Improving Trapping and Mating Disruption of the Navel Orangeworm

Project Leader: Walter Leal
Dept. of Entomology, University of California, Davis, One Shields Ave., Davis, CA 95616
(530) 752-7755, wsleal.ucdavis.edu

PROJECT SUMMARY

Objectives:

- Improve mating disruption of the the navel orangeworm (NOW)
- Develop a highly attractive lure to monitor NOW populations

Background:

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.

The research effort has included this project (Project 09-ENTO2-Leal), Project 10-ENTO9-Cardé, and Project 10-ENTO12-Kuenen/Walse

This project under the leadership of Walter Leal is currently analyzing batches of synthetic pheromone to identify possible inhibitors, and this is being done in cooperation with Ring Cardé.

This research effort has also identified the three dimensional structure of the pheromone binding protein in the male NOW antenna. This protein can be used as a tool to identify parapheromones that mimic the structure of the actual constituents. Once identified, the more stable mimics could then be substituted for unstable pheromone components to yield a stable attractant.

Project Cooperators and Personnel: Frank Zalom, Zain Syed, Ruben Palma, Zhao Liu, Julien Pelletier, David Wilson, James Ames, UC Davis; Franz Niederholzer, UC Cooperative Extension, Sutter/Yuba counties

For More Details, Visit

- 2009-10 Annual Report CD (09-ENTO2-Leal); or on the web (after January 2011) at AlmondBoard.com/ResearchReports
- Related Projects: 09-ENTO9-Cardé; 09-ENTO12-Kuenen/Walse