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.

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, or degrade, attractiveness.
- Testing a number of lures in the field that show promise. One new formulation is competitive with females in almond but not pistachio orchards.
- 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 when placed in the canopy at mid-tree level.

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 44, Exhibit Hall A and B during conference, or on the web (after January 2013) at www.almondboard.com/researchreports
- 2011.2012 Annual Report CD (11.ENTO9.Cardé); or on the web (after January 2013) at www.almondboard.com/researchreports
- Related Projects: 11.ENTO4.Beck; 11.ENTO12.Kuenen/Walse