CITRUS ADVANCED TECHNOLOGY PROGRAM

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

▶ INSTRUCTIONS

(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*

Required: What is the "headline" for this report (e.g. a one-sentence "newspaper headline" describing what you accomplished)

CtNH1 confers resistance to citrus canker

Proposal Title

Engineering Resistance Against Citrus Canker and Greening Using Candidate Genes

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
7/15/11	Citrus Research and Development Foundation	Transgenic/Metagenomic Mediation of Resistance

REPORT UPDATE (500 words; summarize your accomplishments)

The objectives of this project include: (1) Characterization of the transgenic citrus plants for resistance to canker and greening; (2) Examination of changes in host gene expression in the NPR1 overexpression lines in response to canker or greening inoculations; (3) Examination of changes of hormones in the NPR1 overexpression lines in response to canker or greening inoculations; (4) Overexpression of AtNPR1 and CtNPR1 in citrus by using a phloem-specific promoter. We have transformed the cloned CtNPR1 (also named CtNH1) into the susceptible citrus cultivar 'Duncan' grapefruit. After survey on transgene expression, we now focus on the three lines, CtNH1-1, CtNH1-3, and CtNH1-5, which showed normal growth phenotypes, but high levels of CtNH1 transcripts. The three lines were inoculated with Xac306. They all developed significantly less severe canker symptoms as compared with the 'Duncan' grapefruit plants. To confirm resistance, we carried out growth curve analysis. Consistent with the lesion development data, as early as 7 days after inoculation (DAI), there is a differential Xac population in the infiltrated leaves between CtNH1-1 and 'Duncan' grapefruit. At 19 DAI, the level of Xac in CtNH1-1 plants is 104 fold lower than that in 'Duncan' grapefruit. These results indicate that overexpression of CtNH1 results in a high level of resistance to citrus canker. We are planning to propagate the CtNH1 line by grafting. We are in the process of inoculating the CtNH1 lines with Candidatus Liberibacter asiaticus (Las).
We have completed the SUC2::CtNH1 construct, in which CtNH1 is driven by a phloem-specific promoter from the Arabidopsis SUC2 gene. The construct were transformed into 'Duncan' grapefruit. To date, five transgenic lines have been obtained.

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Organization University of Florida

Project Number 202

Project Duration (years) 3 *Year of Project* 3

Total Funds (current year) $100,700.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.