks doing a combined application on one and divided on another to see if there's a

difference in tree health later in the season. But with only 40 trees at this point, it didn't make sense for me to "sacrifice" some of them to a possibly less effective protection strategy. I can still get away with a backpack sprayer, so moving heavy equipment around isn't a concern... yet!

Craig Bickle
Hap Woods
Zone 6a
East-Central Ohio

[Reply Quote](#)

[Isa Campbell](#)

[Re: Fatty Acid Knockdown](#)

April 07, 2022 11:30PM

Registered: 6 years ago

Posts: 7

I am just getting around to either a FAK or late-dormant copper application on my semi-dwarf apple trees in their 6th season. It is a bit late for this as we are at half-inch green on many of the trees here, although many buds are still closed and I could selectively avoid the trees/branches that are further ahead.

My question is what should I spray at this late stage to knock back any overwintering disease inoculum? Am I more likely to cause phytotoxicity, major fruit russetting or other problems from 2% neem, copper, or lime sulfur? I am getting ready to start the spring holistic spray program afterwards. Any thoughts or advice would be very welcome!

Vineyard Hills Community Orchard
Grow Ohio Valley
Zone 6a in Wheeling, WV

Edited 3 time(s). Last edit at 04/12/2022 01:19AM by Isa Campbell.

[Reply Quote](#)

[Josh Willis](#)

[Re: Fatty Acid Knockdown](#)

April 27, 2022 01:30AM

Registered: 6 years ago

Posts: 134

Isa, I assume that with greater green showing, there is greater risk for phytotoxicity. Similar to you here in MD, I skipped a double rate for our first spray for that very reason, since we were also running behind. But of course, you know what they say about when you assume things. So I'm curious to hear others.

Craig and Brittany, to back track a bit to your earlier comments -- it would be lovely to have a central, updatable reference table for HON's common or best practices for sprays, as I think you are suggesting. Of course, besides the not a small amount of work that would entail, it would be a tricky proposition as these things are always evolving, and there may be multiple view points on best practices. Still, it seems like a nice thing to start conceptualizing what such a reference online would look like!

Earthworks
Zone 7a in West-Central MD
Non-commercial, ~100 fruit trees, dwarf to MM106

[Reply Quote](#)

[Brittany Kordick](#)

[Re: Fatty Acid Knockdown](#)

April 28, 2022 02:52PM

Registered: 4 years ago

Posts: 211

FYI, HON members in good standing can find a copy of Michael's "Holistic Orchard Framework," detailing his spray program, in The Secret Tattoo section of this website, which may satisfy interest in a "best practices" holistic spray plan. I believe it's also detailed, albeit without any recent tweaks, in at least one or two of Michael's books. Actually, what I was referring to in my previous comments was not a desire for a spray writeup, per se, but my perpetual wish for better biology and chemistry chops. I am lucky that my mother is a microbiologist and always helpful; understanding the biological and chemical underpinnings of what we do does not come naturally for me.

However, while I agree it is useful to reference what others are spraying (or not spraying), especially for beginning orchardists, I think it would be unfortunate for anyone to just copy another's spray plan, particular if you don't fully understand why what's being applied is being applied. Everyone's situation, climate, varieties, etc. are different and must be considered, and I would encourage everyone to really understand why they're applying anything (and what the far-reaching effects may be) before they spray it, no matter whose fine example they are following. This forum is great for working such things out with your peers!

What might be more helpful to a beginning holistic orchardist is some sort of workshop along the lines of, "Establishing a Management Plan for your Orchard," that explores all aspects and considerations that should go into any kind of spray application plan. It's taken us years to garner the understanding of our particular situation and build on our wants and needs for the orchard in a way that makes holistic sense. For the most part, that's just paying your dues and inevitable, unfortunately, but there are definitely things I wish we had done differently, going back years.

[Kordick Family Farm](#)

Westfield, NC
Zone 7a

Edited 1 time(s). Last edit at 04/28/2022 02:57PM by Brittany Kordick.

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

May 03, 2022 03:43PM

Registered: 2 years ago

Posts: 82

Thanks for the question Josh. Luckily, I have a different take from Brittany's, so we can ponder over more than one perspective...

