Monitoring the Adult Navel Orangeworm (NOW) Moths with Pheromone and Host-Plant Volatiles

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PROJECT SUMMARY

Objectives:

- Develop a highly attractive lure to be used to monitor male navel orangeworms (NOW)
- Improve mating disruption of the NOW
- Determine if conventional wind-tunnel or static air assays are effective in helping to refine the most active blend for a female lure, based on host plant volatiles identified by John Beck (Project 11-Ento4-Beck).

Background and Discussion:

As a rule, insect pheromones consist of multiple chemical components, often a major component with minor ones. The major component ((Z11,Z13)-hexadecadienal) of the NOW pheromone was identified in the late 1970s. It is being used in mating disruption as a control for NOW. However, traps baited with this component alone attract no male moths and are useless as a monitoring tool. Furthermore, experience shows mating disruption is usually improved with addition of minor pheromone components.

For over 3 decades, identification of the critical minor components has been elusive. Fortunately recent breakthroughs have identified three of these minor components to yield an active 4 component NOW pheromone mixture. Other components may be involved, but this mixture is as attractive as female NOW moths in the field.

However, there has been a challenge: that is developing a formulation that would last under field conditions. Initially synthetic lures consisting of the 4 components were attractive, but the activity was short lived.

Experts in pheromone chemistry experienced in NOW pheromone development and supported by the Almond Board and other groups like pistachios have developed a stable pheromone mixture and formulation which lasts 4-5 weeks in the field. This is being used as a NOW lure for monitoring when deployed in traps.

This project led by Ring Cardé contributed to this effort by optimizing the 4-component blend for maximum male response in a wind-tunnel assay. In addition, work shows that potential breakdown products of the major pheromone component do not affect, or degrade, attractiveness. The number of candidates tested for an inhibitory effect was expanded in 2013 to include several new compounds that are expected by-products of synthesis and/or degradation of the alcohol components. To date, none of these compounds have been found to diminish lure attraction.

This project also has developed a still-air bioassay system to test chemicals that are host plant volatiles identified and supplied by John Beck. The assay lures mated females into collection chambers and almond meal is used as the attractive control treatment. This assay is used to evaluate candidate synthetic compounds and blends that could be used as NOW attractants.

Project Cooperators and Personnel: Walter Leal, UC - Davis; Jocelyn Millar, UC - Riverside; Brad Higbee, Paramount Farming Co.; Tom Larsen, Suterra, Inc.; John Beck, USDA/ARS, Albany, CA

For More Details, Visit

- Poster location 19, Exhibit Hall A and B during conference, or on the web (after January 2014) at www.almondboard.com/researchreports
- 2012.2013 Annual Report CD (12-ENTO9-Cardé); or on the web (after January 2014) at www.almondboard.com/researchreports
- Related Projects: 11-ENTO4-Beck; 11-ENTO12-Kuenen/Walse