

Impact of Sex, Age, and Mating Status on Flight Behavior of the Navel Orangeworm (NOW)

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PROJECT SUMMARY

Objectives:

- Compare the flight activity of unmated adults by sex and age
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- Examine the association between laboratory flight and the number of eggs subsequently laid

Background and Discussion:

Data from the current flight mill study shows that single-night median flight distance of mated navel orangeworm adults is 3-5 miles over the first five nights of adult life, and for 7-day-old adults, 1.5 miles. Differences due to sexes were minor, and more evident in flight time than in flight distance. Data to date indicate that mating status also has little effect on flight performance. Maximum single-night distances were 34-41 miles. Initial experiments examining association of flight performance and egg capacity are underway.

The navel orangeworm is an important pest of not only almonds, but also pistachios and walnuts. As the acreage of these nut crops have expanded in recent years and as mating disruption has entered the arsenal of management tactics for this pest, understanding the circumstances and impact of inter-orchard movement has become increasingly important.

Flight mills are used to study the flight capacity of an insect under controlled conditions. The laboratory of Thomas Sappington, in Ames, Iowa,

is one of a few places in the world where this technique is being used to study moth species. In flight mill experiments, insects are attached with glue to a light metal arm balanced on a center pivot. An infrared detector along the center pivot detects each revolution of the arm, which represents a distance of one meter. Data from an array of 15 mills in a walk-in environmental chamber are sent to a computer and compiled by a custom program.

While flight mill studies offer comparisons under more tightly defined physiological conditions (e.g., age and mating status) than field studies, data from these two approaches (i.e., flight mill vs. field) must be compared for a more complete understanding. Flight mill data indicate minimum distances possible for navel orangeworm moths to travel, and are consistent with recent findings of higher damage in almonds located up to three miles from pistachio blocks, potential sources of higher navel orangeworm abundance.

These data indicating high capacity for long-distance flight do not necessarily mean the navel orangeworm routinely disperses such long distances in the field. Field data confirm that adults can travel at least half a mile in a night, but also show that a significant proportion stay in the release orchard for several nights, and apparently mate near where they emerge. Field studies of damage suggest a non-linear relationship between oviposition and dispersal distance, with most damage occurring within 200-300 yards of the site of emergence.

Project Cooperators and Personnel: Thomas Sappington, USDA/ARS, Ames, Iowa

For More Details, Visit

- Poster location 13, Exhibit Hall A and B during conference; or on the web (after January 2014) at www.almondboard.com/researchreports
- 2012.2013 Annual Report CD (12-ENTO2-Burks); or on the web (after January 2014) at www.almondboard.com/researchreports