

Citrus Notes



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Dear Growers,

During the summer months we will be publishing the citrus newsletter every other month. In this month's issue we continue to bring you the latest observations on citrus greening and the progression of symptoms during the summer. The latest Florida citrus greening map now includes Marion, Seminole and Osceola Counties bringing the total number of Florida Counties with at least one citrus greening positive tree to 23. As always if you need any additional information or have questions please call me.

Enjoy,

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***Citrus Greening
Update:
Hillsborough
County***

We have continued to follow the development of infected trees with citrus greening through the spring flush. This flush has now begun to harden-off and we are documenting the foliar, fruit and tree symptoms as these trees enter the summer.

There are a number of citrus greening observations that can be made to date. One of the interesting observations is that as the spring flush commences these infected shoots with symptomatic leaves push out a flush with bloom. The new flush develops and very few of the fruit on infected shoots will set although some will. The older leaves exhibiting the blotchy mottle symptoms this past winter in many cases are now dropping off the trees.



*Blotchy
mottle
symptoms
on winter
foliage
2/23/07*

*Spring flush
and bloom
with older
mottled
leaves
3/27/07*



*No fruit set
with one
mottled leaf
remaining
4/26/07*

Some of this fruit is thumbnail size and you can see the beginning of fruit deformities even at this early stage of fruit enlargement.

*Fruit
exhibiting
deformity
notice stylar
end of fruit
5/24/07*



Older symptomatic leaves, with yellow thickened midveins, seem at this time to remain on the tree. Spring flush leaves from these symptomatic branches are now exhibiting the same type of symptoms (bright yellow midveins).

*Spring flush leaf on left older mature leaf on
right
5/24/07*



There are even some remaining branches that have the characteristic yellow shoots in some of these trees as of May 24, 2007.

***Greening Update:
Scouting for
Greening
Symptoms
(June 1, 2007)***



Jamie D. Yates and Michael E. Rogers

Since the discovery of the citrus greening disease in Florida, the focus of scouting for symptoms has been to look for yellow shoots and blotchy mottled leaves. These symptoms are most easily found on trees during the fall and winter months. Currently (June 2007) blotchy mottle leaves can still be found on infected trees but are much lower in number compared to what has been observed earlier in the year. The lower number of blotchy mottle leaves may be



Blotchy mottle leaf symptoms collected from canopy deep inside tree.

due to trees dropping these symptomatic leaves after the last flush. When searching for blotchy mottle symptoms, make sure to inspect deep inside the canopy of the tree.

At this time, one greening symptom that is being found more frequently is small yellow leaves with green islands. These leaves can be found on the outer canopy of the tree on small leaves from the most recent flush. These leaves resemble extreme zinc deficiency symptoms,

which may be the actual cause of this symptom. In addition to these green island symptoms, milder zinc deficiency symptoms can be widespread on the same greening affected trees. It is unclear whether these leaves will eventually green-up, develop characteristic blotchy mottle symptoms, retain their current appearance, or drop from the tree.



Green island symptoms



Leaves with yellow midveins, which are slightly thickened, is another symptom commonly observed. While not a definitive symptom for greening, yellow midveins can be an indication that more time should be spent searching a tree for symptoms more characteristic of greening disease.



Leaves showing yellowing of leaf midveins that are slightly thickened.



Left: Green island symptoms on small yellow upturned leaves.



Bottom Left: Branches on greening infected trees where leaves have been dropped.

Greening infected tree with thin canopy and overall yellow appearance of canopy.



In groves where trees are well maintained, greening affected trees are likely easier to locate where the disease symptoms have spread throughout the tree. Trees in decline will have thinning of the canopy due to leaf drop, contain smaller upturned leaves that may have green islands, and have an overall yellow appearance compared to healthy trees.

Citrus Greasy Spot



A fungus called

Mycosphaerella citri causes Greasy Spot disease in citrus. This disease has the potential to cause a significant amount of

defoliation if left uncontrolled. The fungus over winters in leaf lesions and in the late winter and early spring these infected leaves will prematurely drop from the tree. This fallen infected leaf litter serves as a source of inoculum for infection of the spring flush foliage through the summer.

The original research on greasy spot done in the 1960's demonstrated that the release of fungal spores was closely related to the onset of the summer rainy season in Florida (June). This provided the optimum environmental conditions for fungal growth and infection to occur from June through September. Irrigation in the 1960's was not commonplace and leaf decomposition was generally delayed until the summer rains got cranked up. Research done at the Citrus Research and Education Center in Lake Alfred demonstrated the benefit of supplemental citrus irrigation during bloom, fruit set and enlargement. Growers began using irrigation via perforated pipe and overhead. Typical irrigation cycles would be every 1 to 2 weeks. This irrigation method and frequency schedule was not sufficient to alter the timing of greasy spot spore release.

