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Citrus Notes

Polk County Extension Service
PO Box 9005, Drawer HS03 • Bartow, FL 33831-9005
(863) 519-8677, Ext. 108 • wcoswalt@ufl.edu

Hillsborough County Extension Service
5339 County Road 579 • Seffner, FL 33584-3334
(813) 744-5519, Ext. 131

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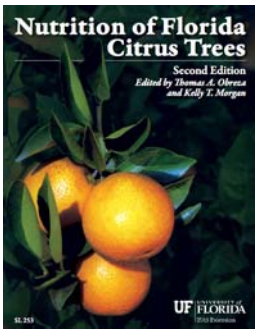
Dear Growers,

We'll be holding or March Citrus Roundtable on Wednesday March 5, 2008 at the Hillsborough County Cooperative Extension Service Office in Seffner. I promise that the starting time and location will be included in this month's newsletter. We have also included information on the Citrus Greening Summit to be held at the 2008 Florida Citrus Growers Institute in Avon Park in April. The citrus greening update article summarizes observations made to date in a grove with greening. The new 2008 Florida Citrus Pest Management Guide is now available and can be ordered from IFAS bookstore in Gainesville. The second edition of Nutrition of Florida Citrus Trees is also now available, call the office and we can hook you up with a copy.

Enjoy the issue,

Chris Oswalt
Citrus Extension Agent
Polk/Hillsborough Counties
863-519-8677 extension 108
P.O. Box 9005, Drawer HS03
Bartow, FL 33831-9005

March 2008 Citrus Roundtable.



Mark you calendars for Wednesday March 5, 2008 for our Citrus Roundtable. The meeting will be held at the Hillsborough County Cooperative Extension Service Office in Seffner beginning at 10:00 a.m. Our topic this month will be the new citrus nutrition publication just released. Nutrition of Florida Citrus Trees SL 253 is the second edition of the popular first edition SP 169. The editors are Drs. Thomas Obreza and Kelly Morgan. Copies of this new publication will be available at the Roundtable. Dr. Tom Obreza will make a presentation highlighting new material and guide improvements made in the new edition of the nutrition guide

So, make plans to join us on March 5, 2008 for donuts coffee and OJ at the Citrus Roundtable.

Greening Summit at the 2008 Florida Citrus Growers Institute

On Tuesday April 8, 2008 the "Greening Summit" at the 2008 Florida Citrus Growers Institute will be held at the University Center Auditorium of South Florida Community College in Avon Park. This year the program was developed as a cooperative effort of your local county citrus advisory committees, the Citrus Greening Task Force of the Florida Citrus Production Research Advisory Council and the University of Florida, IFAS County Extension.

The program brochure along with the pre-registration form is included in this newsletter. Pre-registration is required and due to facility limitations only the first 200 registrations will be accepted. So don't delay, fill out and mail, email or fax your registration form in today.

Citrus Greening Update

We have now been following symptom development and tree decline due to citrus greening in a commercial citrus grove for the past year. I think that it would be interesting to pull all this information together before the onset of the spring flush. The spring flush will signify the conclusion of our observations in this particular block and the following comments are based on observations made this past year. Just to reiterate, the following comments are not recommendations but, observations made in this one block and only during this past year.

The Initial Situation
and
Tree Removal

Last winter in early January 2007 diagnostic tests for HLB or citrus greening confirmed the presence of this disease in a number of trees. These initial trees had significant defoliation, yellow veined and blotchy mottled leaves, yellow shoots, small green misshapen fruit, fruit and leaf drop and canopy die-back. In this block over 109 trees exhibited multiple

symptoms and were immediately removed by the end of January 2007. This group of trees had what could be classified as advanced decline symptoms of the disease throughout the tree canopy. Observations made by the grower indicated that these initially diagnosed trees were in obvious decline a year prior to removal (January 2006). It could be proposed that these initial trees may have had symptoms similar to those seen in newly symptomatic trees this winter (2007-08) back in the 2005-06 winter. This may seem unlikely

Typical symptomatic tree removed in January 2007.

based on the fact that the first citrus greening infected trees in Florida were identified back in August of 2005 and this either would preclude or coincide with this time period. Although no definitive evidence exists, it would not come as a surprise if some of these trees may have had initial greening symptoms appearing prior to this time period. This summation could be further advanced by the fact that many of the 109 trees were not only in close concentration in one area of the block, but some also appeared randomly throughout the block. This type of distribution would undoubtedly require a period of time for the bacterium to spread and reach symptomatic levels.

