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	10/15/09

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

TITLE and CONTACT INFORMATION

Proposal Title Huanglongbing: Understanding the vector-pathogen interaction for disease management

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Organization UF/IFAS/CREC	*Total Direct Funds (current year)* 519,429

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

Acquisition of pathogen: For assessment of adult acquisition, groups of 10-50 healthy adult ACP were confined in mesh enclosures on psyllid-free branches of infected citrus plants for acquisition access periods (AAPs) ranging from 1 to 52 days. To test nymphal acquisition of Las, flush containing first instar nymphs from our healthy psyllid colony was excised and placed on mature leaves of Las-infected citrus plants. Branches containing nymphs were enclosed in mesh bags to prevent dispersal of nymphs. Adults from eight replicate groups were collected upon emergence and preserved for Las-detection as described above. The acquisition of the HLB pathogen by adult ACP, determined by real-time PCR, ranged from 0% (< 1 week of acquisition feeding) to 38.8% (> 5 weeks of feeding). When ACP were reared on infected plants for acquisition as nymphs, the percentage of positive psyllids rose to 62.2%.

Transovarial transmission: Sexually mature, Las-infected D. citri obtained from a laboratory colony were caged on uninfected sweet orange seedlings for oviposition. Eggs laid by single females were collected in pools of 20-30 eggs or transferred to healthy ACP host plants. Nymphs arising from the eggs of single, Las-positive females were collected as 1st-2nd instars in pools of 20-30 nymphs. Of the pools tested, 2.1% of eggs and 6.8% of nymphs were positive for Las. In addition, 2.4% of adults emerging from the eggs of infected females also tested positive for Las. Cumulatively, these results suggest that bacteria are transmitted to offspring at a low rate.

Transmission of Las by individual ACP: Psyllids from an infected colony were held individually on healthy sweet orange seedlings and allowed to feed for inoculation access periods (IAPs) of 1, 4, 7, 15, and 28 d. Plants used in transmissions were held in an insect-proof greenhouse and tested bimonthly via real-time PCR for the presence of Las. To date, Las detection in plants ranged from 0% (28d IAP) to 10% 4 day IAP). Results of experiments to determine the rate of transmission by healthy ACP will be included in the next report pending plant testing.

In determining the effects of host plants on the acquisition and transmission of Ca. Liberibacter asiaticus (Ca. Las) two hosts were studied this quarter. Chinese box orange (Severinia buxifolia) previously listed as a host for the Asian psyllid and a host of HLB was utilized as well as rough lemon (C. jambhii). Healthy Asian citrus psyllids readily fed on Las infected box oranges and rough lemons and after the appropriate acquisition periods were PCR tested. Between 30-40% of the psyllids from the both hosts were PCR positive for Ca. Las. To determine transmission rates from Chinese orange boxwood psyllids reared on infected plants were transferred in groups to Valencia orange seedlings. Infection results are pending. HLB infected rough lemon stems were PCR assayed at various locations to determine if symptomatic or asymptomatic differed in bacterial concentrations. Psyllid acquisition experiments from rough lemon are in progress.

Seasonality of HLB infected psyllids: During 2009, psyllid collections continued at the same 5 locations sampled during 2008. During 2009, a noticeable increase in the overall percentage of HLB infected psyllids was found. While there was still a trend for periodic increases and decreases in the percentage of HLB+ psyllids, the periods when infection rates were highest occurred in January, April and July. While the average psyllid infection rate was less than 5% across all study sites, at one of these locations (Lake Alfred) the percentage of HLB+ psyllids was above 15% on each of these three months. Data collected thus far in 2009 from a 6th new location (Homestead) have shown that there does appear to be fluctuations in the number of HLB+ psyllids even where 100% of the citrus host plants are HLB+. However, the numbers of infected psyllids is much greater ranging from 20-100% based on data analyzed thus far.