CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD September 2014

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Disrupt the bacterial growth in the insect vector to block the transmission of Candidatus Liberibacter Asiaticus to citrus, the causal agent of citrus greening disease

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
11/14/14	Citrus Research and Development Foundation	Infection Consequences

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

"This project aims is to express molecules in plant that Disrupt the growth and ACP- transmission of CLas "

project narrative:
Genome of Candidatus Liberibacter asiaticus (CLas) reveals the presence of luxR that encodes LuxR protein, one of the two components cell-to-cell communication systems. But the genome lacks the second components; luxI that produce Acyl-Homoserine Lactone (AHL) suggesting that CLas has a solo LuxR system.
We confirmed the functionality of LuxR by expressing in E. coli and the acquisition of different AHLs
We detect AHLs in the insect vector (psyllid) healthy or infected with CLas but not in citrus plant meaning that Insect is the source of AHL.

We investigated the effect of expressing Lux-R in citrus plants on the level of many compounds, especially those presents in citrus. These compounds includes, but restricted to Indole-3-acetic acid (IAA), indole, g-amino butyric acid (GABA), salicylic acid (SA), Riboflavin and Lumichrome. These compounds can activate the Lux-R of many plant pathogens [1, 2, 3, and 4]. The level of these compounds were measured in healthy and CLas-infected CLas expressing Lux-R as well as healthy and CLas-infected plants without Lux-R. We expect that the levels of some of those compounds will be reduced as possible binding to the Lux-R protein and/or bacterial cells.
"WE FOUND THAT IAA, GABA, and SA INCREASED IN THE PRESENSE OF Lux-R PROTEIN IN PHLOEM SAP"
"Similarly, these compounds increased in the infected citrus plants indicating that CLas used them as signals binding to Lux-R"
Identification of citrus compounds that mimic CLas N-Acyl homoserine lactone signal activities and affect CLas population density will highlight new strategies for the prevention of citrus greening disease.

References
1) Spaepen S, Vanderleyden J, Remans R. 2007. Indole-3-acetic acid in microbial and microorganism-plant Signaling. FEMS Microbiol Rev 31: 425–448.
2) Lee JH, Lee J. Indole as an intercellular signal in microbial communities. FEMS Microbiol Rev: 34 (2010) 426–444.
3) Yuan ZC, Haudecoeur E, Faure D, Kerr KF, Nester EW. 2008. Comparative transcriptome analysis of Agrobacterium tumefaciens in response to plant signal salicylic acid, indole-3-acetic acid and g-amino butyric acid reveals signalling cross-talk and Agrobacterium–plant co-evolution. Cellular Microbiology 10(11): 2339–2354.
4) Rajamani S, Bauer WD, Robinson JB, Farrow JM, Pesci EC, Teplitski M, Gao M, Sayre RT, Phillips DA. 2008. The vitamin riboflavin and its derivative lumichrome activate the LasR bacterial quorum-sensing receptor. Molecular Plant-Microbe Interactions: 21 (9): 1184–1192.

PI First Name Nabil
PI Last Name Killiny
Email nabilkilliny@ufl.edu
Phone 863-956-8833
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Form PR-12 Quarterly Reports **SUBMIT REPORT**

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.