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*	Management	7/5/09

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

TITLE and CONTACT INFORMATION

Proposal Title Using physical and chemical property changes of citrus leaves as early indicators of HLB infection and the effects of added plant nutrients

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Organization CREC	*Total Direct Funds (current year)* $164,631

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

Objective 1: We conducted tests with nutrient analyses of leaf samples collected from HLB-infected and healthy trees to establish relationships which could be used for (early) diagnosis of HLB. A protocol was established to correct the distortion of leaf nutrient data caused by fluctuations in leaf dry weight (DW). Starch accumulation in symptomatic leaves can significantly alter the interpretation of nutrient status when diagnosed on a DW concentration basis. Conversion of leaf nutrient data to a leaf area basis is one accepted approach which we are using for correcting the influence of DW fluctuation. The Diagnosis and Recommendation Integrated System (DRIS) is another approach to leaf nutrient diagnosis which eliminates any erroneous background noise due to changes in DW. In DRIS, the DW values simply cancel out in a series of nutrient concentration ratios. Thus nutrient interpretation with DRIS considerably reduces the bias from undesirable nutrient concentration or dilution effects due to uncontrollable changes in leaf tissue DW. Furthermore, versions of the DRIS computations are available which can estimate an index of the leaf DW (DWI). In our studies with HLB-infected blotchy mottled leaves where starch accumulation caused DW to increase, the DWI calculated by DRIS was correlated with measured DW. Analytical labs do not routinely report DW for leaf samples, but by using DRIS, we are able to calculate DWI and obtain an estimate of undesirable DW changes which we need to be aware of. Furthermore, DWI may be valuable for diagnosing early onset of HLB in asymptomatic leaves even before PCR methods can detect the Candidatus Liberibacter spp. DNA.

Objective 2: An HLB infected commercial citrus grove near Haines City, Florida has been located for field trials to determine the effects of remedial applications of plant nutrients on HLB. The experimental design and treatments are currently being developed in cooperation with the grower and will be reported on in future reports.

Objective 3: Seeds of 'Valencia' and 'Hamlin' sweet orange, and 'Duncan' grapefruit have been germinated to produce trees for use in a controlled greenhouse hydroponics study of the effect of specific plant nutrients on HLB expression. The seedlings are currently being grown in sand culture with a complete nutrient solution applied every two days. The seedlings will soon be transferred to larger containers, but maintained in sand culture, to grow up to a sufficient size for budding, at which time a sufficient number of trees will be bud inoculated with HLB. After successful bud inoculation, infected and healthy trees will be transferred to hydroponics culture where specific nutrients (identified through objective 1) will be deleted or supplemented in the nutrient solution to determine their effects on HLB expression and plant growth.