As a brand new to fruit-tree-growing suburban kid with a degree in English and a passion for low impact building of a sustainable homestead when I discovered the wonders of "farmhouse" cider 7 years ago, I was completely at sea about what to do to grow healthy trees that produce drinkable apples. That first year I ordered five whips from Cummins Nursery and plopped them in the lawn using the same technique for the ornamental hardwoods I had planted back when I had yard surrounding our first house in the city. Now what?

Of course, I soon discovered Michael's books and read first "The Holistic Orchard." It was overwhelming. And despite Michael's brilliance in the botanical and horticultural departments, he wasn't the greatest of writers. So it's taken me awhile to go back and pore over his notes in all the various places he put them (including here) to come up with a baseline plan for the cultural practices we (my wife and I) employ in our orchard.

I give this background to point out that when you're starting from scratch and trying to figure out what to spray when, a suggested schedule like the one compiled in the "Secret Tattoo" section of the site is essential. In the first few years my trees were struggling and I had no idea why. I was already doing the four Holistic Sprays of Spring and putting down compost and wood chips each spring. But the trees looked tired and dried up, even though I couldn't discern any pests or diseases whatsoever. So I was motivated to upgrade my spraying routine and got excited about Micheal's foray into sap analysis and foliar nutrition. His home-brew methods for producing calcium and silica were difficult to manage at our place, I found, so when he started talking about the AEA products available it was a breakthrough for us. We're small enough that these commercial items weren't cost prohibitive. So now we've incorporated them into our spray mixes, per Michael's suggested rates of application.

That's probably enough typing by me to illustrate why I think a baseline spray routine for beginning orchardists is crucial, and why I am so thankful that Micheal was able to give us holistic natural growers a place to start. I still haven't seen a plum curculio or borer at our place. Is it because of what I've been spraying? I have no idea! An alternative method might have been to just let the trees fend for themselves and wait until the pests showed up so I could get a better sense of what we were up against, but would it be worth it to grow unhealthy trees so we would know what target to deploy our defense against? That doesn't seem right to me. So I do the FAK, Holistic recipe apps, and this year (now that we have blossoms) Competitive Colonization Boost. I also put on a few coats of Surround to deter the Japanese beetles and maybe misdirect the PCs looking for trees to set up house on. As time passes, I'm sure we'll learn more from what our trees tell us. But at the start, I agree Josh, a coherent baseline plan is essential. So I'll try to contribute my 2 cents about what I'm spraying when I can. Maybe it's time for a new CCB thread! After all, 'tis the season..

Craig Bickle

Hap Woods

Zone 6a

East-Central Ohio

[Reply Quote](#)

[Josh Willis](#)

[Re: Fatty Acid Knockdown](#)

August 12, 2022 12:41AM

Registered: 6 years ago

Posts: 134

Thanks for the clarification, Brittany. I hear you on wanting better biochem chops, and I am way behind you!

I'll have to check out the Secret Tattoo, this is a good reminder, thank you! Perhaps all the answers I ever want are waiting just over that hedge. :)

Without having seen spray plan in the Secret Tattoo, I wanted to respond to Brittany's very good point about new growers who might just use a "copy and paste" approach. I wonder if such a reference table could coexist alongside all the nuance that we discuss in this forum. I think it probably could, but that is just my two cents. I certainly agree that new growers should learn the systems, as best they can, that inform the best practices. But sometimes I spend so long hunting down PC emergence dates, Spinosad rates for a specific pest, etc., that gosh I would love a handy reminder of things I've read before. I've started this on my own, of course, although a few years of writing down observations does not great data make.

Craig, your description of Michael's writing made me laugh. Partly b/c yes, he did not always give clear direct answers, IMO. But also, I don't think he was trying to! I actually quite enjoyed his writing with its roundabout style. I actually think it's an important part of conveying the message! But yes, I also hear you, I have taken a lot of time collating information between his books and the HON newsletters, etc.

Earthworks

Zone 7a in West-Central MD
Non-commercial, ~100 fruit trees, dwarf to MM106

[Reply Quote](#)

[Craig Bickle](#)

[Re: Fatty Acid Knockdown](#)

September 06, 2022 07:28PM

Registered: 2 years ago

Posts: 82

Sorry it's me taken awhile to respond, Josh. A hectic summer caused me to put a lot of things on the back burner, including the HON forum. But with the school year, harvest season, and cold weather on the horizon, I should be able to keep up with the conversation in a more timely fashion, for awhile at least.

