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

Application of a natural inducer of systemic acquired resistance and engineering non-host resistance in citrus for controlling citrus diseases

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
1/29/16	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.)

The project has two objectives:
(1) Increase citrus disease resistance by activating the natural SAR inducer-mediated defense-signaling pathway.
(2) Engineer non-host resistance in citrus to control citrus canker and HLB.

For objective 1, we performed concentration gradient experiments to determine the lowest concentration of the natural SAR inducer, which is sufficient for canker resistance. We used 0, 0.25, 0.5, 0.75, and 1 mM of the SAR inducer, as we have found that 1 mM of the SAR inducer was able to induce strong canker resistance. We used both infiltration and soil drench to treat citrus plants with the SAR inducer. For infiltration, treated leaves were inoculated 24 hours later and for soil drench, leaves on the treated plants were inoculated 7 days later. As in the previous experiments, 5 plants were used for each treatment; three leaves on each plant were inoculated; 6 inoculations on each leaf were carried out, and a total of 90 inoculations were used for each treatment. Results showed that, for both infiltration and soil drench, the strength of canker resistance is concentration dependent in the range between 0 to 1 mM. Therefore, 1 mM is likely the concentration that should be used for inducing canker resistance. We will confirm this result in the coming season. Moreover, we found that treatment of citrus plants with the SAR inducer produced systemic residual resistance to canker. We cut back previously treated plants and tested canker resistance on leaves on the new flushes. Canker disease symptom development was significantly attenuated on the leaves on previously treated plants. We will confirm this interesting observation in the coming season. Meanwhile, we are designing experiment to determine whether the systemic residual resistance is conferred by the SAR inducer residue or products induced by the inducer.

For objective 2, among 49 independent transgenic lines expressing the Arabidopsis nonhost resistance genes, 20 lines showed increased resistance to citrus canker. We have propagated 10 lines that exhibited good canker resistance in the first test. The progeny plants are growing in the greenhouse and will be tested when they are ready.

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Project Number 754

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

Total Funds (current year) $122,834.00

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.