UF UNIVERSITY of FLORIDA IFAS

• SEPTEMBER 2007 •

Citrus Industry Update

Working To Keep You Informed

Published by the Universtiy of Florida, Institute of Food and Agricultural Sciences, with the mission of keeping the Florida Citrus Industry informed of current research concerning canker and greening.

FUNDING FOR RESEARCH

The partnerships between the Florida citrus industry and research agencies have been vital in developing a response to the presence of canker and greening in Florida, and have been expressed in the planning as well as funding aspects of learning more about these challenges to the industry. Extensive discussion, prioritization, and collaboration has led to significant planning progress in addressing the short term response to these diseases that will allow growers, nurserymen, harvesters, packers and processors to remain viable as additional solutions are developed. In addition, pathways for better understanding the disease organisms, disease cycles in citrus plants and the ultimate strategies to limit the impact of these diseases in Florida citrus have been charted and proposals developed.

Crucial to the progress that is being reported in these monthly reports is the commitment of funding to fuel research projects. While research agencies have redirected internal resources to address these important challenges, it is the application of external resources that will magnify efforts to learn about how to manage these diseases under Florida growing conditions, and some examples are provided here. Federal funding through a special grant has supported IFAS canker research since 1999.

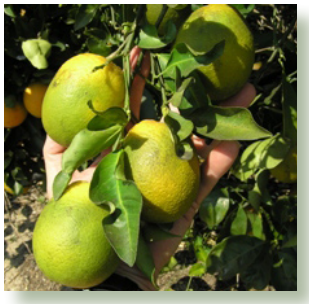
Furthermore, research projects on citrus greening were initiated in 2006 with assistance from the citrus growers, resulting in the start-up of some pilot research while priorities and plans were being developed. In 2007, funding from the Florida Specialty Crop Foundation allied with the Florida Fruit and Vegetable Association was committed to jump start priority greening projects. These funds allowed initiation of projects that will provide short-term information. Research on field detection of greening, psyllid transmission characteristics, disease spread dynamics, and methods to neutralize standing infected trees is being conducted as a result of this early commitment of funding.

In addition, substantial funding has been made available in 2007 through efforts of the industry to match their research box tax funding (managed by FCPRAC) with state and other industry funding. The various industry groups who have supported the commitment of funding and those involved in applying the funding to UF, IFAS and other research investigations are to be commended for their foresight and diligence in obtaining the necessary financial support to expand current levels of research on canker and greening. These funds are currently being contracted, and as accounts are made available to IFAS scientists, acceleration of research is expected. We plan to periodically report on all aspects of this research.

As part of this newsletter, we intend to acknowledge the many and varied sources that are providing the necessary funding to move the research, extension and industry collaborations along to solutions.

For more information, please contact Harold Browning at hwbr@crec.ifas.ufl.edu.

HLB DETECTION UPDATE - IODINE-BASED STARCH TEST



Greening

IFAS researchers, (Ed Etxeberria, Tim Spann, and Bill Dawson) with assistance from Mike Irey at the US Sugar/Southern Gardens Diagnostics Lab, have developed a protocol for performing a field-based test to rapidly detect elevated levels of starch in leaves suspected of being infected with HLB.

Early HLB research found that HLB infected trees accumulate large amounts of starch in their leaves. Starch readily reacts with iodine, staining dark-grey to black in a matter of minutes. The IFAS developed protocol for this test has been outlined in an EDIS publication that will be available online soon (http://edis.ifas.ufl.edu/). This should not be used as a definitive HLB test, as other disorders may also lead to starch accumulation. However, it is a good test to distinguish leaves that are highly suspect and should be submitted for PCR testing from those with mineral deficiencies or other problems that lead to a mottled appearance.

For more information, please contact Tim Spann at CREC (spann@ufl.edu).

THE ROLE OF PSYLLIDS IN GREENING SPREAD

Ongoing work on transmission of the citrus greening pathogen by the Asian citrus psyllid has shown that psyllids can acquire (pick up) the greening pathogen when they feed on greening infected citrus that has not begun to show obvious disease symptoms (referred to as asymptomatic).

The good news, however, is that our work to date suggests that the number of psyllids that pick up the greening pathogen from these asymptomatic trees will be lower than if the tree were in more advanced stages of disease symptom expression.

