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

HLB Resistance and Tolerance in Citrus Scion Breeding

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
1/14/16	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.)

Evaluation of existing cultivar/rootstock combinations for HLB resistance/tolerance has revealed potentially valuable tolerance and indicates that early HLB symptoms and earlier CLas titer are unrelated to growth and cropping. In August 2010, the plants were established at Pico's farm in Ft. Pierce FL. Despite the high incidence of mottle in 'SugarBelle'/SourOrange, it had the greatest overall increase in diameter. 'SugarBelle' and 'Tango' (which were not on the same stock as 'Hamlin' and so results should be viewed as comparing cultivar/rootstock combinations) were the healthiest in overall appearance in 10/15 and had the most fruit (88 per tree). All cultivars except sweet oranges and grapefruit are progressing in production, but production was compromised in all varieties by the severe HLB pressure at this site, and commercial value of the observed tolerance remains uncertain.

A mapping population of Fortune x Fairchild has been planted (collaborating Roose and Gmitter) along with related material, in an effort to identify genes associated with tolerance in the mandarin phenotypic group.

The citrus relatives planting (85 seed source genotypes from the gene bank) has been assessed for growth and apparent HLB tolerance. Most trees containing citron in their pedigree have markedly greater canopy densities and greater tree size than other accessions in the Genus citrus. One alleged standard sour orange looks much healthier and is much larger than other sour oranges.

In October 2013, 34 unique genotypes (USDA hybrids) some of which appear to have tolerance to HLB, and 16 standard commercial varieties were exposed to an ACP no-choice feeding trial and have been transferred to the field at Ft. Pierce FL. Standard growth measurements and disease ratings were initiated in July 2014 and will continue on a quarterly basis. HLB is now widespread and trees of more vigorous scion types are generally the healthiest at this point in time.

Progress continues on the antibiotic treatment of HLB infected bud-wood to compare growth at different levels of CLas infection. HLB-infected budwood was treated with various concentrations of antibiotics and grafted on sour orange rootstock using 3 fairly HLB-resistant ('Temple', GnarlyGlo', and 'Nova') 3 tolerant ('Jackson', FF-5-51-2, and Ftp 6-17-48), and 3 susceptible ('Flame', 'Valencia', and 'Murcott') genotypes. Standard growth measurements and disease severity are evaluated and leaves sampled for qPCR analysis on a quarterly basis.

Development of periclinal chimeras with resistant vascular tissue from Poncirus and remaining layers from sweet orange is underway. One hundred and fifty etiolated seedlings of the trifoliate 'Rubidoux' and the sweet orange 'Hamlin' have been approach grafted together. Generation of new chimeras has been difficult. An existing periclinal chimera (Satsuma and Poncirus) has been imported,has been with DPI two years, but has not yet been released to us for testing.

A method for the rapid identification of potential sources of HLB resistance is being developed. This project involves the screening of citrus seedlings at the 3 to 5 leaf stage, or very small micrografted trees, that are exposed to HLB infect ACP feeding. CLas titer levels, using real time PCR, are easily detectable in most plants at 3 weeks Seedlings of Hamlin and Dancy show marked CLas proliferation and systemic movement from 3-6 weeks after exposure to ACP.

Trees of seemingly HLB resistant/tolerant sweet orange-like hybrids and mandarin -types were propagated on x639. Replicated trials with standards have been established, in cooperation with G. McCollum. Six locations each of all sweet orange-like together and 4 with all mandarins were established in replicated block plantings with 6-8 trees of each cultivar at each site (in Ridge, IR and Gulf coast).

Seedlings with a range of pedigree contributions from Microcitrus and Eremocitrus have been received in a collaboration with M. Smith, Queensland Aus. citrus breeder, and are germinating for field testing of HLB resistance.

PI First Name Ed

PI Last Name Stover

Email ed.stover@ars.usda.gov

Phone 772-462-5951

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.