

Citrus Notes



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At the printing of this issue of the Citrus Newsletter, we have a confirmed citrus greening infected tree in Polk County. I have continued with the series on the development of citrus greening symptoms during the year. We have some suggestions on screening possible causes of zinc deficiency in citrus since this type of symptom has been associated with citrus greening. The UF Cooperative Extension Service will be holding a series of meetings on citrus greening identification and worker survey training, that information is also included in the issue.

Enjoy,

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***Citrus
Greening
Found in
Polk
County***



It was bound to happen sooner rather than later and the sooner was the middle of August 2007. A confirmed citrus greening infected tree in Polk County was found in a commercial citrus grove located between Ft. Meade and Frostproof. The grower indicated that a small portion of the block was not growing well and the trees had reduced growth and canopies compared to the majority of trees in the block. Upon closer inspection, classic symptoms of citrus greening were found. These included small misshapen fruit and blotchy mottle leaves in the interior canopy of the tree. This symptomology is consistent with the comments we have been making in the Citrus Newsletter over the past few months. This includes a reduction in tree growth and the appearance of blotchy mottle symptoms.



Citrus Greening Identification & Worker Survey Training

This October, UF/IFAS Citrus Extension Agents will be conducting a series of meetings in 6 Florida locations. The enclosed flyer has the details of the meeting series. The first meeting will be held at Polk County Agricultural Center,

Stuart Conference Center, 1710 Highway 17 South in Bartow. Class size is limited so pre-registration is encouraged.

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



This month we will be discussing the development of citrus greening symptoms from early summer through the first week of August. We will make some general observations on the foliar symptoms and just a few additional comments on over all tree appearance of infected trees.

In beginning, our discussion on foliar symptoms let's drop back and make some comments on the types of symptoms found from June. Back in June predominate foliar symptoms found on infected trees were yellow veins.



Yellow veins associated with citrus greening on June 8, 2007.

This type of symptom was really easy to find when looking on infected trees even back in June. The blotchy mottle leaves found in late winter had a tendency to disappear or drop off the tree as we entered the summer. It is also interesting to note that trees found this past winter with very few foliar symptoms or just some limited blotchy mottle leaves were very difficult to see during the summer (almost impossible to find symptoms). This may indicate that when the



Persistent yellow veins of greening infected tree on August 6, 2007

pathogen is present in relatively low concentrations there is an absence of symptoms once the tree commences growth during the summer. Returning to the yellow veins, this symptom seems to be persistent on the older and newer foliage found on infected trees during the summer. The trees that had persistent symptoms like yellow veins also produced very little new growth after the spring flush especially on these infected branches.

In some instances these symptomatic portions of the tree have produced some very limited off-season bloom. Since this has been very limited and recent, I find it hard to believe that this fruit will ever set since the spring bloom did not set. I

noticed in the past month (August), a reappearance of leaves with the typical blotchy mottle symptoms on infected trees.



Blotchy mottled leaves are becoming more prevalent August 6, 2007

Observations on overall tree appearance of infected trees are, as one would guess, variable based on the severity of foliar symptoms. Trees that had an abundance of foliar symptoms in the winter have not shown any signs of



June 8, 2007

July 9, 2007



August 6, 2007



Greening infected tree from June to August 2007.

recovery during the summer. In fact these trees appear to have continued to decline and some twig dieback has begun to show up. This is in contrast to trees with very few symptoms during the winter being difficult to relocate during the summer due to the lack of apparent symptoms. Other observations related to overall tree appearance include a general decline in tree vigor with very little growth occurring after the spring flush on severely infected trees. This lack of



Greening infected tree-showing symptoms of twig dieback.

growth has resulted in trees that appear thin and lack the density of foliage of trees that have not exhibited persistent greening symptoms during the summer.



Diagnosing Citrus Greening from Citrus Blight and Zinc Deficiency

Over the summer we have found a few instances of some suspicious foliar symptoms that in some locations of the state have been associated with citrus

greening. The one symptom of concern that oftentimes can be difficult to discern is that of zinc deficiency. Zinc deficiency has been associated with not only citrus greening, but also with citrus blight and even just plain old nutritional zinc deficiency. It has been documented that trees that have zinc deficiency with green islands have tested PCR positive for citrus greening. This is a similar type of symptom that can be associated with citrus blight. You may then see zinc deficiency and have neither citrus blight nor greening. So how do we tell the difference?

Foliar symptoms on tree with low levels of zinc and manganese



Symptoms on greening infected citrus tree

Depending on the time of the year, you could test the tree for citrus greening, but what if it is in the middle of summer? We believe that the timely removal of infected trees is important in greening management? You may want to make a decision in short order to remove a possible source of greening inoculum from the grove.

Never fear, here are a few suggestions that may help you with your decision especially if this is the only symptom present:

1. Field-test the tree for citrus blight.
2. Take a leaf tissue analysis.

The field test for citrus blight is quite simple and rather effective screening method to eliminate one of the possible causes for the appearance of zinc deficiency. You will need a cordless



drill, and 1/8" drill bit, a 40ml syringe filled with water and a suspect tree to test.

Proceed under the canopy of the tree and locate an area on

the trunk that is above the bud union or about 12" above the soil line. Take and drill a 1/8" diameter hole about 3/4" or so deep into the trunk. Next take the

syringe filled with water and place the end into the freshly



drilled hole in the trunk. Apply constant steady pressure to the end of the syringe forcing water into the tree trunk. A healthy tree during the summer should have no trouble taking 8 to 10 ml of water over about 30 seconds. If the tree has blight it will take up very little if any



water and at best the water will be forced out from around the syringe

plunger. During the winter water uptake is greatly reduced and it may be difficult to determine that the lack of water

uptake is related to blight.



