



“Keeping You Informed About the Research Process”

## International Research Conference on HLB

Some Research Success – Virtual Sequencing of Liberibacter!

Grower Success – Keys to live with greening in Brazil.

Interesting Results – Tolerant Citrus Variety?

Challenge to Researchers – Communicate, spend \$ like it was your own and examine what is the next step with your results.

**The International Research Conference on Huanglongbing** was held the first week of December in Orlando. Quite truthfully the conference was designed primarily for researchers and the presentations for the first three days were very technical. There will be a formal proceeding published in order to preserve and share the information, especially within the scientific community. The last day of the conference was targeted toward growers and provided an excellent summary of the technical talks. I attended a large portion of the conference and must admit most of the presentations were well above my pay grade! There will be summaries of the conference from several viewpoints. This newsletter will provide what I thought were some key points and summarize some of the material presented.

### World Wide Situation

There were over 400 registered for the conference representing 27 countries! There was a large delegation from Brazil. Greening (HLB) is worldwide and believed to have originated in SE Asia. Since this is the assumed origin of citrus it seems likely HLB first appeared there as well. Many citrus areas on all producing continents are dealing with HLB. The disease has been studied for at least the last 50 years. It was found in Brazil in 2004 and Florida in 2005. These finds in the two largest citrus producing areas has brought renewed interest in the research arena (growers are looking for answers NOW). HLB has been found in Louisiana, the psyllid is in Texas and recently the psyllid also showed up in southern California. Other North American neighbors; Cuba and Mexico have HLB.

### Finding HLB

There are many scientists looking at different methods to detect HLB. The standard used all over the world is the PCR method. To date the Southern Gardens lab has processed over 55,000 samples! A second lab (at the UF/IFAS SW Florida Research and Education Center) is in

full operation. Demand is still high in Florida with the labs many weeks behind. An early detection method would be of great value and a concerted effort is being made in this area.

As a note, Mike Irey at Southern Gardens reports “at this point we are 7 weeks behind. The number of samples run (for outside growers) to date (starting Oct 31, 2006) is 70,869. We are absolutely swamped with all fridges and freezers full of samples waiting to be run (3 freezers and 3.5 fridges).....We are slowly catching up but we are one person down but hope to fill that position soon.

### **Sequencing the Bacterium**

One of the major efforts over the past year has been sequencing the liberibacter bacteria that is thought to be the causal agent of HLB. Attempts have been made at many labs and it appears the USDA lab in Ft. Pierce has a virtual sequence (Dr. Yong ping Duan). The liberibacter organism was extracted from psyllids and cultured. The results will be available for others to use in the area of molecular biology. Many scientists are working on HLB at the molecular level; genes, DNA, RNA, etc. and the sequence is valuable to them.

### **Bacterium/host Interaction**

By the second full day of the conference the presentations had moved to how the bacteria interacts with the host (citrus). The bacteria is associated with zebra chip in potatoes and were found in the tomato psyllid. The issue of seed transmission has not been put to rest. Even though after three years all 319 seedlings tested negative with the standard PCR test, and most had no symptoms, there is always the “but”. In this case a sour orange seeding was severely stunted, and with a more involved test did indicate liberibacter was present. More work will be done to gain a better understanding on possible seed transmission of HLB . Mike Irey provides this insight with regards to seed transmission, “The seed transmission work that you refer to is only from John Hartung. There were several posters that tested many more seedlings and all had plants that tested positive (at least for a period of time).

### **The Psyllid**

There were numerous presentations dealing with the transmission of HLB and managing the vector *Diaphorina citri* (scientific name for the Asian citrus psyllid). Talks ranged from impact of cold weather on psyllid populations to pheromones. Management strategies were presented including chemical control, biological control and flight patterns. The impact of “bad neighbors” was demonstrated indicating the need for fellow growers to get on board with psyllid management. Several studies clearly showed the “edge” effect. Larger numbers of infected trees are located along ditch roads, next to ponds, adjoining removed trees (canker eradication).

## **Economics/Juice Quality**

By the afternoon of the second full day, presentations moved to economics, fruit quality and crop loss. A study by USDA showed that there were almost no detectable differences in juice from infected and non infected trees. It was noted that fruit drop was heavy and occurred well before harvest for advanced HLB infected trees. As one can imagine economic losses can be significant, both from the cost to manage the disease and yield reduction.

## **Psyllid Management**

Additional psyllid management presentations as well as some modeling talks led day three. It should be noted that a detailed analysis of the guava revealed a sulfur volatile repelled the psyllid. Work continues to see if this compound can be used effectively in the field. There was one paper dealing with the use of guavas in Japan that indicated after three years citrus trees interplanted with guavas became infected with HLB! This is contrary to most observations of interplanted orchards. Management strategies were discussed in the afternoon. Most attention was given to control of the vector in combination with removal of inoculum. Scouting is critical to identify infected trees as early as possible so they can be removed before they “pass” HLB to psyllids which in turn transmit the disease to non infected trees.

## **Genetics**

There were many presentations dealing with the genetic modification of citrus to produce tolerance or hopefully resistance trees. It is amazing how the plant breeder of today has a lab stocked with “genes” that can be inserted into plants in hopes of modifying characteristics (better fruit quality, disease resistance, adaptation to environment, etc.). The modern modified (transgenic) trees are subject to many regulatory issues and patent matters. This entire area of taking a genetically modified tree from the lab to field is a nightmare of rules and attorneys. The easy part is inserting the gene, then the real work begins. It is evident the long term solution to HLB lies in the area of genetic improvement, and it is just as evident this will be a most challenging task from lab to regulatory agency to patent attorneys. An interesting note to the breeding area, a Japanese scientist reported finding a mandarin selection that appears to tolerate HLB. This is certainly encouraging and will be studied carefully to confirm the observation and hopefully find out why this cultivar can tolerate the bacterium.

## **Wrap Up**

The wrap up on Friday took a broader look at HLB with grower friendly summaries of the technical presentations. This was well done and provided the basis for the above material. Dr.

Tom Turpen had some most interesting comments on successful research and challenged the researchers to communicate with each other, spend the research money like it was their own, and analyze what is the next step with their research results. Some good news from Brazil, HLB was “discovered” in 2004 and if infection levels are low when a management program is implemented, if frequent inspections are made, if infected trees removed, and if a concerted psyllid management program is implemented then the disease can be “controlled” (number of infected trees held to an economic level). Other good news is that Florida has recognized the solution to greening lies in research and that a significant level of funding is necessary to get research done. Fortunately growers are committed to spending whatever it takes to whip greening! Texas and California realize the potential problem and are equally committed to the battle. California is starting a massive awareness program to inform homeowners, and are involved in a hunt and destroy program for the psyllid which has showed up in the San Diego area.

Even though it appears to be an uphill battle, most feel we will be able to solve the HLB problem. Certainly there are many excellent scientists working on the disease from many perspectives and we have had some exciting success stories. Plans call for another HLB research conference in two years to bring the research community together again to share good news and discuss remaining challenges. Now all we need is a few breaks and lots of hard work. A positive attitude is always helpful as well.

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