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	6/25/09

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

Asian citrus psyllids disperse frequently and abandoned groves serve as a source of infestation; borders need more attention

TITLE and CONTACT INFORMATION

Proposal Title Quantitative measurement of the movement patterns and dispersal behavior of Asian citrus psyllid in Florida for improved management

Principal Investigator Lukasz Stelinski	*PI Last Name* Stelinski
Email stelinski@ufl.edu	*FDACS Contract Number* 72359
Phone 863-956-1151 ext. 1281	*Project Duration (years)* 2 *Year of Project* 1
Organization University of Florida/IFAS	*Total Direct Funds (current year)* 101631

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

The movement patterns and dispersal capabilities of Asian citrus psyllid (ACP) required investigation to better understand the spread of huanglongbing (HLB) and to improve management strategies for ACP. Recently, we adopted an immunomarking technique which utilizes crude food proteins (chicken egg albumin, bovine casein, and soy protein) to track the movement of ACP in Florida citrus. In general, both egg and milk protein markers exhibited longer residual activity (35 d) than the soy protein marker (20 d) when applied to citrus leaves. However, residues of all three protein markers decreased with a simulated rain; this was more pronounced for soy protein than for egg and milk proteins. Temperature did not significantly affect acquisition of markers by adult ACP. Egg, milk, and soy protein markers were detected on >90% of adult ACP for up to 10, 10, and 5 d, respectively, post field application. Addition of tetrasodium ethylenediamine tetraacetic acid (water softener) and/or Silwet L-77 (wetting agent) to marker solutions did not affect longevity of detection. Each of the protein markers was detected on ≥80% of exposed ACP for up to 30 d after direct application to adults. After development of the marking technique, we have conducted several field investigations to understnad how psyllids move. In our initial field studies, we measured the movement of ACP between replicated pairs of managed and unmanaged citrus groves separated by 60-100 yards. Approximately 70% of captured psyllids were found marked 3 d after application of proteins in the field. Using two marker proteins, we determined that ACP moved bi-directionally between managed and abandoned groves within 3 d with net movement from unmanaged into managed plots. These data indicate frequent movement by adult ACP between groves and suggest that unmanaged groves may act as refuge sites for ACP leading to re-infestation of nearby managed groves. Our most recent data suggest that the majority of this back-and-fourth movement between groves is restricted to the first 3-4 rows of the grove borders and that psyllid populations are much higher on grove borders than in the interior of groves. This "border effect" suggests that grove borders should be monitored more intensely than grove interiors and that supplemental border sprays should improve psyllid management. A recent more detailed investigation of the movement patterns of ACP from abandoned into managed groves revealed that approximately 65% of the marked and captured ACP moved from abandoned borders to managed borders; 10% moved from abandoned interiors to managed borders; 20% moved from abandoned borders into managed interiors; and 5% moved from abandoned interiors into managed interiors. These data confirm that most of the movement occurs between grove borders. However, it also shows that ACP can infest grove interiors up to 60 yards of the grove border within 4-7 days. In addition, approximately 65% of those ACP found moving were females and 35% were males. It is possible that females disperse from abandoned into managed groves in greater frequency in search of optimal sites for egg laying. In summary, ACP movement is biased in the direction from abandoned or marginally managed groves into well managed groves; ACP are capable of moving back and forth between 2 groves separated by 100 yards within 2 days; ACP are capable of invading up to 60 yards into managed grove interiors within 4-7 days; ACP move even when there is abundant flush (food/egg laying sites) available; most invading ACP are found in the first 3-4 rows of trees from the plot borders, but are capable of invading; female ACP appear to move more than males. We have confirmed that abandoned groves are a problem and negatively impact managed groves. Current studies are focusing on determining whether abandoned groves serve as a source of HLB infection. Both psyllids and trees in abandoned groves are being investigated. Also, we are investigating whether HLB infection impacts ACP movement. In addition, the seasonality of ACP movement is continuously under investigation to optimize an ACP spray calendar.