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*	HLB Pathology	10/2/09

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

Understand the HLB disease development by studying the gene expression of different citrus varieties at different conditions

TITLE and CONTACT INFORMATION

Proposal Title Characterization the virulence mechanism of the citrus Huanglongbing pathogen Candidatus Liberibacter asiaticus

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Organization Citrus Research and Education Center, UF	*Total Direct Funds (current year)* 160000

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

The goal of the proposed research is to understand how Candidatus Liberibacter asiaticus causes Huanglongbing (HLB) disease on citrus. Citrus HLB is the most devastating disease on citrus. There are very few options for management of the disease due to the lack of understanding of the pathogen and citrus interaction. Understanding the citrus and citrus HLB pathogen interaction is needed in order to provide knowledge to develop sustainable and economically viable control measures. We proposed to expand our current research to different citrus varieties which are either susceptible or tolerant to HLB and a more facile model system tobacco (Nicotiana tabacum Xanthi). The specific objectives of this proposal are: transcriptional and microscopic analyses of citrus varieties which are either susceptible or tolerant to Ca. L. asiaticus infection at different infection stages in greenhouse and citrus grove; and transcriptional and microscopic analyses of host response to Ca. L. asiaticus infection with a model system tobacco. Microarray analysis and/or suppressive subtractive hybridization libraries approaches will be used to study the host response to the HLB pathogen infection followed by confirmation with Northern blot or quantitative reverse transcriptional PCR. Anatomical study will be performed with light microscopy using different staining methods.

The following objectives related to this project were pursued: (A) An initial microarray analysis of host response of sweet orange to Las infection in greenhouse and in field; and (B) A preliminary study of the effects of HLB on phloem at the microscopic level and phloem transport of sweet orange. The results of these experiments are detailed below.

Major achievements:

1. Microarray analysis of host response of sweet orange to Las infection in greenhouse. The results have been published in the following paper: Kim, J., Sagaram, U.S., Burns, J. K., and Wang N*. 2009 Response of sweet orange (Citrus sinensis) to Candidatus Liberibacter asiaticus infection: microscopy and microarray analyses. Phytopathology 2009 99:50-7.
2. To further expand our current understanding of Las-host interaction, we are currently comparing two susceptible and two resistant hybrid/cultivars in greenhouse. Currently, we have collected samples for more than 4 months for the two susceptible varieties including grapefruit and Madam Venus. The two resistant/tolerant varieties have not been inoculated successfully.
3. Leaf samples from different varieties including grapefruit, Murcott, and Hamlin were collected from Florida citrus groves. Both healthy and infected trees were sampled. It is expected gene expression of those trees in the citrus grove will reveal more information when compare with the gene expression profile in greenhouse. Those samples will be used for gene expression analysis using microarray or SSH approaches.
4. Gene expression of Valencia in citrus grove have been done. The data is under analysis.