CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD March 2013

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Development of Promising Supersour and Other Rootstocks Resistant to HLB

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
4/15/13	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.)

Fruit quality, yield, tree health, and tree size data were collected from eight late-season rootstock field trials. All trials appear significantly affected by HLB. Some selections, including US-942, appear to perform better than other standard rootstocks in locations being affected by HLB. Rootstocks that appear to have more tolerance to HLB were identified, and selected rootstocks propagated for increase and inclusion into more and larger scale field trials. Fruit quality data was collected at multiple harvest dates for a large grapefruit rootstock trial in Indian River County. Significant differences were observed among the rootstocks for many fruit quality traits. For example, sour orange induced an intermediate level of total soluble solids early season and relatively high solids late season. US-897 induced the highest soluble solids early season, and US-812 induced the highest soluble solids late season, while X-639 and US-852 rootstocks induced the lowest soluble solids throughout the season.

A field trial with new supersour rootstocks was planted at a site in Indian River County and will be used to evaluate trees for tolerance of Diaprepes, Phytophthora, and HLB. Rootstock liners were budded in preparation for planting in three new rootstock field trials later this year. Several thousand propagations of supersour rootstocks at USHRL were prepared for budding and use in field trials. Cooperative work continued with a commercial nursery to multiply promising supersour rootstocks to prepare trees for medium-scale commercial plantings. Work continues to assess supersour tolerance of CTV, salinity, and calcareous soils. The most promising new USDA rootstocks were identified for a cooperative effort with CRDF to place new rootstocks with HLB tolerance into larger scale commercial plantings.

Detailed evaluation of specific defense-related citrus genes continued, including genes identified by expression studies as being associated with HLB response, such as CtCDR1 and CtPDF2. Constructs designed to alter expression of these citrus defense genes are being used to transform citrus for improvement of HLB tolerance and resistance, and derived transgenics will be tested using the pathogen. In a collaborative study with a University of California team and funded by CRB, we are comparing gene expression for trees infected with HLB to those infected with CTV. There are some common elements to the two different diseases that present good opportunities to understand citrus defense response. A study to understand the interaction of rootstock tolerance with scion tolerance/susceptibility is being completed and will be published later this year. Work continues to examine the effect of grafting height on tree response when the rootstock is an HLB-tolerant type.

More than 200 new transgenic rootstock selections with potential resistance to HLB were produced this quarter, targeting increased expression of the citrus resistance genes CtNPR1, CtEDS1, CtMOD1, CtEDS5, CtPAD4, CtNDR1, and CtACD1. Eighteen new transgenic rootstocks with selected antimicrobial genes were propagated and entered into a replicated greenhouse test with ACP inoculation to assess tolerance to HLB. Evaluation and indexing of three previous groups of transgenic rootstocks under test with HLB continued, with selected transgenics showing some promise. A paper was published describing the overexpression of a citrus NDR1 ortholog and increased disease resistance. Presentations were made at Florida Citrus Show, Ft. Pierce and Florida Citrus Growers Institute, Avon Park, with exciting new information regarding rootstock effect on tree performance with HLB.

PI First Name Kim

PI Last Name Bowman

Email kim.bowman@ars.usda.gov

Phone 772-462-5920

Organization USDA, ARS, USHRL

Project Number 508

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

Total Funds (current year) $416,203.00

Form PR-12 Quarterly Reports **SUBMIT REPORT**

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.