

Citrus Notes

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This month we will be holding our local Mini-Greening Summit Meeting in Bartow. It is also the time of year to start preparing for the winter and signing up for the Winter Weather Watch. Out in the field we made some additional observations related to greening infected Hamlin oranges. Greening symptoms are becoming more evident this time of the year so make sure to carefully examine all of your blocks for symptoms. There has been a study done on the effects of citrus greening on fruit size distribution and the abstract is included in this issue. In the pesticide news and information section, Remedy® brand herbicide is now labeled for citrus stump treatment.

Enjoy the issue,

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Mini-Greening Summit



On Thursday, October 9, 2008, the Mini-Greening Summit will be conducted in Bartow. The Summit will be held in the Stuart Conference Center at 1710 S. Highway 17 in Bartow. Lunch at the Bartow location is being sponsored by Triangle Chemical Company and Bayer CropScience. In order to get an accurate head count for lunch, you must call Gail at 863-519-8677 to register by Tuesday, October 7, 2008.

The Summit is a program developed and delivered by your UF/IFAS Citrus Extension Agents. The program agenda is as follows:

- 9:30 a.m. Registration
- 10:00 a.m. **Psyllid Control Research and Management Update**
- 10:25 a.m. **Greening Bacteria Research Update**
- 10:50 a.m. Break
- 11:05 a.m. **Horticultural Greening Management Research Update**
- 11:30 a.m. **Citrus Canker Research Update**
- Noon Lunch

2 CEU's will be available for your Restricted Use Pesticide (RUP) and Certified Crop Advisory (CCA) licenses. Scheduled speakers for the Bartow location are: Chris Oswalt,

Steve Futch, Ryan Atwood and Gary England. Don't forget to register and I hope to see you on October 9th.



2008-09 Edition of the Winter Weather Watch

The 2008-09 edition of the Polk County Winter Weather Watch program will begin on November 15, 2008. The program provides growers with winter weather forecast information specifically geared toward agricultural interests in West Central and South Florida. The program provides subscribers with an unlisted phone number for (24 hour/7 days a week) access to daily weather forecasts. The zone forecasts are from the National Weather Service (NWS) and are listed on the automated phone menu, so you can select the products you are interested in. Forecasts include the zone forecasts, 6-10 and 8-14 day outlook forecasts. In addition to the forecasts, we have special weather narratives provided as needed in the event of freezing temperatures and a weekly outlook provided by Fred Crosby (retired Ruskin NWS meteorologist-in-charge). Fred has extensive experience in forecasting in Florida and has been exclusively assisting us for a number of years. When freezing temperatures are predicted in our area, additional updates will include the afternoon zone forecast and the modified sunset brunt minimum temperature equation. If

this is not enough, we will also provide the weekly citrus leaf freezing temperatures and the 2008-09 Winter Weather Watch manual.

Here is the forecast schedule for this year:

Product	> 32° F	32°-29°F	< 28° F
Zone	Daily 8:30 a.m.	Daily 8:30 a.m.	Daily 8:30 a.m.
6-10 & 8-14 Day Outlooks	Mon/Wed /Fri 8:30 a.m.	Mon/Wed /Fri 8:30 a.m.	Mon/Wed /Fri 8:30 a.m.
Weekly Outlook	Friday 5:00 p.m.	Friday 5:00 p.m.	Friday 5:00 p.m.
Leaf Freezing Temperatures	Friday 5:00 p.m.	Friday 5:00 p.m.	Friday 5:00 p.m.
Special Weather Narratives	As Needed	Daily 4:00 p.m.	Daily 4:00 p.m.
Afternoon Zone Forecasts	None	Daily 5:30 p.m.	Daily 5:30 p.m.
Sunset/Brunt Forecast	As Needed	As Needed	Daily 7:00 p.m.

Subscriptions for the Winter Weather Watch program are only \$100.00 for the entire 4 month period (Nov. 15th to Mar. 15th). The cost is about the same as one tank of gas for your pickup truck. You can subscribe to the Winter Weather Watch by filling out the en-

closed registration form and sending your payment to the address listed on the form.

Observations on Greening Infected Hamlin Oranges



I had the opportunity to go out into the field with a grower the other day (Mid September). We continued to make some observations on trees that had visible citrus greening symptoms. The trees were 5 year old Hamlin oranges on Swingle rootstock. We have some limited information about changes in the size distribution of fruit on infected trees (see abstract on fruit size), but this was done on Valencia on Carrizo. We noticed that some of the fruit had the typical misshapen appearance normally seen on citrus greening infected trees. This was easy to see compared to healthy appearing fruit. When cutting the fruit lengthways the central axis was curved and the seeds were aborted. We also observed a distinct variation in fruit size on these symptomatic trees. Symptomatic fruit detached easily and many times the calyx would remain on the stem rather than remain with the fruit as typically seen in healthy fruit. These observations are what we would normally expect to see in the field with symptomatic trees.

