

Oviposition behavior and host plant preference of monarch butterflies on different milkweed species

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Abstract

We compared oviposition preference and rate of eastern and western North American monarchs in two experiments.

- **Experiment 1:** Predicted monarchs would preferentially lay more eggs on milkweed species that are present in their native habitat.
- Placed mated female monarchs in cages with 4 milkweed species: *Asclepias fascicularis* and *Asclepias speciosa davis* (western), and *Asclepias incarnata* and *Asclepias syriaca* (eastern).
- Counted the number of eggs laid per plant.
- Found strong preferences, but no variation between populations (no local adaptations)
- Family effects were statistically significant, oviposition preference may be a heritable or maternally determined trait.
- **Experiment 2:** Quantified oviposition of eastern and western monarchs over time on *A. incarnata*.
- Non-significant trend showed western monarchs were more rapid and productive egg-layers.



FIG. 1. Map of monarch butterfly breeding ranges and migratory routes to over-wintering sites. Eastern monarchs (1) migrate to Mexico while western monarchs (2) migrate towards the coast of California. Florida monarchs (3) are non-migratory. This difference in migratory patterns is a major distinction of monarchs in North America.

Background

Monarch butterflies (*Danaus plexippus*) in North America have different regional populations that appear to be separated by both geographic barriers and migratory divides. Monarchs east of the Rocky Mountains migrate to central Mexico for the winter. Western monarchs migrate to the California coast for the winter. There is little quantitative data that indicates how biologically distinct these populations are. Comparing regional differences in monarch behavior and other traits will provide vital information towards understanding and protecting this well known butterfly species, as recent controversies have surrounded the commercial sale and long-distance transfer of captive reared monarch butterflies.

Objectives

Specific goals of this study were to:

- Determine if there is a difference in host plant preference or rates of use between eastern and western monarchs
- Examine variation in preferences within and among family groups to assess the potential role of genetic or maternal effects

Methods

Monarchs from several families were chosen and numbered. Males and females were placed in four mating cages, two for each population, with 45 monarchs per cage. Mating were recorded and mated females were transferred into oviposition cages with milkweed stalks from 4 milkweed species (below).



Results

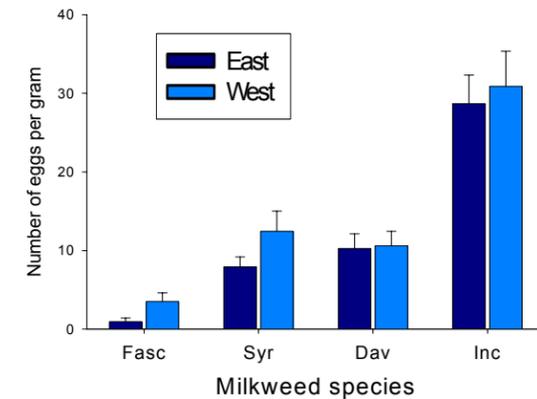


FIG. 2. Oviposition preferences of eastern and western monarchs. Preference was measured by the proportion of eggs laid on each milkweed species per gram of plant material, averaged across all females from each population.

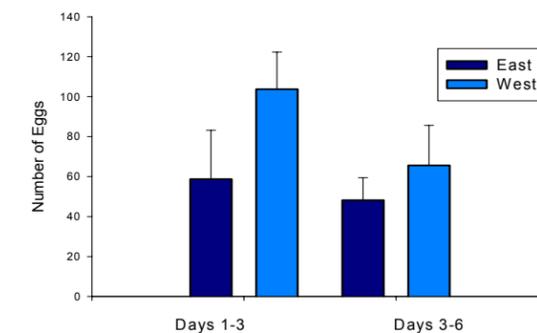


FIG. 3. Oviposition rate of eastern and western monarchs. The data was measured as number of eggs per 3-day block. Eastern monarchs had a consistently lower rate of oviposition. However, there was no significant difference between population or time blocks.

Conclusions

- Female monarchs showed strong rank order preference for milkweed species but there was no difference in oviposition preference between populations
- Preference of siblings were similar and significantly affected oviposition patterns
- Western monarchs appeared to have a higher rate of oviposition than eastern monarchs