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 Bacterial Virus Based Method for Biocontrol of Citrus Canker

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
1/14/16	Citrus Research and Development Foundation	Unclassified

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

The overall objective of our research project is to develop an effective and sustainable phage/phage component-based biocontrol system for Xanthomonas axonopodis pv. citri (Xac), the causal agent of citrus canker. We have previously reported on first and second round evaluations of phage cocktails and first round testing of tailocin cocktails in cooperation with Dr. Nian Wang (University of Florida-Lake Alfred).

In two independent experiments, when the tailocin cocktail containing tailocins XT-1 and XT-4 was applied to foliage at a multiplicity of killing units (MOKU) of 16 at 6 h post- or pre-inoculation with 5 X 10^7 CFU/ml of Xac, there was a an average reduction of 49% and 53%, respectively, in lesion formation as compared to the plants inoculated only with Xac. It was of interest to determine a dose response curve to the tailocin treatment. Using the same condition as previously described (Jan. 2015 report), Hamlin sweet orange trees were inoculated with 1×10^8 CFU/ml of Xac. After 6 h, the tailocin was applied at a MOKU of 15, 10 or 5. Lesion numbers were assessed 21 days after inoculation with the pathogen for treated and untreated trees. In two independent experiments an average of 39%, 31% and 11% reduction in lesions were observed in leaves of trees treated with tailocin cocktails at a MOKU of 15, 10 and 5, respectively, as compared to non-treated trees.

Using a delta-PilA mutant of Xac, we have isolated and purified two non-type IV pilus dependent phages that appear to be virulent. Base on their plaque morphology the phages appear to exhibit depolymerase activity. Ongoing studies will determine the morphology and lifestyle of the two phages. Bioinformatic analysis of Xac phages genomes and tailocin gene clusters is ongoing.

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Project Number C-726rev-Canker

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

Total Funds (current year) $162,110.00

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.