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

Identifying and Characterizing Citrus Targets from Candidatus Liberibacter asiaticus

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
4/7/14	Citrus Research and Development Foundation	Infection Responses

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

The bacterium Candidatus Liberibacter asiaticus (CLas) is closely associated with the development of HLB and is transmitted into the citrus phloem via the psyllid insect. Using the fully sequenced CLas genome, we have identified 27 proteins that are predicted to be secreted outside the bacterial cell. These bacterial proteins are called effectors. In other bacteria, effectors are required for pathogen virulence enabling nutrient acquisition, insect feeding, and suppression of defense responses. The goal of the funded research will be to investigate the expression patterns and citrus targets of four different CLas effectors that are expressed in HLB-infected citrus trees. We hypothesize that these effectors are important for bacterial survival or HLB symptom development by targeting important citrus proteins to manipulate their host. A detailed understanding of these effectors and their citrus targets will facilitate HLB detection strategies as well as provide pathogen targets that can be manipulated to enhance plant tolerance and resistance.

We have made significant progress in developing tools to assess CLas effector expression. When a gene is expressed, it is first transcribed into RNA and then translated into protein. In order to assess effector expression at the protein level, the Ma lab has previously generated antibodies that can recognize each of the four CLas effectors. During the funding period, we have purified each effector and used this to affinity purify each antibody. This has resulted in significantly enhanced detection of effector proteins with no interfering background detected in navel, mandarin, or Lisbon lemon. These purified antibodies can now be used for effector detection as well as effector targets in the funded work.

In the Contained Research Facility at UC Davis, we have started a time-course experiment to investigate the expression of each effector in navel and mandarin orange over time after graft inoculation with CLas. We have validated that the infected material is PCR positive for CLas, contains the four effectors, and expresses the effectors at the RNA level. Leaf tissue from plants at time zero (before inoculation) and one month after inoculation has been collected and is currently being processed to extract DNA, RNA, and proteins. We anticipate that samples will be taken for at least six months, or until the plants exhibit severe disease symptoms. In collaboration with Siddarame Gowda at the University of Florida, citrus expressing each effector is being generated using the CTV-based expression system to determine if effector expression results in any obvious morphological changes, enhances susceptibility to CLas, or promotes psyllid feeding.

PI First Name Gitta

PI Last Name Coaker

Email glcoaker@ucdavis.edu

Phone 530-752-6541

Organization The University of California, Davis

Project Number 5300-160(A)

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

Total Funds (current year) $90,756.00

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.