



frog eye leaf spot (FELS)

Posted by [Alan Surprenant](#)

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[Alan Surprenant](#)

[frog eye leaf spot \(FELS\)](#)

July 04, 2015 11:30AM

Registered: 10 years ago

Posts: 22

what? frogs in the orchard? isn't that a good thing? well after 10.5 inches of rain in june (another 1.5 on july 1st) frogs might well be moving into the wetter parts of the orchard. but all seriousness aside.....

after trying for 2 years to get a control handle on FELS in my orchard I've had success. I think a combination of 5 copper sprays over that same 2 year period along with a regular micronized sulfur spray on all the apple trees (including the scab resistant varieties) and an extremely dry month of may, now there is virtually (and actually) no FELS in the orchard. for those not familiar with FELS, it appears in spots which look like frog eyes on the foliage, the n the leaves turn yellow and fall off around early august leaving one with a lot of little fruit with no leaves to grow and ripen it. not a pretty site. and the worst infections were in the scab-resistant (think weaker tree here) varieties like liberty, prima, priscilla, honey crisp etc. I hope it's gone for good, but I'll settle for this growing season right now.

I would quickly add the importance of pruning, especially the lowest/ first set of scaffolds. this is the 'fungal zone' some of us refer to. good air drainage under the well pruned first scaffolds is also important, in my humble opinion.

[Brook Farm Orchard](#)

Zone 5 in Massachusetts

Edited 1 time(s). Last edit at 07/13/2015 02:49AM by Michael Phillips.

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[Michael Phillips](#)

[Re: frog eye leaf spot \(FELS\)](#)

July 13, 2015 03:53AM

Moderator

Registered: 11 years ago

Posts: 621

Frog-eye is the leaf manifestation of black rot, caused by the fungus *Botryosphaeria obtusa*. Once well-established, it can require allopathic measures like copper (especially copper!) to knock back the pathogen. This is a disease that thrives in dead wood in the tree, especially those "stumps" where the pruner leaves a limb remnant or deep cold the week following winter pruning prevents proper closure. Another major source of inoculum are piles of pruned branches left to decay in the air, years on end. And mummified applets. Dead limbs in surrounding hardwood forest may contribute here as well. Especially humid seasons and the [association with fire blight in the Southeast](#) complete the *be forewarned of black rot* spectrum.

Three things here worth noting to drive home certain points:

The frog-eye phase enters through stomata on the undersides of the leaves ... thorough spray coverage matters with this pathogen, especially in the month following petal-fall.

Prunings cut into short lengths and lying flat on the ground are subject to "soil level microbes" to break down and indeed will never be a problem. Black rot takes 2, 3, even 4 years to establish in those branch piles in the air. Too many struggle to grasp what it means when different microorganisms are the decomposers.

Lastly, a shake-your-bones proposition: We as growers don't always have to do the same thing, year after year after year. Alan had a problem. He met it head on with copper (your timing could be shared here, mate) in back-to-back seasons. Now with the inoculum source seriously set back, health-supporting measures alone will work. Using "surgical means" on rare occasion followed by a return to nutritional and biological support is okay.

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

Edited 1 time(s). Last edit at 07/14/2015 02:10PM by Michael Phillips.

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[Liz Griffith](#)

[Re: frog eye leaf spot \(FELS\)](#)

February 14, 2016 02:16AM

Registered: 7 years ago

Posts: 46

Newbie to the forum here - thanks to all for wonderful discourse and work!

Follow-up question for this topic: a high percentage of our orchard consists of semi-dwarfs (mostly M7) that were planted in the mid-80s, especially in our one upper (highest elevation) PYO block. Thusly we have many older trees, a high percentage of which have been colonized with black rot, especially in some of the weaker cultivars (i.e. traditional Golden Delicious and Gala). We don't see a high occurrence of FELS in this block, suprisingly, just the classic black rot on limb and trunk cankers. I've only noticed heavy colonization of FELS in our Honeycrisp, which is in a completely different block with younger/healthier trees, strangely.

More orchard background: Though we manage our farm with bio-diversity and ecosystem health first and foremost, we have mixed opinions on allopathic organic materials and are new to holistic sprays altogether. Michael recommends holistic trunk sprays to enhance health before infection (which I hope to implement starting this growing season), but I'm interested in hearing how holistic trunk/limb sprays can help lengthen an aging tree's life even after colonization by black rot. Has anyone had success/experience with this? We are about to lose our Golden Delicious altogether and don't have a planting ready to replace it. This will leave a gap in our PYO varieties for the "late-season" window unless I can nurse these trees along for a few more years...