I sprayed more this year than I have yet, generally following the timing Michael sketched out in the spray schedule he posted behind the Secret Tattoo. Some trees are doing well, some are OK, others are struggling. The noticeable difference is the rootstock. Early trees we grafted on M26 seem to have hit a wall, whereas later planted trees on G890 from Cummins are growing gangbusters.

Still a few months before I need to make a decision, but since this is the Fatty Acid Knockdown thread, I'm pondering whether to make a FAK application in November or early March as I did last year. Since it's a dormant spray, I have no hesitation about applying it. The biological reasoning makes sense to me. I can't say the same for the summer sprays which, as the warm weather advances around about May turning to June, I get less assured about. Next year, my goal is to get better about leaf analysis and foliar feeding (in addition to Coddling Moth control!) but until then, there are apples to pick and cider to press. Favorite time of the year!

Craig Bickle

Hap Woods

Zone 6a

East-Central Ohio

[Reply Quote](#)

[Mike Biltonen](#)

[Re: Fatty Acid Knockdown](#)

September 07, 2022 03:16PM

Registered: 11 years ago

Posts: 298

I just read back through all of this thread (I'd read them as they were posted, just never responded) and have a few thoughts and some comments based on my experiences working with a wide range of growers in different regions. The first is that there are no silver bullets. The second is that recipes don't work. Why? Every year is different and every location/grower challenges are different. Michael's approach is a conceptual one that needs to be digested and applied to each person's specific issues. This year, for example, the problems have run the gamut from few problems to myriad ones (I know that's general). Now, more specifically, let's look at FAK. First, this approach relies on medium-chain (C8-C10) fatty acids to accompany the other heavy lifters in the mix. This is the same "technology" that Certis uses in Cueva - fatty acids to essentially pierce the cells walls and copper to finish them off. When we look at the FAK mix there is only the neem doing the heavy lifting from a disease perspective, everything else supports the nutritional and recolonization of the biome. But they do it together. One may ask why is there no copper (even Cueva) or micronutrients in the FAK?

One of my questions has been if MCTs take out pathogens (bacteria or fungi or even viruses) why wouldn't they also take out the good ones? The answer (with no supporting data) is that they probably do, but in a differential way - meaning of course the FAK differentially but equally affects the good and the bad biome together. We just don't know which ones. Michael and others have mentioned peach leaf curl and Xanthomonas (neither of which are problems on pome fruit). But how does it affect scab, fireblight, powdery mildew, Marssonina, etc. The answer to that requires an understanding of the biology and how those diseases are most effectively controlled. Scab overwinters on fallen leaves in the fall and sporulates in spring. Fireblight is a systemic bacterial disease that overwinters in cankers on and in the tree. Powdery mildew overwinters in the bud scales of trees and sporulates as the bud scales open in the spring. Marssonina seems to overwinter on both the leaves (like scab) and on the bark of the trees. All pathogens enter their overwintering phases in the fall and reawaken in the spring. We do know that for pathogens like powdery mildew (PM) and peach leaf curl (PLC) that it traditionally best to try and control them in the fall before the leaves fall (or as they do so) and the before the bud scales close up. Copper at 50% leaf fall is a great traditional organic approach to helping course-correct for PLC the following season. PM seems to respond better to sulfur or oil (but not both) in the spring, but taking out the hardening spores BEFORE bud scales close up in the fall with sulfur also works. Scab by spraying the leaves as they fall from the tree, fireblight by cleaning cankers and painting with a neem paste, and Marssonina by spraying the trunks of trees in the fall.

But back to the topic at hand. The question of when to apply FAKs should really be changed to whether you should be (or need to be) applying FAKs. And the answer to that is it depends. For example, this year has been very hot and dry and with few exceptions the disease pressure has been low (exceptions being fruit rots like bitter rot and fireblight). Last year (2021) was a different ballgame. At the end of 2021 I would have suspected the potential for overwintering disease inoculum would be high. And if 2022 was a wet year we could have had a totally different season. Where am I going with this? The fact that FAKs work is not in doubt. How well they work on different microbial organisms is another question. I don't think it's fair to assume they work equally on all microbes. And we don't really know how well they work comparatively on different disease organisms. So know the problems you are dealing with and work within that reality. This doesn't mean that applying FAKs regardless of detailed intel is a bad idea. It just means that knowing what you're dealing with may give more credence to a fall FAK spray rather than a spring spray, or vice versa. Or maybe both are the best option if the pressures are high. This year, given the low disease pressure and likely low overwintering inoculum, a FAK spray may not be necessary. But in the spring when things are waking up, that I feel is the most powerful and best use of these materials. Second, I would definitely spray the MCTs first, give it a few days then spray the microbes and fish. If the MCTs work on one type of microbe then it's likely they work on others - good, bad or indifferent. And mixing EM in a tank with something designed to kill microbes just doesn't make sense. That said, the timing of the EM/fish is important because some microbes also use FAs for food, so as they MCTs are breaking down, layering on the

