CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD December 2015

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Metabolomic profiling to accelerate development of HLB tolerant rootstocks

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
1/15/16	Citrus Research and Development Foundation	Conventional Citrus Breeding

REPORT UPDATE (500 words-It is not necessary in this public report to disclose your institution's proprietary information or intellectual property.)

Excellent progress was made on work to identify metabolite profiles associated with tolerance to HLB and other stresses in advanced rootstock selections, and validate the effectiveness of these metabolite profiles for selection by comparison of existing rootstock selections within the USDA program. As requested by CRDF, the project will place highest priority on work with new hybrid rootstocks already created, selected, and included in field trials. As requested by CRDF, other parts of the original proposal that involved integration with the breeding program, recurring selection, and discovery of HLB-associated biomarkers and antimicrobial compounds will not be conducted.

In this quarter, data from a preliminary metabolomic study was summarized and written into a manuscript, and will be submitted for publication in the next quarter. This study demonstrates striking metabolic differences between HLB-sensitive and HLB-tolerant genotypes, both with and without Las infection, and will serve as a foundation for continuing work under this grant.

Specific studies were initiated to further identify key metabolic compounds and collect the first stage of information to be used in the validation process. For the first year of the project, three greenhouse studies with potted trees, and five field studies (with established trees of different ages) will be conducted, to collect information about metabolite expression in leaf and root tissue, as well as seasonal effects on metabolite profiles. The work will focus on 12 rootstocks where previous studies have identified relative differences in tolerance to Las infection. Field plantings, established under a grant previously funded by CRDF, are available with these 12 rootstocks suitable for the testing needed.

In this quarter, trees in the selected field trials were scored for HLB symptoms and tested by PCR for Las infection. Leaf and root samples were collected from selected trees in five field trials and one greenhouse trial, and underwent preliminary processing for metabolomic analysis. A contract was prepared for the metabolomic analysis of this first group of samples, and those first samples will be analyzed in the next quarter. In preparation for additional greenhouse studies, budded trees were propagated in the greenhouse for study in the coming year.

Environment may have strong effects on metabolomic data, so field testing, greenhouse testing, and information on seasonal variation will be critical for success in validating the approach. To clarify environmental effects, greenhouse studies will be used, and a greenhouse suitable for the work is being constructed. In this quarter, construction of the new greenhouse began, and is expected to be completed in March 2016.

The project is evolving to include a new researcher at University of Florida in Immokalee, Dr. Ute Albrecht, who has experience and special expertise in this research field. It is anticipated this will result in no additional cost, but will significantly increase productivity and effectiveness of the project.

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Organization USDA, ARS, USHRL

Project Number 15-003

Project Duration (years) 3 *Year of Project* 1

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