Our current management for Frog Eye Leaf Spot/Black Rot: manage orchard for beneficial fungi on the orchard floor as much as possible; remove black rot cankers during winter pruning (chip small diameter wood back into the orchard soil and burn large diameter wood); maintain proper pruning for airflow. We receive the "Michael Phillips Badge of Fungal Honor" every year - lots of 'shrooms growing on the orchard floor.

We'd prefer to not use sulfur. Additionally, we cannot use copper as an allopathic measure because we graze our sheep through this block, and copper is incredibly toxic to sheep. We found this out the hard way when we fed hay grown by a neighbor who fertilizes with composted pig manure (pigs' bodies are very adept at eliminating copper, and so their manure has a high percentage). We lost several animals before figuring out the problem. Now we feed solely with hay grown from our own hay field (they also graze rotationally throughout other parts of the farm).

Thoughts? We have begun being more aggressive at eliminating inoculum in the orchard--oh how it hurts to take down those trees!--but as of now this is our only strategy.

Addition after more thoroughly reading the wonderful thread on Anthracnose - would an application of Biodynamic tree paste on the trunks be worth a try?

Door Creek Orchard
Zone 5a in Wisconsin

Edited 1 time(s). Last edit at 02/14/2016 05:42PM by Liz Griffith.

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[Michael Phillips](#)

[Re: frog eye leaf spot \(FELS\)](#)

February 15, 2016 06:56PM

Moderator

Registered: 11 years ago

Posts: 621

Black rot has this interesting twist in being pronounced in seemingly only one of its manifestations at a time. Alan started this post because frog eye leaf spot was taking too much from tree vigor and photosynthesis. Another post speaks to actual rotting fruit with a tie-in to black rot inoculum sites where fire blight had struck previously on small shoots. And here's Liz with dominant dieback in cankered branches.

The most assertive way to change the microbe scene on tree structure is with biodynamic tree paste. Think native clay + fresh manure, with an element of sand thrown in for adhesion and wear. Other posts in the forum address aspects of this (and the search feature will help you find additional references beyond that equally-applicable anthracnose post) which can be pulled into finding a solution to further canker encroachment by black rot. Think of the clay contribution as a "tree facial" to smooth wrinkles and restore luster. The microbes in the manure have the job of taking over from the pathogenic fungi behind the cankers. The other bit to complete this picture lies in our [Biodynamic Orchardng](#) category where we discuss how the trunk and major branch structure of a tree should be considered more akin to the soil than as a plant. Voila! An earth remedy for an earth condition.

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

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[Liz Griffith](#)

[Re: frog eye leaf spot \(FELS\)](#)

February 16, 2016 03:26AM

Registered: 7 years ago

Posts: 46

Thanks, Michael. So true that black rot is an odd duck. I'd further add that we almost never see actual fruit rot in any of our blocks. Go figure.

I will definitely get going with mixing up some tree paste. Am wondering if I could perhaps use sheep manure instead of the usually recommended cow. It would be more easily accessible since we have our own flock, but this being WI, cow wouldn't be that much harder to source. The difference in consistency might be a problem, though we could blend the sheep manure in water first...? Is there too much of a difference in nutrition between manures? (googling now) And so the question that follows my stream of consciousness debate: Has anyone tried using manure other than cow for tree paste? [Perhaps I should start a new thread.](#)

We have some great spots on our farm for harvesting clay, however I won't be able to access any until things thaw a bit. Perhaps in the interest of time I can find an alternate, slightly less native source until spring.

Tree trunk/scaffold as soil begins to make sense. Thanks again for the wisdom.

Door Creek Orchard

Zone 5a in Wisconsin

Edited 1 time(s). Last edit at 02/17/2016 01:37PM by Michael Phillips.

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[Josh Willis](#)

[Re: frog eye leaf spot \(FELS\)](#)

May 18, 2023 07:36PM

Registered: 6 years ago

Posts: 133

Hi Alan,

I'm wondering if you have any update to your orchard's FELS. Is it still kept in check? Any other modifications to your spray program?

Also, if you remember, what are the details on the copper spray program you used? You said 5 sprays in 2 years. I can imagine a spring dormant spray and fall clean up spray in each year, at high rates. And one other lower rate during prime infection period? We are trying to figure out our own FELS, so any details you remember and feel like sharing would be greatly appreciated.

Thank you.

Earthworks

Zone 7a in West-Central MD

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

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