Re-inspection and Identification

The initial symptomatic trees were removed in January of 2007. In February and March a complete re-inspection of the block was made for symptomatic trees that exhibited initial signs of infection. These symptoms included blotchy mottled and yellow veined leaves, yellow shoots, small green misshapen fruit and some defoliation. Symptoms many times appeared in localized areas of the canopy and rarely did trees appear to have an extensive distribution of symptoms throughout the tree. These trees did not appear overly obvious and required a diligent scouting effort to locate. Based on the observed progression of symptom development seen this year these trees more than likely began to exhibit initial symptoms in late summer of 2006. After these trees were identified, subsequent PCR confirmation of a sub-sample of identified trees indicated that over 70% of trees tested PCR positive for the citrus greening bacterium. The majority of these identified trees were in close proximity to groups of trees that had previously been removed. The balance of these greening symptomatic trees appeared randomly out in the block. These additional 102 trees were identified and flagged for removal.

Psyllid Suppression

A decision was made to aggressively target the Asian citrus psyllid through the application of recommended insecticides. The pest management program was typical of most Florida citrus growers. Three annual sprays were scheduled; a post bloom, first summer oil and a second summer oil or fall spray. There were 2 additional sprays included last year for a total of 5 pesticidal spray applications. All 5 applications had a recommended material for psyllid suppression. The scheduling of the spray applications occurred every 6

to 8 weeks from early February to October. During the past year regular visits were made (about every 2-3 weeks) to the grove to follow symptom development on this second group of 102 trees that had not yet been removed. During those visits, in a very limited area of the block, new flush was inspected looking for both adult and immature psyllids. On this very limited amount of flush inspected during the year a couple of adult psyllids and one nymph were found. This was not an attempt to statistically quantify the populations of psyllids during the year, but a casual observation to see if large populations could be found. Based on these limited observations the grower was successful in suppressing the psyllid populations last year compared to casual observations made on psyllid populations in other groves that did not attempt to suppress psyllids.

Symptoms of the Foliage

The typical blotchy mottle symptom was transient in nature and appears most frequently during the fall and winter. Upon the onset of

Persistent yellow veined symptoms found on a greening infected tree.

the spring flush the blotchy mottle leaves may have either re-greened or dropped off. This made it extremely difficult to identify greening infected trees using this symptom during the growing season. Yellow veined leaves would appear in the winter and was one of the symptoms that seemed to remain persistent throughout the year. Entering this fall blotchy mottle leaves again began to develop on trees that did not appear to be previously infected. It is worth mentioning that based on these observations it may be extremely difficult to find some of these foliage symptoms during the growing season.

Tree Growth Observations

The following observations have been made in some citrus greening infected blocks including this one. In many areas where citrus trees have been exhibiting symptoms of greening there has been a noticeable change in the growth patterns of certain shoots on the tree. It appears as multiple shoot development from the terminal end of the shoot causing a witches broom kind of appearance. The

Multiple shoot development on terminal end of symptomatic shoot.

foliage on these shoots many times will have blotchy mottle and/or yellow vein symptoms. This is not typically considered a classic symptom of citrus greening and no information exists on whether PCR testing of the foliage on these shoots will result in a positive test for greening. It could however, be used as a possible symptom to consider during certain times of the year on existing suspicious trees.

Another symptom to look for that may be related to citrus greening during the summer affects overall tree growth. Some non-symptomatic trees in this block appeared to produce a strong spring flush and bloom. As

the summer progressed it became obvious that although these trees did have subsequent flushes, the trees did not increase in overall size. Toward the end of the summer you could visually see that some trees did not flush during the same general time period as healthy trees. This reduction in overall tree growth is even more evident in young trees. By late summer a closer inspection of these trees revealed that initial greening symptoms were found on some of these poorly growing trees.

