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)

Insecticide resistance in Florida ACP populations

Proposal Title

Maintaining the effectiveness of our current and most important psyllid management tools (insecticides) by preventing insecticide resistance

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
10/11/10	Citrus Research and Development Foundation	Vector Monitoring, Behavior, Cultivation

REPORT UPDATE (500 words; summarize your accomplishments)

Insecticides are currently the basis of Asian citrus psyllid (ACP) management programs and the number of annual insecticide applications has increased significantly. We continue our investigations of insecticide susceptibility and resistance among field populations of adult and immature Asian citrus psyllid in Florida. Our goals are to monitor resistance and develop effective psyllid management programs that mitigate escalation of resistance development.
Five geographically discrete populations of ACP displayed a range of susceptibility levels against twelve tested insecticides. In 2009, one or more field populations of ACP exhibited higher LD50 values to fenpropathrin, imidacloprid, malathion and thiamethoxam compared with the laboratory susceptible population. The highest level of resistance was displayed by the La Belle population with a resistance ratio or RR (LD50 value of field population/LD50 value of laboratory susceptible population) of 38 and 13 to imidacloprid and thiamethoxam, respectively. Three populations displayed a moderate level of resistance to malathion (Ft. Pierce: RR = 5.4, Lake Alfred: RR = 5.0, Groveland: RR = 3.7). The Vero Beach population displayed a moderate level of resistance to fenpropathrin with a RR value of 4.8.
In 2010, three diagnostic doses corresponding to 50, 75 and 95 percent mortalities determined from the laboratory susceptible population in 2009 were chosen to assess the susceptibility of field populations in 2010. Susceptibilities of field populations were compared with the laboratory susceptible population as in the previous year. In general, percent mortality of adult ACP from each field population was lower than that of the laboratory susceptible population for all three diagnostic doses tested. This indicates that resistance levels continue to increase from year to year.
The susceptibility levels of immature ACP from four field populations to five insecticides were determined. The LC50 value for carbaryl obtained from the laboratory susceptible population was significantly lower than from the highest value obtained from one of the field populations representing a resistance ratio of LC50 [RR50] of 2.88. For chlorpyriphos, the highest LC50 of 8.31 observed from a field population was significantly higher than the laboratory susceptible population (2.58), representing an RR50 of 3.22. The synthetic pyrethroid, fenpropathrin, yielded a range of LC50 values from 0.15-0.57, with the lowest value obtained from the laboratory susceptible and highest from the Groveland population. Two of the field populations tested exhibited significantly lower susceptibility to imidacloprid than the laboratory susceptible population exhibiting RR's of 3.81 and 2.27, respectively. Two of the populations tested showed significantly lower susceptibility to the microbial insecticide, spinetoram, than laboratory the susceptible population with RR50's of 2.98 and 5.88.

The current results suggest that ACP have developed varying levels of resistance to major insecticides currently registered for its management. Elevated levels of detoxifying enzymes in these populations may be underlying mechanisms of this resistance. Although none of these current resistance levels should result in product failures in the field, continuing elevation of resistance among Florida populations of ACP needs to be stopped. Rotation of insecticides is critical to mitigate this emerging problem.

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Organization University of Florida

Contract Number 333

Project Duration (years) 2 *Year of Project* 1

Total Funds (current year) $50,080.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.