CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD June 2015

Quarterly Report Final

Proposal Title

Bringing young citrus trees infected with Candidatus Liberibacter asiaticus into production using intensive horticultural management strategies

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
2/23/16	Citrus Research and Development Foundation	Epidemiology and Cultural Control

REPORT UPDATE (500 words-It is not necessary in this public report to disclose your institution's proprietary information or intellectual property.)

The objective of this project is to determine if various combinations of ground and foliar applied fertilizer nutrients, coupled with psyllid control, can rejuvenate young 3-year old HLB-symptomatic trees in a grove with 14% HLB incidence, allowing them to grow and bear an economically viable yield of quality fruit for juice processing.
The field experiment was established in a commercial 58 acre-grove of 3-year-old 'Valencia' / Kuharske Carrizo trees using a combination of three different foliar and three different ground applied nutritional programs.
Factorial AxB treatments consist of
A) ground-applied: 1) Liquid/dry+Ca ('BHG standard'), 2) Liquid+Ca, 3) Liquid/dry-Ca
B) foliar-applied: 1) 'BHG standard'-Ca, 2) 'BHG standard'+Ca, 3) 'Prescription'(+Ca).
The prescription treatment was designed to be dynamic, customized for optimization, with feedback for development based on frequent leaf tissue analyses, visual symptoms, and the growth of the tree canopies and yield.
There are six replications of the treatments, with two being pure replications.

By the time the project was approved and we began treatments, the HLB incidence was already approximately 30%, and all HLB-symptomatic trees showed severe canopy decline. In the three following years, HLB incidence rapidly increased to near 100% by the third year of the experiment, and yet the severity of HLB symptoms decreased steadily so that by year two, HLB symptoms were difficult to identify in the grove. At the end of the project period, all treatments continued to perform equally well, which was quite difficult to comprehend given that the grove is practically 100% HLB-affected. Yields per tree have increased from year to year, averaging 1.14 boxes/tree for the 2014/15 season, and passing the juice quality requirements for harvest. Unfortunately the commercial block was set widely at only 151 trees/acre, resulting in only 172 boxes/acre at age 6 years. Future higher density plantings (300-500 trees/acre) of similar HLB-affected trees responding favorably in the same way could potentially realize a respectable 342-570 boxes/acre. The lack of experimental treatment response in this project was unexpected and disappointing. However it did serve a very important purpose in demonstrating that the reason for the inconsistent performance of HLB-affected young groves in Florida lies more in the soil and water of the site or the basal management level used in the grove than in the multiple applied enhanced nutritional programs being used. The most advanced nutritional treatments often will not elicit a response on HLB-affected trees on one (unresponsive) site and yet the simplest standard grove fertilization will be sufficient on another (responsive) site. Obviously complete absence of grove fertilization will cause rapid decline and collapse of HLB-affected trees on any site. In this study site we could not identify any special soil amendment, pesticide or fertilizer that had been used before or during the experiment, that could explain the complete recovery of HLB-affected trees in the Valencia block. It is noteworthy that the grove is irrigated primarily with surface (pond) water, but that does not account for the initial poor condition of HLB-affected trees in year 1 of the project, and in the three preceding years before the project began.

This experiment site and others with similar rehabilitation success of HLB-affected trees may contain important information waiting to be discovered, specifically the site conditions (soil and /or water) that permitted the sustainable recovery and reversal of HLB symptoms, putting the grove back on track to economic production. The Blumberg grove will be one of the 24 survey sites to be used in subsequent studies. By spreading the survey over a wide range of responsive and unresponsive grove sites, we aim to identify the key components responsible and then home in on developing a remedy

PI First Name Arnold

PI Last Name Schumann

Email schumaw@ufl.edu

Phone 863-9561151

Organization University of Florida

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Form PR-12 Quarterly Reports SUBMIT REPORT

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