Current research has now demonstrated that greasy spot spore release occurs 4 to 6 weeks earlier from April to early June. This shift in timing of spore release has been linked to the current use of micro sprinkler irrigation. Scheduling of micro sprinkler irrigation systems in Florida during this time period is such that we are keeping infected leaf litter wet during what would be the traditional dry time of the year. This continuous wetting not only speeds up leaf decomposition, which is good but also

moves up the timing of spore release. The earlier timing provides for a greater opportunity for infection to occur earlier than in the past.



Infection on underside of citrus leaf by greasy spot

Recommendations call for 1 to 2 sprays to control greasy spot. The number will be dependent on the susceptibility of the variety to greasy spot and the market. Hamlins, pineapples, tangelos and grapefruit are very susceptible and generally will benefit from 2 sprays during the summer. Valencias, temples, murcotts and most tangerines can get by with 1 application. If you are further south or have a recent history of severe greasy spot you may want to consider 2 spray applications.

Current recommendations for spray materials include petroleum oil (FC 435-66, FC 455-88, FC 470) and copper. Trilogy can be substituted for oil only if copper is also used. Enable 2F and the strobilurin fungicides (Abound, Gem or Headline) can be used with or without spray oil although the addition of spray oil increases the efficacy of the strobilurin fungicides.

The timing of single applications for greasy spot control can be made from mid-May to June. If 2 applications are to be made the first should occur from mid-May to June with a second spray after the major summer flush has expanded. Greasy spot infects the stomates of citrus leaves. These stomates only occur on the underside of the leaf, therefore it is

important in controlling greasy spot that there is adequate coverage of the underside of leaves. This may require higher spray volumes per acre and/or slower tractor speeds.

One other consideration is if you are a grapefruit grower producing for the fresh fruit market greasy spot rind blotch maybe an additional concern. If rind blotch has previously been severe in the block then a third spray may be required in August for rind blotch control.



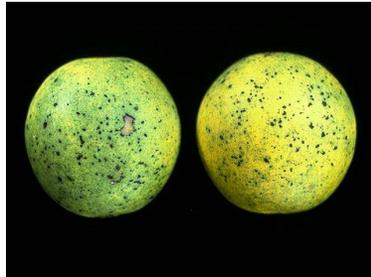
Greasy spot rind blotch on grapefruit

The following recommendations are related to materials and timing of sprays for rind blotch control and to reduce potential fruit burn on fresh fruit blocks.

1. Oil is less effective for rind blotch control than the other recommended materials. If using oil, the heavier oils (455 and 470) will work better.
2. Copper will effectively control rind blotch but care should be exercised when using high copper rates during hot dry weather or when applied with spray oil. Copper sprays can be applied during the summer but only under moderate temperatures and at a rate of 2 pounds metallic per acre without oil or other additives and with spray volumes of at least 125 gallons per acre.
3. Enable 2F can be used at anytime but, would be a good choice for

- mid to late summer control of rind blotch.
4. Strobilurin fungicides would be a another good choice to use in late May and early June to prevent potential fruit burn concerns with using copper during this time period. One final note that you should not use more than one application of a strobilurin fungicide per season and the efficiency of these strobilurin fungicides are increased when using with spray oil.

Spray burn on fruit caused by concentrated spray application



Additional information on spray materials and rates for greasy spot control can be found in the 2007 Florida Citrus Pest Management Guide and at: <http://edis.ifas.ufl.edu/CG018>.

Pesticide News and Information



Agri-Mek

We have just received word that there is a new Agri-Mek label that becomes effective on 6/13/07. The following highlights changes made to the label for citrus use:

- The use of 5 - 20 oz./A for the

control of citrus leafminer & citrus rust mite

- A maximum of 3 applications per season
- A minimum application interval of 30 days
- A maximum seasonal use amount of 40 oz./A

Please remember that the label is the law and you must follow the instructions on the label that is on the material you are using.

Bee Health



University of California San Francisco researchers reported in late April that a fungus that caused widespread loss of bee colonies in Europe and Asia

may be playing a crucial role in the mysterious phenomenon known as Colony Collapse Disorder that is wiping out bees across the United States. Researchers have been struggling for months to explain the disorder, and the new findings provide the first solid evidence pointing to a potential cause.

The results are “highly preliminary” and are from only a few hives from Le Grand in Merced County, UCSF biochemist Joe DeRisi said. “We don't want to give anybody the impression that this thing has been solved.” Other researchers have also found the fungus, a single-celled parasite called *Nosema ceranae*, in affected hives from around the country - as well as in some hives where bees had

survived. However, those researchers have also found two other fungi and half a dozen viruses in the dead bees. (LA Times, 4/26/07).

