CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD March 2014

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Manipulating defense signaling networks to stimulate broad-spectrum resistance to HLB and other diseases in citrus

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
4/22/14	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.)

We aim in this project to genetically manipulate defense signaling networks to produce citrus cultivars with enhanced disease resistance. Defense signaling networks have been well elucidated in the model plant Arabidopsis but not yet in citrus. Salicylic acid (SA), jasmonic acid (JA) and ethylene (ET) are key hubs on the defense networks and are known to regulate broad-spectrum disease resistance. With a previous CRDF support, the PI's laboratory has identified ten citrus genes with potential roles as positive SA regulators. Characterization of these genes indicate that Arabidopsis can be used not only as an excellent reference to guide the discovery of citrus defense genes and but also as a powerful tool to test function of citrus genes. This new project will significantly expand the scope of defense genes to be studied by examining the roles of negative SA regulators and genes affecting JA and ET-mediated pathways in regulating citrus defense. We have three specific objectives in this proposal: 1) identify SA negative regulators and genes affecting JA- and ET-mediated defense in citrus; 2) test function of citrus genes for their disease resistance by overexpression in Arabidopsis; and 3) produce and evaluate transgenic citrus with altered expression of defense genes for resistance to HLB and other diseases.

We have so far cloned six full-length cDNAs of citrus genes that potentially regulate SA, ET, and/or JA defense signaling. Agrobacterial strains containing these constructs were placed on the pipeline of citrus transformation in the co-PI Dr. Bowman's laboratory. We also transformed Arabidopsis to overexpress these genes and to eventually test their defense function in Arabidopsis. We harvested T0 transformed seeds for some constructs and our initial screening of these constructs has yielded several transgenic plants for each construct. Arabidopsis transformation and screening have been continued during this past quarter.

In addition, we are in process of cloning additional citrus genes. Six new full-length cDNAs of different citrus genes were cloned into the entry vector and will be further moved to the binary vector pBINplusARS for both Arabidopsis and citrus transformation and eventually for defense tests with the corresponding transgenic plants.

In addition, we continue to characterize transgenic citrus plants expressing the SA positive regulators, as proposed in the previous project (#129), although the support of the project has already been terminated.

PI First Name Hua

PI Last Name Lu

Email hualu@umbc.edu

Phone 410-455-5972

Organization University of Maryland Baltimore County

Project Number 566

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

Total Funds (current year) $100,000.00

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.