Thus, growers should continue to remove visibly infected trees that serve as a source of the pathogen for psyllid acquisition. Psyllid populations should be maintained as low as feasibly possible to minimize psyllid acquisition of the greening pathogen from asymptomatic greening infected trees. Michael Rogers (mrgrs@ufl.edu) and Ron Brlansky – (rhby@ufl.edu).

ASIAN CITRUS PSYLLID SUPPRESSION

Dr. Pasco B. Avery, a new post-doctoral entomologist, began work at the Indian River Research and Education Center in Ft. Pierce on Sept. 17. The primary focus of Dr. Avery's work will be to aid growers, particularly on the east coast, with the evaluation of their psyllid management programs. Dr. Avery will be working under the direction of Drs. Michael Rogers (CREC) and Charles Powell (IRREC). Michael Rogers (mrgrs@ufl.edu)

SOUTHERN GARDENS DIAGNOSTIC LAB (SGDL) - UPDATE

What is SDGL?

The SDGL is a partnership between United States Sugar Corp/Southern Gardens Citrus (USSC/SG) and UF/IFAS/CREC. The lab, administered by Mike Irey (msirey@ussugar.com), provides PCR-based testing to confirm that leaf and fruit samples with suspect visual symptoms are greening. USSC/SG provides facilities, equipment, supplies and technician support. UF/IFAS/CREC provides a technician and additional supplies. There is no charge for testing provided the submitter completes the submission form and the disclaimer, both of which can be found on the Citrus Mutual website (http://www.flcitrusmutual.com/content/docs/issues/canker/sg_samplingform.pdf)

The SGDL runs samples in order of submission for three types of samples on a priority basis: 1) nursery and foundation budwood sources; 2) grove samples; and 3) research samples.

What does greening look like today?

Growers conducting self surveys for greening need to train/evaluate their scouting teams' performance. Initially the recommendation is to confirm that samples with symptoms from each block are positive. At first, the tendency is to send in every sample from a block for confirmation. After symptoms in a given location are confirmed as positive, usually just a couple of samples per block are necessary for confirmation. In areas of the state where greening is not yet well established more samples may be needed to determine if

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symptoms are greening.

After almost one year of sample submission from outside growers (with a range of sampling experience) there is evidence that symptom expression varies during the year and from grove to grove (Figure 1). Therefore, for best results, samples should be collected from August through March (before the spring flush). However, with well trained scouts, it is possible to achieve much more consistent results throughout the year (for example, for samples collected by an experienced SG crew from March 1, 2007 to Sept 6, 2007, the percent of positive samples was 95.4% out of 5448 samples submitted by that group). To achieve these consistent results during the non-optimum times of the year, it will be necessary to observe symptoms and select the samples for submission much more carefully.

Greening

SGDL statistics after first year:

- First grower samples received 10/31/2006;
- Total of 17,944 outside samples run through 9/6/2007;
- 3,561 samples from Bureau of Citrus Budwood Registration;
- 14,383 grower or research samples;
- Average turn around time (from receipt of sample to reporting of results) 15 days (including weekends and holidays) (Figure 2). The January lag was due to a combination of Christmas and New Years holidays and equipment breakdown;
- Over entire period, averaging 399 grower samples per week;
- Since June 1, averaging 464 grower samples per week;
- 118 different submitters (people sending in samples);
- 342 different groves from 19 different counties;
- Results sent directly to growers as available. Summary results sent to State and Federal agencies every two weeks. Mike Irey (msirey@ussugar.com); Jim Graham (jhgraham@ufl.edu)

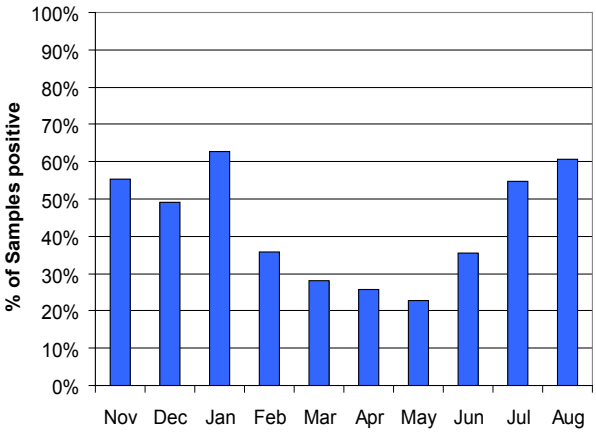

Figure 1. After almost one year of sample submission to SGDL, there is evidence that symptom expression varies during the year.