microbial spray within 48 hrs (just a guess) takes the "knockdown" out of the equation, layers on the good guys and the fish, and leaves some FAs as additional food source.

So, first, spring over fall applications unless disease pressure or your conditions indicate otherwise. Second, separate out the two sprays - knockdown first, microbes second. Third, don't hesitate to use copper and/or lime sulfur every 3-4 years to clean up what the FAK left behind. But reinoculate the orchard soon after (7-10 days after) the copper and sulfur has dissipated. Fourth, try different microbial mixes. EM is just Lactobacillus, some yeast, and molasses (oh, and the stuff they don't list). Pretty minimal. Tainio Spectrum, OP-8, and other inoculants are out there and give you a broad range of fungal and bacterial species to put to work. IMOs, compost teas, various unwashed plant teas, etc. give you different microbial compositions - how they work and which ones to use is the BIG questions - and one that Michael among others have asked. We just don't know. I propose a "variety is the spice of life of approach," but in reality, there be some mixes that are better for fall apps and some better for spring apps. Then different microbial mixes may be better at different times of the year like different nutrients serve the different developmental phases of the trees better. We just don't know (or at least I don't). And while we are looking to this approach for disease control, diversity and timing may also (and likely will) prove beneficial for the overall health via internal physiology. Science is showing that there are certain plants that will harbor certain bacteria inside their cells to serve specific functions under anaerobic conditions. Fatty acids by virtue of their ability to help materials penetrate cells walls may help supercharge the plants internal microbiome in a way we haven't really even thought about.

Going into fall I would apply the fall FAK at 50% leaf fall at 3-4% neem oil. Followed by fish + microbes within 48 hours. In the spring I would back off to 1-2% on the neem after silvertip, so applications and rates should be adjusted based on phenology. Before silvertip the spring FAK can be treated as the fall would be since the trees are still relatively dormant (not showing any green tissue). Consider and reconsider your microbial additions based on what it is you are trying to achieve - more bacterial, more fungal, more.....? Can't answer that question - go long and use a blend with a diverse composition. Consider as well that anytime during the growing season that you apply anything close to a true fungicide/bactericide (e.g., copper, sulfur, Double Nickle, Regalia, etc.) that you will want to follow that up with a CCB for obvious reasons - but not at the expense of damaging the soils. More work def needs to be done to study how mixing MCTs or other materials and microbes in the tank affects their viability.

Anyway, sorry for the long post, but I do feel that there is nuance in all of this and thinking that there is a recipe that works for everyone is misguided. It's a great starting point, but we need to go deeper. And since there are no silver bullets, we need to remain vigilant, creative and adventurous as we carry on the mission of holistic orcharding. We're all involved in one big experiment anyway, what have we got to lose?

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

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[Josh Willis](#)

[Re: Fatty Acid Knockdown](#)

January 06, 2023 08:11AM

Registered: 6 years ago

Posts: 134

Mike, I've just re-read your post for about the 5th time, and each time I am learning something more that I missed before. Juggling all the actions involved in these sprays takes a few times for my mind to grasp it all, it seems. But this post is super helpful for thinking about the parameters of what we mean by FAK. So thank you!

If I may ask a few quick clarifying questions, please.

You mention MCTs. What are those? Sorry if I am missing the obvious.

Is Cueva's, or any mineral fungicide's, effective persistence timeframe 7-10 days, if I understand you correctly? i.e., give Cueva 7-10 days before inoculating with the our favorite little microbial buddies (LMB's? can that be a thing?)?

Finally, if we are blasting our orchard with a dose of Cueva or other mineral fungicide, followed by inoculation with LMB's (see how much space that saves?), is there a compelling rationale for also applying a FAK that same month? I am guessing the answer is no, i.e., no harm but perhaps not worth the money or time.

