CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD June 2016

Quarterly Report Final

Proposal Title

Insecticide resistance monitoring and managment in Florida citrus to maintain sustainable control of Asian citrus psyllid within Citrus Health Managment Areas

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
7/15/2016	Citrus Research and Development Foundation	Vector Management

REPORT UPDATE (500 words-It is not necessary in this public report to disclose your institution's proprietary information or intellectual property.)

The first objective of this study was to develop a simple and fast tool to determine insecticide resistance in Asian citrus psyllid (ACP) and implement it for field monitoring of resistance in Florida citrus groves. For this experiment, we developed a timed bottle bioassay. LC50 and LC95 estimates were determined for eight commonly used insecticides against a laboratory susceptible ACP population 24 hours after treatment. Insecticide resistance diagnostic times were determined for dimethoate (45 minutes), fenpropathrin (45 minutes), imidacloprid (45 minutes), bifenthrin (45 minutes) and flupyradifurone (60 minutes). Also, using the diagnostic time, we surveyed two central Florida groves for five major insecticides. There was no resistance detected for any of the tested insecticides.

The next objective of this study was to monitor ACP populations for insecticide susceptibility in Florida. We collected ACP adults from three field populations in Polk and Orange county. The susceptibility of ACP was evaluated using carbaryl, dimethoate, fenpropathrin, spinetoram, bifenthrin, imidacloprid, aldicarb and chlorpyriphos. These insecticides represent several modes of action and are among those that are currently used to manage ACP in commercial groves in Florida. The method used was a topical application technique previously developed in our lab. At least five adult insects were treated in five replicates at the LD50, LD75 and LD95 diagnostic doses. Mortality of LD50 ranged between 36% to 56%; mortality of LD75 ranged between the 40% to 83%; mortality of LD95 ranged between 80% to 100% for both field and laboratory populations. There was no significantly resistance levels in the three field populations tested.

The final, objective of this study was to develop effective insecticide rotation schedules based on the understanding of fundamental resistance mechanisms in the field. We have investigated three different rotation modules using dimethoate, adamectin, fenpropathrin, diflubenzuron and imidacloprid which have five different modes of action. There were three rotation models, one positive control and one negative control. Each treatment had four replicates. Before application we used a leaf dip bioassay to determine susceptible levels of ACP populations. We monitored ACP adults, eggs and nymphs weekly and determined when insecticide applications should be made based on a threshold of adults ≤ 2, eggs ≤5 and nymphs ≤5 per per average sampling per sample date. We have already sprayed two insecticide applications for this study. Results indicated susceptibility levels of the field population being tested were not significantly different from our laboratory suspectable population at the onset of this experiment. This experiment remains currently in progress.

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