

Standard and Commercial Formulations for Navel Orangeworm (NOW) Pheromones

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PROJECT SUMMARY

Objectives:

- Develop a highly attractive lure to be used to monitor NOW.
- 2012 specific objectives: 1) Continue to develop formulations in appropriate matrices that are attractive to NOW males for a sufficient time period; and 2) Identify or remove the inhibitory compound(s) in the major pheromone component (ZZ-aldehyde) that is commercially available.

Background and Discussion:

Most known insect pheromones consist of multiple chemical components, often a major component plus 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 mating disruption in other species is usually improved with addition of minor pheromone components.

For 3 decades, identification of the critical minor components had been elusive. Recent breakthroughs have identified three minor components to yield an active 4 component NOW pheromone mixture. This mixture is as attractive as female NOW moths.

However, there is still a challenge: that is developing a trap-bait formulation that lasts under field conditions. So far, we have made synthetic lures containing the 4 purified components that capture as many males as female-baited traps, for 1 week in the field.

There could be a number of reasons the test formulations lose their attractiveness, including component degradation, the presence of inhibitory contaminants (which may be degradation products); or the formulations fail to continuously release the components in the correct ratio of components.

Experts in pheromone chemistry and insect behavior are being supported by the Almond Board and other groups like pistachios to develop a stable field-ready pheromone formulation which could be used as a lure for monitoring NOW.

This project under the leadership of Bas Kuenen and Spencer Walse is using chemical analyses plus an evolutionary bioassay-driven process to make lab and then field-ready pheromone lures. The steps involved include:

1. Test "standard" laboratory-based matrices (e.g., plastic vials, tubes, septa), after exhaustive clean up, for the ability to maintain the stability of the NOW sex pheromone.
2. Compare lab-based matrices to appropriate proprietary commercial matrices as carriers for the 4-component NOW sex pheromone.
3. Develop a stabilized formulation that will provide effective and reproducible NOW lures with reasonable field longevity.

Project Cooperators and Personnel: James Bettiga, S&J Ranch; Chris Wiley, AgriWorld.

For More Details, Visit

- 2011.2012 Annual Report CD (11.ENTO12.Kuenen.Walse); or on the web (after January 2013) at www.almondboard.com/researchreports
- Related Project: 12.ENTO9.Cardé