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	7/22/10

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

Short feeding periods on infected plants are sufficient for acquisition of Ca. Liberibacter asiaticus by the Asian citrus psyllid

TITLE and CONTACT INFORMATION

Proposal Title Factors influencing acquisition and inoculation of Candidatus Liberibacter asiaticus by Diaphorina citri

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Organization University of Sao Paulo	*Total Direct Funds (current year)* $63,200.00

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

Current management of citrus greening requires preventive control measures targeted to the pathogen (e.g. planting healthy nursery trees, inspection and removal of diseased plants) and to the psyllid vector, Diaphorina citri. In this project we are investigating factors that influence the risks of acquisition or inoculation of the pathogen (Candidatus Liberibacter asiaticus) by D. citri, e.g vector developmental stage, feeding periods, leaf phenology and symptom expression/bacterial population in disease plants, in order to optimize strategies to avoid or reduce disease spread within and between citrus groves. We already learned in this project that bacterial acquisition can occur when the vector feeds on asymptomatic infected plants, although acquisition efficiency is higher on citrus plants with higher bacterial titers, usually symptomatic. We also showed that D. citri nymphs in all development stadia (1st-5th instars) can efficiently acquire the pathogen if allowed to feed for 48 h on young leaves of infected plants (mean acquisition rates ranging from 75-100%); adults can also acquire it, but efficient acquisition depends on the availability of young leaves in infected plants, apparently because phloem sap ingestion (and thus pathogen acquisition) by D. citri adults is more frequent and last longer on the younger leaves.

Here we report a further experiment detailing acquisition efficiency of Ca. L. asiaticus by adults and nymphs of D. citri, in which we varied the acquisition access period (AAP). Groups of 30 psyllid adults (1-wk old) or third-instar nymphs were confined on leaves of a young shoot of a symptomatic infected plant, with recently expanded leaves, inside sleeve cages, for AAPs of 1.5, 6, 12, 24, 48 or 96 h. After the AAP, the insects of each group were first transferred to healthy citrus seedlings for a latent period of 15 days at 25C, and then transferred to healthy test seedlings (5 insects/plant) for a 7-day inoculation access period (IAP). After the IAP, total DNA of each insect (sample of 10-20 insects per AAP treatment) was extracted and submitted to nested-PCR with specific primers for Ca. L. asiaticus. The experiment was repeated three times, using different source plants of the pathogen for the AAPs. Partial results showed that around 28% nymphs and adults can acquire the pathogen during an AAP of only 1.5 h. Acquisition efficiency for both nymphs and adults increases linearly with longer AAPs, exceeding 90% after a 96-h AAP. For nymphs, acquisition rates of 38, 55, 91, 88 and 94% were observed when the insects were allowed to feed for 6, 12, 24, 48 and 96 h on the source plants, respectively. Because development time of D. citri nymphs on young citrus shoots ranges between 2-4 wks under field conditions, there is plenty of time for pathogen acquisition if the host plant is infected; in this case, it is likely that most (if not all) emerging adults will be infective. This observation makes imperative to control developing nymphs of D. citri in infected groves. If not controlled, the emerging adults will certainly spread the pathogen to other citrus plants.