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	7/14/10

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

HLB infection of plants manipulates psyllid behavior

TITLE and CONTACT INFORMATION

Proposal Title How does Liberibacter infection of psyllids affect the behavioral response of this vector to healthy versus HLB-infected citrus trees?

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Organization University of Florida/IFAS	*Total Direct Funds (current year)* 30867

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

The goal of this project is to determine if infection by Candidatus Liberibacter affects the response of Asian citrus psyllid (ACP) to its citrus host plants to understand a critical component of disease spread. In this project we evaluated if healthy psyllids are attracted more to HLB infected or healthy trees. Also, we determined whether this behavior changes when the ACP vector becomes infected with the pathogen.
We conducted a series of behavioral experiments to investigate whether HLB-infected citrus plants are differentially attractive to ACP as compared with healthy citrus plants. We also examined if psyllids known to be infected with the pathogen behaved differently from uninfected controls in response to both healthy and HLB-infected plants. Our preliminary results indicate that HLB-infected citrus plants are more attractive to ACP adults than healthy plants in two-choice olfactometer experiments. More ACP were attracted to HLB-infected plants than to healthy plants in open-air cage experiments. However, subsequent dispersal of ACP adults to healthy plants following their initial choice indicated that final settling preference was for healthy rather than diseased plants.

Initial movement of ACP to infected plants and further dispersal to healthy plants may be explained by production of deceptive volatile compounds by HLB-infected plants to attract ACP adults in the field to facilitate the spread of bacteria as occurs with apple phytoplasma Candidatus Phytoplasma mali, responsible for apple proliferation disease. Ca.P. mali hijacks the apple trees to produce specific chemical that attracts the plant-sap sucking psyllid vector to infected trees. This is a major factor for facilitating disease spread in apple. Alternatively, the yellow color of HLB-diseased plants due to chlorosis and yellowing of shoots may attract the ACP initially but psyllids move to healthy plants after sampling the phloem of diseased trees. The movement to new plants could be due to poor nutritional status of HLB infected plants. It is known that ACP adults are attracted to yellow color; therefore, initial attraction of ACP adults to diseased plants may be due to chlorosis of leaves caused by HLB. Also HLB-infected plants are deficient in zinc, iron, manganese, calcium, sulfur and/or boron and hence the subsequent movement of psyllids to healthy plants could be due the poor host suitability of HLB-infected plants. To answer these questions, we are analyzing the head space volatiles produced by HLB infected plants versus healthy plants to evaluate if the differential response of ACP to HLB infected and healthy citrus plants is due to differential chemical production. In addition we are continuing to conduct more experiments in light and dark conditions to evaluate the role of visual cues in the differential response of ACP to HLB infected and healthy citrus plants.