Past observations and experience has shown that greening infected fruit abscise prematurely. The damage caused by the greening bacterium causes a distinct brownish coloration of the fruit button easily seen when the fruit is detached. This may be a type of necrosis causing ethylene production and fruit



Brownish discoloration at the calyx end of asymptomatic fruit from a symptomatic tree.

The white flesh albedo of a healthy fruit. Notice no staining of the segment vascular system.



White/greenish coloration of calyx on fruit off a healthy tree.



on infected trees were compared to similar sized fruit from healthy trees. The differences become apparent as you cut thin layers of the peel from the top down.

Although not definitive, this observation can be added to the collective experience in the identification of greening infected fruit in the field.

drop. The importance of this observation is that this button necrosis can be easily seen when removing the calyx of some of the asymptomatic fruit from greening infected trees. A sample of these small Hamlin oranges



Scouting for Citrus Greening



Brownish coloration of the albedo. Notice the staining of the segment vascular system and the dark center core of fruit from symptomatic tree.

As mentioned in the previous article, in making observations in blocks with a history of greening, typical symptoms are now becoming evident. In many cases yellow veins and blotchy mottle are becoming easier to find in groves with the disease. In early orange blocks, it appears that some fruit drop can also be seen. If you have this situation, it would be extremely important to map the location of these symptomatic trees. This would be an excellent way to monitor the spread of the disease within a block over time. Effective greening management plans that would address inoculum reduction, psyllid control along with timely scouting, would result in

the expectation that the disease incidence would be slowed over time.

The difficulty in predicting spread of this disease is the occurrence of random single tree infections along with a more systematic leading edge spread in the same block. It would



Grove where a cluster of greening infected trees have been removed.

be beneficial to note locations with clusters of trees versus areas of single tree infections. We have earlier information that indicated that the adjacent trees in these random single tree infections seem to be less likely to develop symptoms compared to adjacent trees in an area of clustered infections. This type of situation would assume that an effective psyllid management plan was in place. Inoculum removal of single tree infections without subsequent symptom development on adjacent trees could be a sign that the disease has been caught in the early stages. All groves are different in respect to varieties, rootstocks and management programs. It would be beneficial to have additional quantifiable information to see if this holds true in different production regions of Florida.

Having said this, we currently have only casual observations and a very limited amount of data on this occurrence. Only with continued experience in Florida with this disease and careful mapping of disease progression, can we get a better picture of the potential benefit of this information.

Citrus Greening Effects on Fruit Size Distribution



The following is the abstract from a paper authored by Dr. Tim Spann and Chris Oswalt presented at the Annual Meeting of the Florida State Horticultural Society and at this month's Citrus Expo titled: Citrus Greening Effects on Fruit Size Distribution in Citrus Trees.

Citrus greening disease or huanglongbing (HLB) is a bacterial disease caused by the phloem-limited bacteria *Candidatus Liberibacter* spp. The disease causes phloem collapse which leads to a number of symptoms expressed in leaves and fruit of infected trees. Fruit symptoms include small fruit size, misshapen and lopsided fruit, an inverted color change and off flavors in the fruit. Because of the off flavors, it is important to keep greening affected fruit from entering the processing plant where they could destroy large volumes of juice or the packinghouse as they would be unacceptable to consumers. We hypothesized that there is a significant difference in the fruit size distribution, more heavily weighted to smaller fruit, in greening infected trees than healthy trees. This change in size distribution caused by greening could be used to grade out affected fruit when fruit are harvested from a potentially infected area. Additionally, a load of fruit with a disproportionately high number of small fruit could be an indicator of possible greening infection, thus helping to direct scouting efforts.



Sample of fruit size distribution from fruit off greening infected Valencia tree used in the study.

In this study, results indicated a significant shift in the fruit size distribution from greening infected trees. The shift amounted to an overall reduction of one fruit size for greening infected trees compared to healthy trees of the same rootstock, variety, age and management program.



Pesticide News and Information

**Remedy®
Now
Labeled
For
Citrus
Stumps**



On August 14th, the FDACS approved the Special Local Needs Registration FL-080004

from Dow AgroSciences for the use of tri-clopyr (Remedy®) herbicide for control of citrus stump resprouts from cut stumps in citrus groves. The EPA registration number is 62719-552. (FDACS PREC Agenda, 9/4/08).

USDA Projection on Citrus Greening

Since it was first recognized in the United States near Miami in 2005, citrus greening has spread across Florida. Timothy R. Gottwald, an epidemiologist with the U.S. Department of Agriculture, has projected that virtually all the state's citrus trees will be infected in 7 to 12 years. Many farmers are not replanting, because young, vigorous trees attract psyllids. To save their \$9 billion industry, Florida citrus growers have shifted money to a huge research program from advertising. Spending will triple to \$20 million next year and support more than 100 research projects, said Peter McClure, who is chairman of the Florida Citrus Production Research Advisory Council. (*New York Times*, 8/25/08).