

Improving Mating Disruption and Monitoring Lures of the Navel Orangeworm (NOW)

Project Leader: Ring Cardé

Dept. of Entomology, University of California, Riverside, 900 University Ave, Riverside, CA 92521
(951) 827-4492 ring.carde@ucr.edu

PROJECT SUMMARY

Objectives:

- Develop a highly attractive lure to be used to monitor navel orangeworm (NOW).
- Improve mating disruption of the NOW.
- Determine if conventional wind-tunnel 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 1970's. It is being used in mating disruption as a control for NOW. However, traps baited with this component attract few male moths and lack utility as a monitoring tool. Furthermore, experience shows 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.

However, there is still a challenge: that is developing a formulation that lasts under field conditions. Initially synthetic lures consisting of the 4 components are attractive, but the activity has proved to be short lived.

There could be a number of reasons the test formulations lose their attractiveness, including the components degrade quickly; the presence of inhibitory contaminants (which may be degradation products); or the formulations do not release the components in the correct ratio as emitted by the NOW female moth.

Experts in pheromone chemistry experienced in NOW pheromone development are being supported by the Almond Board and other groups like pistachios to develop a stable field ready pheromone mixture and formulation which could be used both as a lure for monitoring and in mating disruption for control.

Recent accomplishments of this project led by Ring Cardé include:

- Optimizing the 4 component blend for maximum male response in a wind tunnel laboratory assay. In addition, shown the breakdown products of the major pheromone component do not affect attractiveness.
- Testing a number of lures in the field that show promise
- Documenting the courtship behaviors and sensory inputs that occur once the male and female are in proximity.
- Documenting the patterns of pheromone dispersal in almond orchards, which have implications for placement of puffers used for mating disruption. This work indicates puffers are most effective in the mid to lower tree canopy.

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

For More Details, Visit

- Poster location 42, Exhibit Hall, Session 3, or on the web (after January 2012) at AlmondBoard.com/AICposters
- 2010 -2011 Annual Report CD (10-ENTO9-Cardé); or on the web (after January 2012) at AlmondBoard.com/ResearchReports
- Related Projects: 11-ENTO4-Beck; 11-ENTO12-Kuennen/Walse