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	9/29/10

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

Molecules for control of HLB begin field testing stage

TITLE and CONTACT INFORMATION

Proposal Title A Rapid Screening Process for Chemical Control of Huanglongbing

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Phone 772-468-3922	*Project Duration (years)* 3 *Year of Project* 3
Organization University of Florida	*Total Direct Funds (current year)* $75,730

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

In this quarter, the research was focused on the efficacy of the screened chemical compounds against citrus HLB in the field. A completely randomized design with three replicates was conducted at the USHRL farm in Fort Pierce. Seventy-two HLB-affected citrus trees were treated with PS (penicillin and streptomycin) by trunk-injection. Water was used as a control. The applications were repeated once after two months, and samples were taken for PCR assay. Potential phytotoxic effects of PS were also determined in the field. The primary results showed PS may eliminate the Las-bacteria in the treated citrus. When HLB-affected citrus were injected in the field with different dosages of PS, the resulting Ct values increased from 25.7 at pre-treatment up to 34.2 at 2 months after treatment with PS-5 (5.0 g penicillin+ 0.5g streptomycin in 100 ml water solution), which is an approximate 500-fold decrease in the Las bacterial population in the treated citrus plants. At 4 months after the second treatments, the Ct value was ≥ 40.0 (undetectable) indicating elimination of the Las bacterial population in the treated plants. Similar results were found with PS-10 (10.0 g penicillin+ 1.0 g streptomycin in 100 ml water solution). However, phytotoxic effects on citrus were found with PS-10. Penicillin residues in the fruit from the treated citrus were positive (more than 5 ppb) at one week after treatment, but negative (less than 5 ppb) after one month.

A grafting system using HLB-affected citrus scions was optimized and used to screen the chemical compounds. HLB-affected citrus (Lime) cuttings (three to four buds) were collected and soaked overnight in solutions of MDL, PS, Kasu, AG, DBNPA, Chaptin, Oxy and KO, respectively, and grafted into Las-free grapefruit. Scions without any treatment were used as controls. A randomized block design was conducted with three replicates and 45 scions per treatment. New growth from the scions was observed in 1 to 2 weeks. Leaf samples were collected for PCR assay 3 month post-grafting. The results suggested that the scion treatment system may be used for screening anti-Las bacteria compounds to control citrus HLB.

HLB-affected trees characteristically have a damaged root system and nutritional deficiencies because of interrupted transport of photosynthetic products from shoots to the roots and mineral nutrients from roots to the shoots. Greenhouse and field experiments were conducted to develop an integrated approach for keeping groves with HLB productive by means of disease-curing antibiotics combined with nutritional priming and root restoration. Key nutrients, plant growth regulators, and transporters were screened and several chemicals, called growth-priming substances, have been identified to be useful in keeping the HLB-affected citrus growing and promoting root restoration. Soil application once at two-week intervals with the growth-priming substances in combination with antibiotics was found to reduce the accumulation of starch in HLB-affected citrus leaves and enhance the emergence of new flushes from the severely diseased young trees. These growth-priming substance and antibiotic combinations are being evaluated in field trials.