CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD December 2013

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Exploitation of visual Stimuli for Better Monitoring and Management of ACP in Young Citrus

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
1/10/14	Citrus Research and Development Foundation	Vector Monitoring, Behavior, Cultivation

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

The overall objective of this research is to develop a push-pull system for the Asian citrus psyllid (ACP) that can complement integrated management systems in young citrus plantings. Towards that goal, visual factors that affect psyllid takeoff into flight and landing are being examined to guide development of an optimal pull component.

Polarized reflection patterns from host plants are known to guide attraction to host plants for several insect species. The contrast of polarized light reflected from leaves to transmitted through leaves against unpolarized skylight may guide ACP dispersing to new host plants. While ACP are strongly diurnal insects with a strong attraction to light, the role of polarization remains unknown. In nature ACP may be exposed to unpolarized skylight or polarized light transmitted through leaves as well as reflected from leaves, bark, fruit, etc. In particular, responses of dispersing ACP are of greatest interest because of their potential in infesting new trees. In this study, the effect of light polarization in conjunction with color was examined in a flight assay as well as a walking assay.

A vertical flight attraction assay was developed to examine activation of ACP from sitting to flight and landing on a target illuminated with filtered light. This assay simulates the response of ACP settled on vegetation to visual stimuli that could be provided by sunlight, or light reflected from or transmitted through leaves. ACP responses were strongest to white light closely followed by a long wavelength UV. Responses to blue/green and green filtered light were moderate and did not differ. The lowest responses were to blue and a mid-range UV light. Polarization of light did not affect responses to white or UV light. Attraction to green, however, was dramatically reduced with polarization and the impact of this finding on behavior and ACP ecology will further examined. Additionally, these assays are being continued to determine if differences between different colored individuals vary in response.

A horizontal walking assay was developed to simulate walking responses of ACP on vegetation and this assay measured direction of movement as well as speed of movement. Strong and rapid walking responses towards the light sources were obtained with UV and blue light. Walking responses under green, yellow and orange light were very low and there was no clear indication of movement towards or away from the light. Increasing intensity of light increased movement overall both towards and away from the light source depending on the color of light. The distance and speed of walking towards a white light was decreased when the light was polarized. Walking towards polarized UV light tended to be moderately faster and covered a greater distance than to unpolarized UV. In contrast, polarization increased directional walking distance and speed towards green light. In general for walking assays, males and females responded similarly with little difference between brown- or green- colored individuals. Orange-colored individuals (particularly females) tended to be much less active with lower speed and movement towards any light source.

These assays are continuing and will be used to compare responses of ACP reared under conditions that may contribute to production of dispersing individuals (i.e., photoperiod, density, host plant condition). Additionally comparisons will be made between newly emerged unmated female ACP and older gravid females.

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