Fruit Development

In the spring these symptomatic Valencia trees will flush and bloom but, there is little fruit set that occurs on the symptomatic areas of the tree. It appears that the increase in greening bacteria in fruit may predominately occur after fruit set. This theory further evidenced by the fact that small misshapen fruit seen shortly after petal fall will not set. It makes sense that as young fruit grow they become sinks for photosynthates that move through the phloem. Since the greening bacteria is phloem limited it may travel in greater quantities to fruit during brix accumulation. This increase in bacteria in the fruit may then cause the typical fruit symptoms (aborted seeds, lopsided fruit and poor quality fruit) associated with greening. As this symptom progresses through the fall toward fruit maturity the necrosis occurring in the stem end of the fruit may cause fruit drop. Knowing that these observations were made on Valencia orange, I wonder if this occurs to the same degree on early and midseason citrus fruit varieties? are typical fruit symptoms limited to citrus varieties that have long developmental periods and therefore accumulate a maximum amount of bacterium? Initial impressions were that once visual symptoms appear there would be little fruit on the tree the following year. This past year it is apparent that trees exhibiting symptoms on localized sectors of the tree may indeed set some fruit for the next year. These fruit become symptomatic as the bacterium increases and is further distributed throughout the tree and to the fruit. In these cases fruit is relatively small compared to healthy tree fruit and fruit quality is more noticeably affected (salty/kerosene tasting?). Currently a study is underway describing fruit size distribution on a symptomatic tree compared to healthy trees. Plans are, to make a presentation at the Florida State Horticultural Society annual meeting in June 2008. This information may help us to better understand what is normal fruit size distribution while providing a potential affordable way to augment large citrus acreage scouting for citrus greening by determining the relative number of small fruit that a found in a load of fruit. This undersized fruit could further be inspected for fruit symptoms of citrus greening.

Additional Surveys for Citrus Greening in 2008

In the first part of February 2008 a through survey of the block looking for trees exhibiting typical greening symptoms. As you recall 211 trees in this block were flagged as symptomatic last winter (January 2007). This winter we found a 65% (74 trees) reduction in the number of trees of which greening symptoms had developed this fall and winter compared to the total symptomatic trees found in January 2007. It is believed that this number could be further reduced if newly identified trees could be removed sooner. We looked at the distribution of these symptomatic trees in relation to previously removed trees. It appears that a larger number of initial (January 2006) symptomatic trees occurred in a specific area of the block. There were also a number of trees in the block that were single symptomatic trees out away from the concentrated area of infection. The grove was mapped, surveyed and scouted for new trees last winter. The maps that were created demonstrated

the location and spread of greening from one year to the next. Stay tuned next month we will make some comments about the spread and distribution of greening in this block.

2008 Integrated Citrus Pest Management Guide

The 2008 citrus spray guide is now available online http://www.crec.ifas.ufl.edu/extension/pest/index.htm and at the IFAS bookstore http://www.ifasbooks.ufl.edu/merchant2/ . The guide has the latest updates and current recommendations from the University of Florida for citrus pest control. The current cost is $15.00 plus shipping, handling and sales tax.

HLB Diagnostic Lab Now Open

On Monday February 4, 2008 the UF/IFAS HLB/Citrus Greening diagnostic lab opened for business. The lab is located at the Southwest Florida Research and Education Center in Immokalee. The following link http://www.imok.ufl.edu/hlb/ has instructions on sampling and shipping along with sample submission forms. This lab, along with the Southern Gardens Lab, is for commercial citrus growers to send suspicious citrus greening samples for HLB testing. These labs will run samples free of charge for growers.

In determining plant sample selection it is important to remember that growers should send highly suspect samples to determine if citrus greening is present in a block. The lab is designed to be a tool for growers to affirm if greening is present and help them in accurate field diagnosis of symptomatic trees. Growers should exercise restraint in sending an excessive number of samples. Send whatever you need to confirm your suspicions, but remember there are only 2 HLB labs in Florida for you to use. These labs are not setup to run samples for every tree in a block prior to removal.

Pesticide News and Information

Mustang for Asian Psyllid Suppression

FMC corp. has received a supplemental label for Mustang insecticide for the Asian citrus psyllid in Florida citrus. Mustang is in the pyrethroid class of compounds and has a same mode of action as Danitol. Remember, current recommendations are not to use pesticides with the same mode of action consecutively. Mustang has had limited testing in Florida but in those tests it has performed well against the psyllid. If you have further questions don't hesitant to call.