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	3/9/10

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)* 2 *Year of Project* 2
Organization University of Florida	*Total Direct Funds (current year)* $75,730

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

A RAPID SCREENING PROGRESS FOR CHEMICAL CONTROL OF HUANGLONGBING
Annual Research Report-2009
In the second year, the project was mainly focused on: 1) Screening and evaluating anti-microbial molecules for suppression of liberibacter using the optimized screening systems in periwinkle; 2) The effective compounds were tested and evaluated in HLB-affected citrus in the greenhouse
1. Screening of chemical compounds that eliminate or suppress the Las bacteria in periwinkle using the optimized regeneration system.
Antibiotics (penicillin G and streptomycin, oxytetracyclin and Metronidazole), a biocide (DBNPA), a fungicide (zineb), two peptides (D4E1 and D2A21) and three SARs (SA, antiguard, and ortho-phenylphenol) were tested for their ability to eliminate or suppress Las bacteria and to promote the growth of severe HLB-affected cuttings using the optimized regeneration system.
More than 75% of plants could be regenerated from the severe HLB-affected periwinkle cuttings treated with a combination of penicillin and streptomycin (PS). All regenerated plants from the HLB-affected cuttings treated with PS tested negative for Las, even by nested PCR. The Las bacteria were undetected in these regenerated plants with average Ct value of 39.33. When treated with oxytetracyclin, metronidazole or peptides (D4E1 or D2A21), the regenerated plants also tested negative by nested PCR or qPCR with Ct values over 32. However, the regeneration percentage was lower than 30%. The regenerated control plants treated with water tested positive for Las by PCR and qPCR with low Ct values <26.0, indicating that the bacteria titers were at least 100-fold higher than those in the antibiotic or peptide-treated, regenerated periwinkle. DBNPA can also suppress the Las bacteria. The severe HLB-affected cuttings had a regeneration rate of 33.1 %. The Ct values of the regenerated plants ranged from 27 to 30.
The fungicide zineb and three SARs (SA, antiguard and ortho-phenylphenol) were not effective in controlling Las bacteria. Whether treated with zineb or not, the Las bacteria can keep reproducing. The Ct value was lower in the zineb-treated, regenerated plants than those treated with antibiotics or peptides, and similar to the water control. Zineb and ortho-phenylphenol are not very soluble. The water solubility is only 10 mg/L. When PS was foliar-sprayed at one-week intervals for three consecutive weeks on the Las-infected periwinkle plants at different rates (1x, 5x and 10x), no significant differences were found among treatment rates, but each treatment eliminated the Las-bacteria in the infected periwinkle as compared to the water control. DMSO or Silwet L-7 as emulsifiers has no different effect on Las-infected periwinkle plants.
2. Effect of screened chemical compounds on HLB-affected citrus in the greenhouse.
Nutrition and HLB development in citrus. The nutrients K, Zn, N, and Ca were tested for their ability to suppress HLB symptoms in citrus. Potassium and Zn, but not N or Ca could delay HLB symptoms. All-treated citrus remained infected by Las bacterium after 9 months. K and Zn reduced titers of Las bacteria at 5 months after treatment.
Effect of SAR-inducer on HLB development. Seven months after treatment with SAR-inducer (SA and antiguard), HLB-affected citrus tested positive for Las by PCR with an average Ct value of lower than 28, indicating SAR was not effective in suppressing or inhibiting the Las bacterium. This had also been the case with a perwinkle host.
Effect of antibiotics on HLB-affected citrus by root soaking or foliar-spray. HLB-affected citrus was soaked or foliar-spraye