CITRUS ADVANCED TECHNOLOGY PROGRAM

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

▶ INSTRUCTIONS

(●) *Quarterly Report* ( ) *Annual Report* ( ) *Final*

Required: What is the "headline" for this report (e.g. a one-sentence "newspaper headline" describing what you accomplished)

Paper on transmission parameters recently published

Proposal Title

Huanglongbing: Understanding the vector-pathogen interaction for disease management

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
10/15/10	Citrus Research and Development Foundation	Vector Management

REPORT UPDATE (500 words; summarize your accomplishments)

A paper resulting from this funded project was recently published: Pelz-Stelinski, K.S., Brlansky, R.H., Ebert, T.A. and M.E. Rogers. 2010. Transmission parameters for Candidatus Liberibacter asiaticus by Asian Citrus Psyllid (Hemiptera: Psyllidae). Journal of Economic Entomology 103 (5): 1531-1541. ABSTRACT The purpose of this investigation was to evaluate acquisition and inoculation efficiency of Candidatus Liberibacter asiaticus (Las), the pathogen associated with huanglongbing (HLB) or citrus greening disease, by the Asian citrus psyllid, Diaphorina citri (Kuwayama). In laboratory studies, nymphs reared on Las-infected plants were more likely to acquire the bacterium than adults. Acquisition by nymphs ranged from 60-100%, whereas acquisition by adults only reached 40% after 5 wk of feeding on Ca. Las infected plants. Similar rates of pathogen acquisition by psyllids following nymphal and adult feeding were observed in the field. Transmission of Ca. Las from parent to offspring (transovarial) occurred at a rate of 2-6%. One year after psyllid inoculations, successful transmission by individual D. citri ranged from 4-10%, while groups of 100 or more D. citri transmitted the pathogen at a rate of approximately 88%. In addition, the proportion of Ca. Las-positive adult psyllids, determined using quantitative real-time PCR, decreased over time when held on healthy plants. Due to the low rate of pathogen acquisition and long period required for successful inoculation by adult D. citri, experiments designed to determine the latent period required for replication and successful inoculation of Ca. Las by D. citri did not result in Las infected plants after more than one year of incubation following inoculation. Collectively, these results indicate that adult D. citri which acquire the HLB pathogen as adults are poor vectors of the pathogen compared to adults which acquired the pathogen as nymphs. END ABSTRACT.

In other ongoing related work...experiments to evaluate the effect of temperature on acquisition are nearly finished. Preliminary data indicate that peak acquisition occurs between 25-30C, with approximately 50% of D. citri becoming infected after two weeks of feeding on infected plants. Only 4% of psyllids acquired Las at 20C. In addition, Las acquisition decreased at temperatures above 30C, although acquisition was not as low as that observed at 20C. Collectively, these data suggest that little acquisition of Las occurs during winter months when temperatures are low. Currently, experiments are underway to evaluate the effect of temperature on transmission.

Studies to determine whether there are fluctuations in the seasonality of pathogen transmission by psyllids continues. Since this study began in 2008, by analyzing more than 80,000 psyllids collected from 6 studies sites across the state we have documented significant grove-to-grove, year-to-year and month-to-month variability in the number of Las+ psyllids. However, there has been no consistent pattern in the month-to-month change in number of Las+ psyllids within each grove. The changes in abundance of Las+ psyllids is most likely a cyclical pattern associated more with plant related factors than weather per se. The one pattern most evident from this work however is the overall abundance of Las+ psyllids from year-to-year. In 2008, a low level of Las+ psyllids were collected from most sites followed by a dramatic increase in the abundance of Las+ psyllids at all sites in 2009. In 2010, to date, the overall abundance of Las+ psyllids has been much lower, possibly as a result of enhanced psyllid control programs being conducted.

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Organization UF/IFAS/CREC

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SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.