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	3/15/10

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

New Hosts for HLB?

TITLE and CONTACT INFORMATION

Proposal Title Alternative Hosts of HLB to Assist in Disease Management

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Phone 863-956-1151	*Project Duration (years)* 3 *Year of Project* 1
Organization University of Florida, CREC	*Total Direct Funds (current year)* $205,000

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

This work on this project will determine if certain alternative plant species are better hosts for the suspected HLB bacterial pathogens (Ca. Liberibacter asiaticus (Ca. Las), Ca. Liberibacter americanus (Ca. Lam) and Ca. Liberibacter africanus (Ca. Laf)) and can serve as a reservoir hosts for infection to citrus. This work is a collaborative effort of five researchers located at four locations since part of the work involves exotic HLB associated pathogens.

At the University of Florida, CREC Lake Alfred, quantitative real time PCR (qPCR) work focused on Severinia buxifolia, rough lemon, Calomondin and Murraya paniculata. Graft inoculations to Severinia buxifolia (orange boxwood) and showed that it was an excellent host for the Las bacterium. Asian citrus psyllids were allowed to feed on HLB infected S. buxifolia and 20-30% were found PCR positive. Transmission tests from S. buxifolia to sweet orange was done and the transmission rate was found to be high. This research was done by Hao Hu a graduate student studying with Dr. Brlansky on this project. Studies to determine the absolute quantification of live bacteria in the tissues has been done using two compounds to separate dead from live bacteria. We feel that this is necessary since previous results have shown high numbers of Las in infected tissues but microscopy has revealed few bacteria. Real time PCR results on rough lemon (C. jambhiri) showed infection of both symptomatic as well as asymptomatic shoots and leaves with similar PCR values for all shoots. Rough lemon continues to grow even when infected with Ca. Las. Other commercial rootstocks have been tested and results show that many of them continue to grow even when infected with Las. In field experiments rootstocks from clipped HLB positive trees have shown that rootstock sprouts are positive for Las and maybe a source for further spread. Various commercial sweet orange cultivars were inoculated with Florida Ca. Las and one cultivar tested PCR negative in multiple graft inoculation tests. We have expanded tests on this cultivar and plan to report these results at the Florida State Horticultural Society meetings in June. Experiments on the existence of alternative hosts where edge effects next to non- citrus plantings has begun. Zanthozylum species have been found but PCR tests are negative. At Texas A&M Citrus Center, psyllid feeding tests on eight indigeous rutaceous plants. Esenbeckia berlandieri (jopoy), Amyris madrensis (torchwood), Choisya ternata and C. arizonica and Zanthoxylum fragara, Casimiroa terameria were found to be feeding hosts for the psyllid. Egg laying was found on torchwood but the psyllids did not complete development. Egg laying and nymphal development to adults were found on C. ternata and C. arizonica. Feeding and egg laying on 3 of the others species but nymphs died.

At the USDA, ARS, Beltsville quarantine greenhouse graft inoculations were done to M. paniculata with exotic Ca. Ca. Lam and Ca. Laf isolates and are being tested. Work with dodder as an alternative host was completed studying the plant infection process and for its use to transmit all Liberibacters to plants that are not graft compatible with citrus. A manuscript was submitted for publication in Phytopathology by Drs. Hartung and Brlansky. Dodder became infected and phloem necrosis occurred similar to that in citrus. We showed that Liberibacter exists in two morphological forms in the dodder similar to that seen in citrus and periwinkle and an intermediate between the two forms was discovered.

At the USDA, ARS, FDWSRU, Ft. Detrick, MD a manuscript entitled "The relevance of Murraya paniculata and related species as potential hosts and inoculum reservoirs of 'Candidatus Liberibacter asiaticus', causal agent of Huanglongbing (HLB)" was completed and accepted for publication. Authors from the grant include Drs. Damsteegt, Brlansky and Schneider. The details of this work were reported in earlier reports. Psyllid transmissions from HLB (Ca. Laf and Ca. Las (Thailand strain)) infected sweet orange to Severinia buxifolia have been done and testing will begin after incubation.