CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD September 2016

Quarterly Report ● Final

Proposal Title

Why is Poncirus trifoliata resistant to colonization by Asian citrus psyllid?

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
7/19/16	Citrus Research and Development Foundation	Vector Management

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

Major accomplishments

1. We identified an optimal 2-component blend (1.9:1 formic:acetic acid) and an optimal 3-component blend (3.5:1.6:1 blend of formic acid:acetic acid:p-cymene) for maximal probing by ACP of a wax substrate. This could be used as a phagostimulant for "attract-and-kill" strategies for trapping psyllids.

2. We found that CLas-infected ACP probed significantly more often compared with healthy ACP on our phagostimulant blend.

3. This is the first report of a behaviorally active semiochemical blend that could be used for psyllid trapping strategies.

4. We determined that the presence of a thick, well-developed fibrous ring around phloem tissues of mature leaves acts as a barrier to frequent or prolonged phloem ingestion by D. citri from citrus leaves. This may have an important role in limiting or preventing CLas acquisition and/or transmission by D. citri, and could be used for identification and development of resistant citrus cultivars.

5. Our findings were reported in four peer-reviewed articles in prestigious journals including Chemical Senses, the Journal of Chemical Ecology and PLOS Computational Biology.

Publications related to this project:

Hall, DG, George J, Lapointe SL 2015. Further investigations on colonization of Poncirus trifoliata by the Asian citrus psyllid. Crop Protection 72:112-118.

George J, Robbins PS, Alessandro RT, Stelinski LL, Lapointe SL 2016. Formic and acetic acids in degradation products of plant volatiles elicit olfactory and behavioral responses from an insect vector. Chemical Senses 41(4). doi: 10.1093/chemse/bjw005

Lapointe, S.L., J. George, and D.G. Hall. 2016. A phagostimulant blend for the Asian citrus psyllid. J. Chem. Ecol. 42(9): 941-951. DOI 10.1007/s10886-016-0745-4.

Willett DS, George J, Willett NS, Stelinski LL, Lapointe SL 2016. Machine learning for characterization of insect vector feeding. PLOS Comp Biology 12(11): e1005158. Doi:10.1371/journal.pcbi.1005158

Manuscript submitted:

George, G., E. Ammar, D. G. Hall, S. L. Lapointe. 2017. Sclerenchymatous ring as barrier to phloem feeding by Asian citrus psyllid: evidence from electrical penetration graph and visualization of stylet pathways. PLOS ONE (submitted 10/26/2016)

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Organization USDA, ARS

Project Number 853

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

Total Funds (current year) 93,478.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.