Orange Jasmine

The FDACS is proposing the addition of *Murraya paniculata* (orange jasmine) to the citrus greening host list. This would prohibit the distribution of this plant from nurseries located in citrus greening quarantine areas.

Bright Bulbs

The operation to sabotage a UK potato trial was planned with care and under conditions of great secrecy. Nearly 250



protesters swooped down on the 16-hectare site outside Hull, armed with shovels. In less than an hour they had moved to invalidate the trial, planting

thousands of organic potatoes. Mission accomplished. If only they had got the right field. Activists from Mutatoes.org apologized to farmer David Buckton after it emerged that they wrongly identified his land as the site of the potato trial. The field they planted was sown with beans. (Guardian Unlimited, 4/25/07).

Imported Red Fire Ant Control

A virus technology with potential to control red imported fire ants (*Solenopsis invicta*) is available for licensing from the ARS. Scientists in the Imported Fire Ant and Household Insects Research Unit at the ARS Center for Medical, Agricultural and Veterinary

Entomology in Gainesville are working with an ant-infecting virus called *Solenopsis invicta* virus-1, or SINV-1. They have found it to occur in about 20 percent of red imported fire ant fields, where it appears to cause the slow death of infected colonies. The SINV-1 virus is the first virus to be recovered from red imported fire ants. In the laboratory, SINV-1 has proven to be both self-sustaining and transmissible. Once introduced, it can eliminate a colony within two to three months. That's why the researchers think it has potential for cultivation and development into a viable biopesticide for controlling *S. invicta*. Cooperators are being sought to develop methods for growing and packaging the virus commercially, and for applying it under field conditions. (ARS News, 4/17/07).

Guthion®

Makteshim Agan Industries, Inc., Israel, has acquired the Guthion® brand insecticide from Germany-based Bayer CropScience Ag. Raleigh, NC-based Makteshim Agan Industries of North America received the product line of Guthion Solupak in the U.S. and Canada. The insecticide is still labeled for apple, pear, cherry, blueberry, almond, pistachio, walnut, and parsley. (Citrus & Vegetable Magazine, April 2007).

Monthly Pesticide Training

The next pesticide applicator core training and testing will be held at the Polk County Cooperative Extension Office in Bartow on Monday July the 2nd beginning at 9:00 a.m. Two CEU's for the core category of your restricted pesticide license will be available for

attending the training. Pesticide license testing will begin after the training for folks that need to take the test.

Remember that we offer restricted pesticide license training and testing the first working Monday of every month. For more information contact Laura Powell at 863-519-8677 ext 102 or email lapowell@ufl.edu

Florida State Horticultural Society Annual Meeting



At the recent 120th meeting of the Florida State Horticultural Society (FSHS) this June in Palm Beach, FL, FSHS announced the election of new officers.

The 2007/08 President is Jim Syvertsen, UF/IFAS Citrus Research & Education Center, Lake Alfred. Jim will be looking for your help to increase FSHS communications and membership.

The Sectional VPs in charge of meeting program development for the June 2008 meeting in Ft. Lauderdale are

--Garden and Landscape vice-president: Juanita Popenoe (UF/IFAS Extension, Commercial Hort, Lake Co.)

--Handling and Processing vice-president: Gary Luzio (USDA/ARS, Winter Haven)

--Krome (Tropicals) vice-president: Jeff Williamson (UF/IFAS Hort Sciences,

Gainesville)

--Vegetables vice-president: Craig Chandler (UF/IFAS Gulf Coast REC, Balm

--Citrus vice-president: Kelly Morgan (UF/IFAS SWFREC, Immokalee).

Please see <http://www.fshs.org/> for what FSHS is all about and what it takes for you to become a member.



Polk County Citrus Grower Canker Survey Results

By: Kathryn Metcalfe Thomas

For those of you who took the time, I would like to take this opportunity to thank you for completing the grower survey that was sent out in January as part of my graduate studies program.

One of the most important aims of this study was to determine the relationship between the citrus agent and the growers and measure the level of trust in the relationship. The feedback and results that were given about our citrus agent, Chris Oswalt were highly positive and I want you, the growers to know how lucky you are to have such a highly, well trusted agent that represents you and the citrus industry here in Polk County. The survey result showed that Chris has demonstrated a high level of trust, is held in high regard and respected, and has a good rapport with growers when it comes to disseminating information in a crisis situation. Chris was very proactive during the time of the canker outbreaks, knowledgeable, committed, and served

as an activist to the growers. The manner in which Chris handled the canker outbreak painted a strong image for the Polk Extension Service. The survey results showed that the Polk Extension Service could reach more people, not only growers, if they were to increase their awareness about the services that they offer and provide. We all know the only drawback here is that there are limited funds available for improving communication methods.

With the constant challenges people in agriculture face it is important that we continue to support Chris and the efforts of the Polk County Extension Service. Once again I thank you for your time and support.