Tree with reduced water uptake due to citrus blight

Tree with citrus blight associated water sprouts



Last month we discussed taking leaf and soil analysis as part of a complete citrus nutritional program, so I will not go into any great detail on the methodology of this aspect. If you suspect zinc deficiency having leaf analysis data



Zinc deficiency from mild to severe (photo Florida Science Source)

from previous years can show trends in the development of nutritional zinc deficiency. This is a good reason to make a concerted effort to take citrus leaf analysis on an annual basis. It will provide information as to whether this zinc deficiency has occurred quickly or has developed over time. A quick significant decrease in leaf zinc levels could be indicative of a disease problem, while a gradual decrease in zinc levels shown through leaf analysis will more than likely be attributed to nutritional zinc deficiency. Remember that if you take a leaf sample for analysis, use 4-6 month-old spring flush leaves from non-fruiting twigs that have not been sprayed recently with a nutritional spray containing zinc.

The information above can help you in determining the source of zinc deficiency. It would be important to mention that we are still learning about the greening bacterium. We do know that it is a phloem-limited bacterium and this disruption of the tree phloem may cause symptoms (yellow veins) that would closely resemble other diseases that affect the movement of materials in the phloem tissue. It would also be worth mentioning that this organism is slow moving and slow growing and it may take an extended period of time for

significant disruption of the phloem tissue to occur and cause some of the greening associated symptoms. Having said this, it would seem reasonable to think that a tree exhibiting zinc deficiency with green islands in the absence of additional known greening symptoms would not be citrus greening.

Greening Symptoms in Polk County



The following pictures were taken in mid-August in Polk County. These are the typical types of symptoms found on a tree that tested positive for citrus greening.



Greening infected tree with small misshapen fruit and blotchy mottle leaf

Prominent yellow veins on infected tree



Older leaves developing blotchy mottle symptoms



Cluster of foliage on interior canopy showing blotchy mottle symptoms



Blotchy mottle symptoms on interior of tree



Additional blotchy mottle symptoms

If you were waiting for evidence of citrus greening before developing a survey and management program your wait is over.

Pesticide News and Information



EPA Denies Petition AND Objections



In an interesting game of pesticide brinkmanship, the EPA has responded to the states of New York, California, Connecticut, and

Massachusetts regarding their effort to modify or revoke tolerances associated with the pesticides alachlor, metribuzin, chlorothalonil, methomyl, and thiodicarb. The states petition was filed towards the end of 2004. The states contended that the EPA is lacking data for each of these pesticides on developmental neurotoxicity, endocrine effects, and/or cumulative effects of exposure to pesticides with a common mechanism of toxicity. This lack of data mandates that EPA must retain a tenfold safety factor for the protection of infants and children. The states also contended that once this factor is retained, the tolerances no longer meet the safety standard under the Federal Food, Drug, and Cosmetic Act Section 408, so they must be revoked or modified.

In August of last year, the EPA denied the states’ petition. For alachlor and metribuzin, EPA determined that even if they accepted the contention that it should retain the tenfold safety factor, the states had not shown the tolerances to be unsafe. For chlorothalonil, it was determined there were neither neurotoxic nor endocrine effects. Thiodicarb and methomyl were still being reassessed at the time.

After California left the group, the states filed an objection to EPA’s denial of their petition last October. Specifically, to the best of EPA’s understanding, they are making four claims. The first seems to be that they just take issue with EPA’s denial. The second is that EPA “manipulated” exposure data using “statistical sleight-of-hand techniques” to make pesticide exposure levels appear to be lower. The third is that the EPA has no endocrine test results for chlorothalonil. The fourth seems to be

that the EPA just wants to injure children because of the uncertainties of materials that have caused adverse effects in test animals.

Now, in July of 2007, the EPA is denying all four of these objections. For the first claim the Agency “refuses to adjudicate the merits of claims where it can be shown that the claims, even if true, do not justify the relief requested” for alachlor and metribuzin (i.e., exercise in futility). For the second claim, the EPA stated that it used percent crop treated and processing factors to determine exposure - not statistical trickery. For chlorothalonil, the agency has determined that it is not an endocrine disruptor and it does not have to retain the tenfold factor until the endocrine program is functional or complete. Finally, the presence of adverse effects in animal testing is inadequate standing alone to demonstrate uncertainty regarding the safety of a pesticide. (*Federal Register*, 7/18/07).



Additional Meetings of Interest

Restricted Use Pesticide Training and Testing

**Monday, October 1, 2007
Polk County Extension Office
Valencia Room**

9:00 a.m. – 11:00 a.m.
General Standards/Core Exam Review
2.0 CEUs (Core)

Passing the General Standards/Core Exam is required for anyone who would like to obtain a pesticide license. This class is designed to help prepare individuals for the exam, but is also available to licensed applicators who would like to obtain CEUs.

1:00 p.m. – 3:00 p.m.

Private Applicator – Agriculture Exam Review and Agricultural Tree Crop Pest Control Exam Review

2.0 CEUs (Ag row Crop/Ag Tree Crop/ Private Applicator)

This class is designed to help individuals prepare for the Private Applicator – Agriculture Exam, or the Ag Tree Crop Exam, but the class is also available to licensed applicators (Ag Row Crop, Ag Tree Crop or Private) who would like to obtain CEUs.

Restricted use pesticide applicator exams will be offered at 9:00 a.m. and immediately following each review.

For more information, or to register for a class, please contact Laura Powell at (863) 519-8677 ext. 102, or lapowell@ufl.edu.

Mark Your Calendar!



The 2007 Polk County Citrus Worker Safety Training and Tractor Rodeo is scheduled for Wednesday, November 14, 2007. Please make plans for your

employees to attend.