Earthworks

Zone 7a in West-Central MD

Non-commercial, ~100 fruit trees, dwarf to MM106

[Reply Quote](#)

[Mike Biltonen](#)

[Re: Fatty Acid Knockdown](#)

January 06, 2023 11:23PM

Registered: 11 years ago

Posts: 298

Hi Josh,

MCTs are "medium chain triglycerides," or in other words - fatty acids. Technically, MCTs are medium length carbon chains (C6-C12). They are the reason why low ppm copper products like Cueva work so well. The MCT or carbon chain pierces the cell wall of the organism (e.g., fireblight bacteria) allowing the copper to work its way inside and do its thing. That's in addition to the copper's inherent toxicity and the physical damage to the cell wall of the pathogen. There are four different types of MCTs (and many more different types of fatty acids). There are four types of MCTs: caproic acid, caprylic acid, capric acid and lauric acid. Of these, caprylic and capric are the most commonly used in MCT oils. And for those in the know, the organic herbicide Homeplate (also Suppress) is 44% and 36% caprylic and capric acid, respectively. So its not just pathogens that MCTs work well against. Now, an excellent question might be what about short

chain (fewer than 6 carbons) or long-chain (more than 12) fatty acids. *"Short-chain fatty acids (SCFAs) are the main metabolites produced by the microbiota in the large intestine through the anaerobic fermentation of indigestible polysaccharides such as dietary fiber and resistant starch. SCFAs might influence gut-brain communication and brain function directly or indirectly. from [here](#)"* And *"Long-chain fatty acids are saturated or unsaturated fatty acids containing 13–21 carbons. Oleic, linoleic, palmitic, docosahexaenoic acid (DHA), and eicosapentaenoic acid (EPA) are important in health and disease."* from [here](#). Now, short-chain fatty acids are produced by anaerobic bacteria in the guts of animals but also possibly in the anaerobic parts of the soil where typical organic breakdown doesn't take place (more research needed). But if they benefit the gut brain connection in animals, could they not also play a similar role in the underground communication between plants and other organisms; an analogous gut-brain connection. Long-chain fatty acids are important in immune function...in plants as well as humans? Now it starts to make sense why diversity of fungi and bacteria is important in overall soil and plant health. I'll end by saying that coconut oil and milk are rich in MCTs, that's why they are the focus of human nutrition (that and they are easily digestible. Short chain not so much because of how they are produced, but maybe in manure based composts from ruminants they play a different role in soil and plant health. Long chain fatty acids I'm less sure of, but know that many people can't digest this type of fat very easily. In any case, some of my comments here are speculative, but I think you get the jist. These are all things I am interested in learning more about and exploring this coming season.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

[Reply](#) [Quote](#)

[Mike Biltonen](#)

[Re: Fatty Acid Knockdown](#)

January 06, 2023 11:33PM

Registered: 11 years ago

Posts: 298

Hi Josh,

To answer part two of your question: I think that spacing sprays of FAK and LMBs is smart. It allows the FAK to do its thing, then giving space for the LMBs to establish. Applying FAK on a regular basis also doesn't seem like a bad idea, but you are likely to one degree or another resetting the microbiome of the trees such that you'll need to apply more LMBs each time. The FAK at beginning and end of the season seems smarter for resetting the environment after a long winter and cleaning things up at the end of the season - kill of the bad guys, allow the LMBs to fill the void. In season though I've seen FAK sprays have some phytotoxicity (see previous post about some fatty acids being used as herbicides) and so best to probably only apply in season if really necessary. You don't want to disrupt the physiology of the trees or ecosystem anymore than you want to have to reset the microbiome every time you apply an FAK. Now, does using copper on a regular basis constitute an FAK spray that requires resetting the microbiome? That's something I don't know anymore than I know the full effect of mixing cueva or even neem or other fatty acid based material with Em-1 or other microbial magic powder. At least not the full extent. Others may have better intel than me on that. That said, FAK at the beginning and end of the season. Apply microbes to reestablish the microbiome after each spray (assuming the fall FAK spray isn't too late). And then monitor your spray program to ensure you aren't killing off the microbiome you have worked so hard to establish. Otherwise, feed those LMBs and theoretically they'll do you right in the long run.

[Mike Biltonen, Know Your Roots](#)

Zone 5b in New York

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