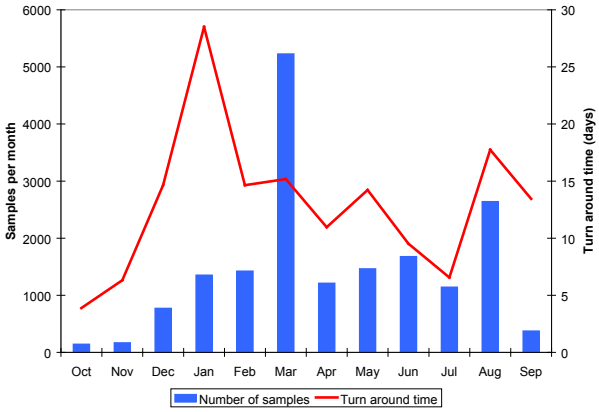

Figure 2. SGDL is averaging 399 grower samples per week with an average turn around time from receipt of sample to reporting of results of 15 days.

GREENING TRANSFERRED FROM *MURRAYA* TO CITRUS

Sweet orange plants, grown and maintained in psyllid-free greenhouses in Gainesville, were infected by dodder (*Cuscuta pentagona*) grown from seed. After the dodder had become well established on the sweet orange plants, the two dodder infected citrus plants were moved adjacent to the two C. Liberibacter-infected *Murraya* plants in the quarantine facility and the dodder from the citrus was draped over the *Murraya*. Co-infection of *Murraya* by dodder occurred within a few days. Sixty days later, both *Murraya* plants, both sweet orange plants and the connecting dodder all repeatedly tested positive for C. Liberibacter by nested PCR. We conclude that *M. paniculata* can serve as an epidemiologically significant host of a Select Agent, since it can harbor the HLB pathogen for at least two months and the HLB pathogen can be transmitted from *Murraya* to sweet orange during this time. Dean Gabriel (gabriel@biotech.ufl.edu)

HLB HOST RANGE STUDIES

One objective of our laboratory is to examine citrus varieties and relatives for resistance or tolerance to HLB. We obtained seed or cuttings of as diverse a collection of citrus as possible. The first series of experiments contains 32 different citrus varieties and relatives. So far, nothing we have tested resists HLB infection by graft transmission. However, some plants exhibit much more severe symptoms than others. *Poncirus* and relatives appear to have milder symptoms than sweet oranges, grapefruit, or mandarins, but these experiments are ongoing and results may change with time. Bill Dawson (wodtmv@crec.ifas.ufl.edu)

Greening

Canker

Upcoming Events

Citrus Greening Identification and Worker Survey Training
Thursday, Oct. 11, 9:30 a.m. – 12:05 p.m.
Polk County Extension Stuart Center
1710 Highway 17 South, Bartow, Florida
To register, contact Polk County Extension Service 863-519-8677 ext. 111

Citrus Greening Identification and Worker Survey Training
Wednesday, Oct. 17, 9:30 a.m. – 12:05 p.m.
Turner Exhibition Hall
2250 NE Roan Street, Arcadia, Florida
To register, contact DeSoto County Extension Service 863-993-4846

Citrus Greening Identification and Worker Survey Training
Tuesday, Oct. 23, 9:30 a.m. – 12:05 p.m.
Southwest Florida Research and Education Center
2686 SR 29 North, Immokalee, Florida
To register, contact Hendry County Extension Service 863-674-4092

Citrus Greening Identification and Worker Survey Training
Wednesday, Oct. 24, 1:30 p.m. – 4:05 p.m.
Lake County Extension
1951 Woodlea Road, Tavares, Florida
To register, contact Lake County Extension Service 352-343-4101

Citrus Greening Identification and Worker Survey Training
Tuesday, Oct. 30, 9:30 a.m. – 12:05 p.m.
Highlands County Extension
4509 W. George Blvd., Sebring, Florida
To register, contact Highlands County Extension Service 863-402-6540

Citrus Greening Identification and Worker Survey Training
Wednesday, Oct. 31, 9:30 a.m. – 12:05 p.m.
Indian River Research and Education Center
2199 South Rock Road, Fort Pierce, Florida
To register, contact St. Lucie County Extension Service 772-462-1660