Florida Citrus Advanced Technology Program

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

Instructions Complete the fields based on your project specs. When finished, save the form to your local disk using a unique name. Then, go to **http://research.fcprac.com**, and log in with your user name and password using Researcher Login in the lower left. Find this project title and click on **Submit a Report**. Update your profile information if needed, then upload this report as directed.

2009-2010 REPORT	CATEGORY (drop-down)	TODAY'S DATE (m/d/yr)
● *Quarterly Report* ○ *Annual Report* ○ *Final*	Psyllid	6/26/09

WHAT IS THE "HEADLINE" FOR THIS REPORT (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Progress toward identification of attractant made in lab studies, but effectiveness not yet clearly demonstrated in the field

TITLE and CONTACT INFORMATION

Proposal Title Identification of psyllid attractants and development of highly effective trapping and attract-and-kill methods for improved psyllid control

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Organization University of Florida/IFAS	*Total Direct Funds (current year)* 180049

REPORT UPDATE (650 words; provide details about your headline)

The purpose of this proposal is to identify and develop attractants, both pheromone and host-plant based, for the Asian citrus psyllid (ACP). The intent is to develop a highly effective attract-and-kill control system for ACP with such attractants, as well as to develop highly effective monitoring traps to effectively evaluate ACP population densities to better determine the need for spraying. Thus far, in collaboration with USDA colleagues, we have determined that virgin and mated male ACP colonized citrus plants that were currently or had been previously colonized by virgin or mated female ACP in greater numbers than control plants without females. However, males or females did not accumulate more on plants colonized by conspecifics of the same sex compared with uninfested plants and females showed no preference for plants pre-infested with males compared with uninfested controls. In complementary Y-tube behavioral assays in the laboratory, virgin and mated males chose arms with odor sources from mated females compared with blank controls in the absence of associated citrus host plant volatiles. In both behavioral assays mated female ACP appeared more attractive compared with virgin females. Collectively, our results provide behavioral evidence for a female-produced volatile sex attractant pheromone in ACP. Subsequently, we determined that male ACP, irrespective of abdominal color, exhibited stronger evidence of attraction to crushed blue/green females than to crushed gray/brown females. Gray/brown individuals of both sexes showed an increase in body mass 5–6 d after transfer to a new citrus seedling, suggesting that abdominal color (which is closely related to body mass) may be influenced at least in part by plant quality. Next, we examined the behavioral responses of mated and unmated ACP of both sexes to odors from host plants in laboratory tests, with and without visual cues in collaboration with USDA colleagues. The host plants tested were: 'Duncan' grapefruit, sour orange, 'Navel' orange, and Murraya paniculata. Responses varied by plant species and by psyllid sex and mating status. Generally, evidence of attraction was stronger in females and in mated individuals of both sexes relative to virgins. The presence of a visual cue typically enhanced attractiveness of olfactory cues; in no case did unmated individuals show evidence of attraction to host plant odors in the absence of a visual cue. Antennal responses to citrus volatiles were confirmed by electroantennogram. The results suggest that ACP uses olfactory and visual cues in orientation to host plants, and suggest the possibility of using plant volatiles in monitoring and management of this pest. Subsequently, we analyzed the chemicals produced by psyllids using gas chromatography and mass spectrometry. We discovered a total of 85 compounds including 8 male and 13 female ACP-specific volatile chemicals with both sexes having 40 volatile compounds in common. Interestingly, we discovered that both ACP and its parasitoid produce γ-Butyrolactone. In behavioral assays in the laboratory, we found that γ-Butyrolactone is attractive to male ACP, but not to females suggesting that this chemical may be part of the female ACP pheromone blend. In collaboration with an industry partner, (Alpha Scents, West Linn, OR), we obtained custom-made release devices for γ-Butyrolactone as well as dispenser for synthetic plant volatiles identified and developed by a USDA collaborator. In our initial field tests, results with γ-Butyrolactone have been inconclusive. Although in one trial it appeared that this chemical incleased catch of ACP on traps, the results were inconsistent in follow up trials. However, simultaneously releasing γ-Butyrolactone and synthetic citrus volatiles did increase catch of ACP on traps compared to unbaited traps. We continue testing the chemicals that have been identified thus far in field trapping tests in an effort to optimize release rates and blends. Also, work is ongoing on identification of further possible attractants with chemical and behavioral testing of ACP.