CITRUS ADVANCED TECHNOLOGY PROGRAM

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

▶ INSTRUCTIONS

(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*

Required: What is the "headline" for this report (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Evaluation of foliar zinc/manganese for management of HLB

Proposal Title

Evaluation of foliar Zinc and Manganese application for control of Huanglongbing or associated symptom development

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
1/31/11	Citrus Research and Development Foundation	Epidemiology and Cultural Control

REPORT UPDATE (500 words; summarize your accomplishments)

Objective 1 is to conduct a field evaluation nutritional sprays for control of HLB and HLB symptom expression and yield. The field study was set up May 2010 in Southern Grove, Hendry Co., FL. Six treatments were set in 4 plots of 150 trees per treatment (interior 10 trees in each block were identified for PCR, leaf nutrition sampling, tree health and yield evaluation). Treatments were 1) non-treated check; 2) Nutri-Phite sprayed 4 times bimonthly; 3) N-Sure sprayed bimonthly; 4) Agra Sol Mn/Zn/Fe plus Nutri-Phite plus triazone urea sprayed bimonthly; 5) Keyplex 1400 DP plus Nutriphite plus triazone urea sprayed bimonthly; 6) Wettable powder nutrients (Diamond R #2) plus Nutri-Phite P+K sprayed bimonthly. The materials were applied to both sides of the tree in 125 gallons per acre with an airblast sprayer driven at 2 mph to obtain thorough coverage. Two disease ratings have been taken so far and no significant change in tree health has been observed yet in treated or control, including symptomatic trees. There were no significant treatment differences in yield at the first harvest, after the initiation of treatments in April.

Objective 2 is to determine the mechanism of HLB symptom suppression by foliar nutritional application, Hamlin sweet orange trees have been inoculated and are being treated bimonthly with the nutritional sprays 1, 2, 3, and 5 from objective 1. Infection rate and progress are being monitored by qPCR monthly. Two months after inoculation, new flush on some trees was strongly positive for Las; however, too few of the trees were positive to determine any treatment effects. Samples from 3 and 4 months post inoculation continue to show an increase in trees detected positive. No significant differences have been observed, although treatment 5 has consistently had the highest number of positive trees each month. Five month qPCR samples showed a leveling off of incidence as most of the trees test positive and the number of trees still testing negative agrees with known graft inoculation efficiencies. Routinely, the first positive sample on a tree is in the newest flush and older leaves remain negative or only weakly positive. No significant differences in Las titer have been observed between treatments to date, although the highest Las titers each month have been in treatment 3 and 5. Initial positives were detected in new flush near the graft inoculation site. 5 months post inoculation Las appears to be moving systemically through the canopy with detections occurring in old leaves, recently hardened off leaves, and topmost new flush depending on the plant. There is a trend towards high incidence of detection in the topmost flush of treatment 5, which, combined with higher titers, could have implications for vector transmission in disease management.
Sampling and fixing of plant material for microscopy of phloem and leaf blade tissue began at two months and continues monthly. Fixed samples will be observed by microscopy once strongly symptomatic tissue is available for comparison. At five months, symptoms began to develop on tissues that had been Las positive the longest according to qPCR. This suggests that it takes 2-3 months after Las invades leaf tissue for symptoms to develop. No treatment differences in symptom development have been observed, except that symptom development first began in the trees from treatment 3 and 5 that were the first to test positive 2 months after inoculation. Currently, no differences in tree vigor have been observed, but this is not expected until strong symptoms develop. As soon as symptoms develop in control plants, analysis of fixed samples will begin, which is expected at month 6 or 7. Sampling for 6 months post inoculation is underway at the time of this report.

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Organization UF, Citrus Research and Education Cent

Contract Number 77601

Project Duration (years) 1 *Year of Project* 1

Total Funds (current year) $49,464.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.