CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD September 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)
10/14/15	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 program research objectives are to develop an effective and sustainable bacteriophage (phage)-based biocontrol system for Xanthomonas axonopodis pv. citri (Xac), the causal agent of citrus canker. Our approach has been to develop a bank of virulent (lytic) phages and/or antibacterial particles called "tailocins", which are derived from phages. We have identified seven tailocins with activity against Xac and developed a large bank of virulent phages representative of the Caudovirales (tailed phages).

Tailocins XT-1 and XT-4 exhibit broad host activity, killing 13/13 Xac isolates in vitro and have shown efficacy in greenhouse studies. A tailocin cocktail composed of XT-1 and XT-4 reduced lesion formation by an average 51% , as compared to non-tailocin challenge plants inoculated only with Xac. We have previously reported on the identification of the cassette encoding for tailocin XT-1.We now report that the tailocin cassette is 16,880 bps and encodes for 22 ORFs. We have identified genes encoding for the tail tube, tail sheath, tail fiber, baseplate assembly and tail tape measure proteins. Further analysis of the XT-1 cassette will identify all genes and allow for an initial bioinformatic comparison of tailocins XT-1, XT-4 and XT-7. The newly identified XT-7 tailocin shows activity against 10/13 Xac isolates tested including the Xac 306 strain.

The type IV pilus dependency of Xac phages CCP504 (podophage), CCP513 (siphophage) and CCP519 (myophage) was confirmed using a pilA gene deletion Xac mutant. The deletion mutant exhibited no twitching motility and was resistant to all three phages, whereas the in trans complement exhibited twitching motility and was sensitive to the three phages.

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Organization Texas A&M AgriLife Research

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Total Funds (current year) $162,110.00

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.