Florida Citrus Advanced Technology Program

QUARTERLY & FINAL REPORTS: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

Instructions Complete the fields based on your project specs. When finished, save the form to your local disk using a unique name. Then, go to **http://research.fcprac.com**, and log in with your user name and password using Researcher Login in the lower left. Find this project title and click on **Submit a Report**. Update your profile information if needed, then upload this report as directed.

2009-2010 REPORT	CATEGORY (drop-down)	TODAY'S DATE (m/d/yr)
(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*	HLB Pathology	7/27/10

WHAT IS THE "HEADLINE" FOR THIS REPORT (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Strains of Ca. Liberibacter asiaticus identified

TITLE and CONTACT INFORMATION

Proposal Title Does huanglongbing (HLB) or associated nutrient deficiencies change asian citrus psyllid (ACP) feeding patterns?

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Phone 863-956-1151	*Project Duration (years)* 2 *Year of Project* 1
Organization CREC, University of Florida	*Total Direct Funds (current year)* $39,689

REPORT UPDATE (650 words; provide details about your headline)

The objective of this project is to investigate three questions: 1) whether HLB symptoms or boron/zinc deficiencies alone affect how ACP responds to citrus; 2) whether feeding patterns by adults, length and location of feeding, are altered by HLB infection or boron/zinc deficiencies; and 3) whether different strains of Ca. Liberibacter asiaticus (Las) differentially affect the response of ACP to citrus.

In other pathogen/host/vectors systems, such as that with Ca. Phytoplasma mali and Cacopsylla picta (the apples psyllid), the pathogen manipulates the plant host metabolism so that diseased plants become more attractive to the psyllid vector, thereby spreading the pathogen more rapidly than if no plant host manipulation occurred. Since nutrient deficiencies are often associated with HLB in citrus, we wished to confirm that the reported attraction of Diaphorina citri to HLB symptomatic plants over uninfected plants was due to changes in host metabolism by the pathogen rather than physiological changes due to poor nutrition.

The production of greenhouse-grown citrus trees with nutrient deficiency symptoms for both zinc and boron is underway. Deficiency symptoms are expected to take a few months to develop. This is especially the case for zinc because of the high mobility of zinc within the plant allowing redistribution of existing zinc to new flush, delaying the development of symptoms. Multiplication of our stocks of HLB infected citrus is also underway to provide a constant source of symptomatic tissue for experimentation once the nutrient deficiency symptoms have developed.

We are also interested to determine if strains of Las will have any effect on the attractiveness of trees to D. citri. It has been reported that Las strains have varying levels of virulence and symptomatology (Tsai et al. 2008). We have analyzed DNA samples from HLB positive trees from Polk and Highlands counties as well as the 'Smoke Grove' CREC greenhouse strain by PCR and sequencing. Three putative strains of Ca. Liberibacter asiaticus (Las) were found with 5 (CREC greenhouse isolate), 13, and 15 tandem repeats of DNA in the LAPGP locus described by Chen et al. 2010 and have identified sources of budwood. We are currently using the identified budwood sources to acquire greenhouse isolates of the three strains while sequencing other loci including the b-operon, OMP (outer membrane protein) gene and phage DNA polymerase to support the differentiation of the three strains as has been reported in the literature (Bastianel et al. 2005; Lin et al. 2008; Okuda et al. 2005; Tomimura et al. 2009).