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	1/14/11

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

Creation of citrus canker resistance by the NPR1 genes

TITLE and CONTACT INFORMATION

Proposal Title Engineering Resistance Against Citrus Canker and Greening Using Candidate Genes

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Organization UF-Department of Plant Pathology	*Total Direct Funds (current year)* 114,483

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

The goal of this project is to transform the citrus and Arabidopsis NPR1 genes (CtNPR1 and AtNPR1), and the rice XIN31 gene into citrus, and to evaluate their resistance to both citrus canker (caused by Xanthomonas axonopodis pv. citri (Xac)) and greening diseases. The first year objectives include: (1) Molecular characterization of the transgenic plants; (2) Inoculation of the transgenic plants with Xac; (3) Inoculation of the transgenic plants with the HLB pathogen, and monitoring of the bacterium in planta with quantitative PCR; (4) Transformation of SUC2::NPR1 into citrus; (5) Plant maintenance.

We have identified three transgenic lines overexpressing CtNPR1. These NPR1 overexpression lines were inoculated with 105 cfu/ml of Xac306 and the results showed high levels of resistance from the NPR1 overexpression lines, but not from the control plants. We also conducted growth curve analyses. Nineteen days after inoculation, the bacterial population in one of the NPR1 overexpression lines is 10,000 fold lower than that in the control plants. These results demonstrate that overexpression of CtNPR1 confers resistance to canker disease.

We also graft-inoculated the NPR1 overexpression lines with greening to determine whether NPR1 is functional in greening resistance. We are in the process of monitoring Candidatus Liberibacter asiaticus populations in the inoculated plants using quantitative PCR.

Finally, transformation of the SUC2::CtNPR1 construct, in which CtNPR1 is driven by a phloem-specific promoter from the Arabidopsis SUC2 gene, is in progress.