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

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PROJECT SUMMARY

Objectives:

- Use wind-tunnel bioassays to identify host-plant volatiles (blends or individual compounds that can be used to monitor males and females.
- Determine if these are field active and could serve as a replacement for oviposition traps

Background and Discussion:

Suterra has developed a plastic membrane formulation of pheromone that attracts of males for approximately one month. This breakthrough enables pest managers to monitor populations more effectively than by using traps baited with females

A second strategy is to use host volatiles as a monitoring lure for females (and possibly males) or in combination with pheromone for males. This would be similar to the pear ester that has proved promising for codling moth. John Beck has identified many volatiles released by almonds, almond mummies, and almond foliage. We are seeing if any of these alone or in combination are efficacious lures. At present, the only system in use for monitoring females relies on a bait of almond meal to induce egg laying.

Our wind-tunnel tests evaluated the most likely of these to be attractive, based on two criteria: the compounds are major constituents of the blend and they are electroantennogram active. We test volatiles at 3 doses (10, 100 and 1000 micrograms) with and without a pheromone lure for males and 3 doses (without pheromone) for females. Among the compounds tested so far are octanal plus nonanal, sabinene, (*Z*)-3-hexenal, (*Z*)-3-hexenal plus (*Z*)-3-hexenol, 3-octen-2-one, methyl salicylate, sabinene hydrate, inalool, limonene, a pistachio blend and other compounds. We have yet to find an odor or blend that is attractive in a wind tunnel assay and so we are suspending this work.

A new study will determine if adult moths feed. If so, we then will test if flower or other plant volatiles that can be combined with an insecticide to induce adult mortality. This method has been suppressing heliothine moths in Australia and it could complement mating disruption.

A second effort will be to determine the mechanisms of mating disruption. Higbee and Burks using puffers showed that the aldehyde alone and the 3-component blend (those components necessary and sufficient for monitoring attraction) provided equivalent levels of nut protection under mating disruption. These two formulations cannot be achieving mating disruption by the same mechanism. This will be tested by seeing how prior exposure to both disruptants affects subsequent ability to orient in a wind tunnel to female extract.

A third effort is determining if females sense their own pheromone (to assess presence of nearby competing females). In the case of mating disruption, the presence of synthetic pheromone may cause females to call earlier and deplete their pheromone before luring a male, adding to disruption efficacy.

Project Cooperators and Personnel: Jocelyn Millar, UC - Riverside; Brad Higbee, Wonderful Orchards; John Beck, USDA/ARS, Gainesville, FL

For More Details, Visit

- Poster location 105, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at Almonds.com/ResearchDatabase
- 2015 - 2016 Annual Reports CD (15-ENTO9-Cardé); or on the web (after January 2017) at Almonds.com/ResearchDatabase
- Related project: 16-ENTO4-Cheng/Beck