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

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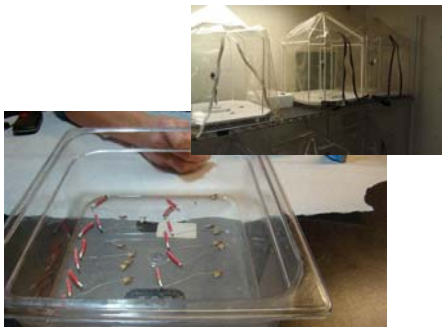
1) Objectives

- ✓ Develop methods and baseline data for flight mill experiments with navel orangeworm*.
- ✓ Compare the flight activity of unmated adults by sex and age*.
- Examine impact of mating on the age-specific flight capacity of males and females

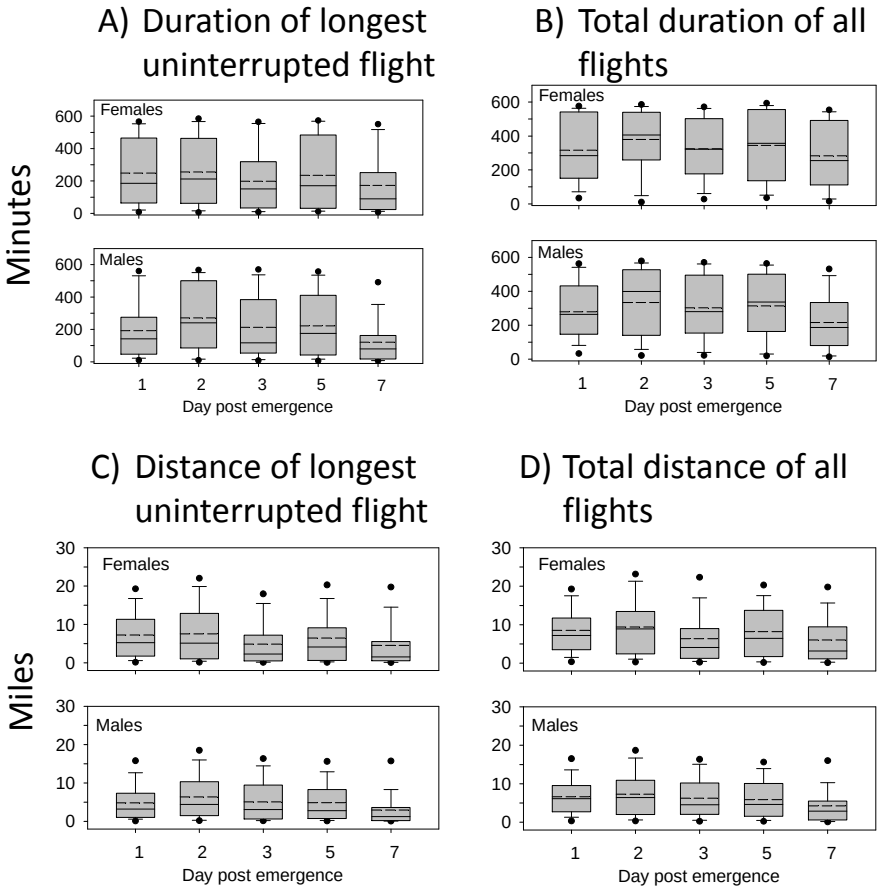
*Objective completed

2) Approach

Flight mills are used to study the flight capacity of an insect under controlled conditions. In these 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.



Performance of unmated navel adults of various ages on flight mills during 10 hours of darkness and 0.5 hour each of gradual dusk and dawn



3) Results (see left)

Box plots are used to present results from 51-58 moths flown for each level of sex × age (total 533). The solid and dashed center lines respectively represent the median and the mean; the ends of the boxes represent the 25th and 75th percentile, the whisker represent the 10th and 90th percentile, and the individual points represent 5th and 95th percentile. Generally there were highly significant differences between ages (2-way ANOVA, $P < 0.001$), marginally significant differences due to sex (P 0.02 to 0.1), and no significant interaction ($P > 0.5$)

4) Summary and conclusion

- Most NOW adults are capable of flying at least several miles in one night during the first week after emergence (longevity in the lab ~14 days)
- Further information needed includes
  - Effect of mating on duration and distance of flight
  - Possible trade-off between flight and oviposition
  - Whether females in the field disperse prior to first mating

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