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

A secure site for testing transgenic and conventional citrus for HLB and psyllid resistance

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
1/14/16	Citrus Research and Development Foundation	Transgenic/Metagenomic Mediation of Resistance

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

A test site at the USDA/ARS USHRL Picos Farm in Ft. Pierce supports HLB/ACP/Citrus Canker resistance screening for the citrus research community. There are numerous experiments in place at this site where HLB, ACP, and citrus canker are widespread. The first trees have been in place for six years.

A number of successes have already been documented at the Picos Test Site funded through the CRDF. The UF Grosser transgenic effort has identified promising material, eliminated failures, continues to replant with new advanced material, with ~200 new trees in April 2015 (Grosser, personal comm.). The ARS Stover transgenic program has trees from many constructs at the test site and is seeing some modest differences so far, but new material has been planted that has shown great promise in the greenhouse and the permit has been updated to plant many new transgenics. A trial of more than 85 seedling populations from accessions of Citrus and citrus relatives (provided as seeds from the US National Clonal Germplasm Repository in Riverside, CA) has been underway for 6 years in the Picos Test Site. P. trifoliata, Microcitrus, and Eremocitrus are among the few genotypes in the citrus gene pool that continue to show substantial resistance to HLB (Lee et al., in preparation, with the last samples collected this week), and P. trifoliata also displayed reduced colonization by ACP (Westbrook et al., 2011). Marked tolerance to HLB is apparent in many accessions with citron in their pedigree. All replicates of one alleged "standard sour orange" looks remarkably healthy and may permit comparison of more susceptible and tolerant near-isogenic variants.

A new UF-Gmitter led association mapping study has just been initiated using the same planting, to identify genes associated with HLB- and ACP-resistance. A broader cross-section of Poncirus-derived genotypes are on the site in a project led by UC Riverside/USDA-ARS Riverside, in which half of the trees of each seed source were graft-inoculated prior to planting.

A collaboration between UF, UCRiverside and ARS is well-underway with more than 1000 Poncirus-hybrid trees (including 100 citranges replicated) being evaluated to map genes for HLB/ACP resistance. Marked differences in initial HLB symptoms and Las titer were presented at the 2015 International HLB conference (Gmitter et al., unpublished). In July 2015 David Hall led assessment of ACP colonization across the entire planting, and the Gmitter lab will map markers associated with reduced colonization. Several USDA citrus hybrids/genotypes with Poncirus in the pedigree have fruit that approach commercial quality, were planted within the citrange site. Several of these USDA hybrids have grown well, with dense canopies and good fruit set but copious mottle, while sweet oranges are stunted with very low vigor (Stover et al., unpublished). A Fairchild x Fortune mapping population was just planted at the Picos Test Site in an effort led by Mike Roose to identify genes associated with tolerance. This replicated planting includes a number of related hybrids (among them our easy peeling remarkably HLB-tolerant 5-51-2) and released related cultivars.

Valencia on UF Grosser tetrazyg rootstocks have been at the Picos Test Site for several years, having been Las-inoculated before planting, and several continue to show excellent growth compared to standard controls (Grosser, personal comm.).

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.