

# CITRUS ADVANCED TECHNOLOGY PROGRAM

## QUARTERLY & FINAL PROGRESS REPORT FORM: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

▶ **SELECT PERIOD** February ▼ 2020 ▼

**Quarterly Report**  **Final**

Proposal Title

Evaluation of the spatiotemporal dynamics of bactericides within the citrus tree via different application methods

Today's Date Sponsoring Organization (drop-down)

03/11/2020

Citrus Research and Development Foundation

Category (drop down)

Other

### **ABSTRACT** (750-word Executive Summary-public report-do not disclose proprietary information or intellectual property)

The purpose of this project is to reveal the mechanisms of bactericide uptake and transport in citrus plant and establish a theoretical basis for developing technologies to improve the efficacy of bactericides, which are hopeful to provide potential solution to the development of effective chemotherapeutic tools for HLB management. Achieving this outcome will require progress in the following three tasks: (1) to compare the delivery efficacy of bactericides with three application methods (foliar spraying, trunk injection, and root administration) based on the uptake and dynamic movement/distribution of the bactericide within the tree; (2) to clarify the systemic movement and transportation mechanisms of bactericides within the phloem of tree; and (3) to investigate the effects of citrus variety and age on the delivery efficacy of bactericides. This project requires a combination of greenhouse studies and field trials. Prior to conducting these experiments, a sensitive and accurate method for quantifying bactericides (oxytetracycline and streptomycin) in citrus tissues is needed. This project officially started on December 1, 2018. This is the 5th quarterly progress report covering 12/01/2019 to 02/29/2020. During this period, we have started and/or completed the following work/research tasks:

- 1) The greenhouse experiments with citrus trees were completed. All the samples were collected and prepared for analysis. The data from the foliar spraying experiments in greenhouse are currently under processing and analyzing.
- 2) The samples of leaves, stems and roots from the trunk injection and root administration experiments in greenhouse are prepared for extraction with the modified method prior to analysis of bactericides using a LC-MS. The LC-MS data are expected to be available in the early April 2020.
- 3) The selection of desired sites and citrus trees for field trials with foliar application of bactericides were initiated, the treatments included two bactericides (streptomycin and oxytetracycline) and different ages and varieties of trees on different citrus farms.

The work planned for the next quarter:

The major goals of research for the next three months are to analyze the data and evaluate the delivery efficacy of three different application methods for bactericides in greenhouse experiments. Based on the above results, field experiments will be started and the following research tasks will be performed during the next quarter (March 1, 2020 to May 31, 2020): 1) collection and analysis of the obtained data from greenhouse experiments; 2) selection of the locations for field experiments; 3) conducting foliar spraying experiments in the field sites; 4) preparation of trunk injection treatments for the field experiments; and 5) preparation of the next quarterly progress report.

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**Sponsor Project Number** 18-040c

**Project Duration (years)** 2 **Year of Project** 2018

**% Completion of Objectives** 60.00%