CITRUS ADVANCED TECHNOLOGY PROGRAM

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

▶ INSTRUCTIONS

(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*

Required: What is the "headline" for this report (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Search for "off-the-shelf" chemicals similar to guava repellents

Proposal Title

Development of Effective Guava-based Repellent to Control Asian Citrus Psyllid and Mitigate Huanglongbing Disease Incidence

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
10/11/10	Citrus Research and Development Foundation	Trapping and Repellant Plants

REPORT UPDATE (500 words; summarize your accomplishments)

Recently we identified several sulfur chemicals from guava that repel Asian citrus psyllid (ACP) in the laboratory, but are difficult to formulate into controlled release devices for field use because of their high volatility. As we continue to work on formulating these sulfur compounds into devices that will have practical application, we have also investigated several potential "of-the-shelf" essential oils for their repellency against ACP. These were chosen based on their known repellency to many insects and based on their perceived similarity to guava in chemistry.

ACP generally rely on olfaction and vision for detection of host cues. Certain plant volatiles and plant-derived essential oil products are known to repel several insect species and are considered minimum-risk pesticides. We examined the effect of five essential oils previously reported to have activity against various insect species on ACP behavior in a two-port divided T-olfactometer in the laboratory in an effort to identify an effective natural repellent and/or insecticide for ACP. Volatiles from essential oils of coriander, lavender, rose, thyme, tea tree oil and 2-undecanone, a major constituent of rue oil repelled ACP adults compared with clean air. Also, coriander, lavender, rose and thyme oil inhibited the response of ACP when co-presented with citrus leaves. Volatiles from eugenol, eucalyptol, carvacrol, β-caryophyllene, α-pinene, α-gurjunene and linalool did not repel ACP adults compared with clean air. Chemical analysis of the headspace components of coriander and lavender oil by gas chromatography-mass spectrometry revealed that α-pinene and linalool were the primary volatiles present in coriander oil while linalool and linalyl acetate were the primary volatiles present in lavender oil. Coriander, lavender and garlic chive oils were also highly toxic to ACP when evaluated as contact action insecticides using a topical application technique. The LC50 values for these 3 oils ranged between 0.16 to 0.25 µg/ACP adult while LC50 values for rose and thyme oil ranged between 2.45 to 17.26 µg/insect. Our current efforts are focusing on quantifying the airborne concentrations of these essential oils found to have behavioral activity against ACP that are required to induce the effect. Our current results suggest that garlic chive, lavender, and coriander essential oils should be further investigated as possible repellents or insecticides against ACP. Also, these repellents may be useful in organic citrus production, which currently has few available tools for management of ACP.

We have also developed a method with which to sample and quantify the airborne concentrations of sulfur violates directly in the field. We are perfecting this method so as to be able to directly quantify the airborne concentration of DMDS in the field that is associated with our SPLAT treatments. We believe this will help us understand why certain applications of DMDS show effectiveness in suppressing ACP populations while others do not.

Our field results with DMDS released from SPLAT have been mixed. While some trials appeared to show reductions of ACP populations, others did not. We have almost completed a large investigation of four new SPLAT formulations of DMDS and will have that information compiled soon.

PI First Name Lukasz

PI Last Name Stelinski

Email stelinski@ufl.edu

Phone 863-956-1151 ext. 1281

Organization University of Florida

Contract Number 217

Project Duration (years) 3 *Year of Project* 2

Total Funds (current year) $129,259.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.