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)

Unusual psyllid trap on the way to fruition

Proposal Title

An effective trap for Asian citrus psyllid that can be used to monitor groves and plants for sale

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
10/18/10	Citrus Research and Development Foundation	Infection Consequences

REPORT UPDATE (500 words; summarize your accomplishments)

The objectives of this proposal are to address some strict regulatory needs concerned with reducing the spread of citrus psyllid and greening. We propose to develop a citrus psyllid trap that will capture adult psyllids at very low population levels in an urban retail environment (and in other venues as applicable) and preserve them such that the citrus greening bacteria can be extracted from the psyllids to determine the psyllid infection rate at a later date; and to do so in a secure manner. This type of trap has never been developed for any insect to our knowledge and requires an indepth understanding of the behavior of the target insect. As a result we have executed a number of laboratory and field experiments to determine the specific behaviors exhibited by psyllids to a broad range of visual and odor cues. These have been broken down into fine grain and very specific behavioral responses and investigated in simple choice comparisons. the second year of the proposal we will complete the development of the trap though continued refinement of its parameters, complete and test several prototypes, and modify a final prototype that will be tested for its efficiency under the regulatory conditions for which the trap is to be used. This will include evaluation of the usefulness of the trap and comparison of various preservatives to enable determination at various post capture intervals of vector infection rates. We have made excellent progress toward our stated objectives through a combination of laboratory and field experiments looking at the behavior of Asian citrus psyllids. We have determined the following: 1) The 2-sided flat yellow trap used as the standard psyllid monitoring and detection tool is extremely inefficient and will not serve in any manner as the basis for meeting our objective, therefore, it was necessary to start from scratch to develop a trap. 2) In laboratory bioassays, we have determined that psyllids are highly attracted to yellow and orange objects and yellow and green LED-produced light; psyllids will orient visually to and follow dark lines, raised ridges and shadowed areas (apparently similar to their response to leaf edges). This aspect of their behavior can be exploited to direct their movement on a surface. Psyllids will respond readily to sunlight in an effort to escape confinement. Psyllids cannot walk without falling from a surface covered with fluon (liquid teflon used to confine flightless insects inside open containers). 3) In field bioassays we have determined which configurations (trap sizes and shapes) of various parameters have promise to serve as the most efficient and attractive visual cues. We also have tested the trap attraction angle or degree of slant and horizontal and vertical orientation of traps to optimize trap efficiency once Asian citrus psyllids arrive on the trap's attracting surface. These remain to be optimized under target conditions along with development of the security portion of the trap to prevent tampering by the public. Testing of semiochemicals reported to be attractive to psyllids by other researchers were tested at various concentrations in the lab alone or in combination with lights and traps. The results were inconclusive but promising and maybe an important incremental component of the final trap since it will not rely on stickem to capture the psyllids. Various procedures for psyllid collection, shipping and processing were evaluated during the year. In preliminary experiments, over 1000 psyllids from a model system (Bactericera cockerelli from tomato carrying Candidatus Liberibacter psyllaurous) were used. Over 2000 single psyllid extractions of Asian citrus psyllids were conducted using 25 different extraction methods for finding out the best method for detection of Liberibacter in Asian citrus psyllids. An efficient high throughput method of extraction has been developed. This method will be used for comparing different collection reagents in the second year.

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Contract Number 90

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

Total Funds (current year) $100,000.00

SUBMIT REPORT

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.