

TACHINID FLY PARASITISM OF MONARCH EGGS AND LARVAE

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Introduction: Monarchs collected as 4th and 5th instars from the wild are frequently parasitized by tachinid fly parasitoids (Prysbly 2004). However, there have been no systematic collections of immature monarchs to document the stages at which monarchs are parasitized, and the time during the breeding season that parasitism is most likely to occur. The purpose of this study is to measure variation in parasitism rates across monarch ages and time.

Methods

Collection. I collected monarch eggs and larvae on *Asclepias syriaca* (mainly), *A. incarnata* and *A. tuberosa* weekly throughout the summers of 2002-2005 as follows:

- 2002 and 2003: L4 and L5 collected from 1265 sq ft garden of prairie forbs and grasses.
- 2004: eggs and L1-L5 collected from garden and yard (site Pond View).
- 2005: eggs and L1-L5 collected from garden and expanded Pond View site, and State Game Area (about 50 miles away, only visited 2 weeks in June).

Monarch Rearing. I raised monarchs in individual containers, transferring them to larger containers as they grew (see figure 1). Containers were sterilized between each use. I reared the eggs and larvae inside the house at 20-25°C and ambient light. Frass was removed as needed (at least once a day), and fresh *A. syriaca* leaves added at least every day or as consumed. I collected leaves every day, soaked and washed them in cold water and stored them in the refrigerator before use.

Sample Sizes. 703 monarchs over 4 years



Figure 1. Monarch rearing containers.

Results

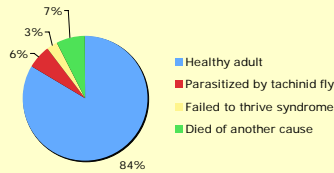


Figure 2. Fate of eggs and larvae collected at all sites for all years. *Fail to thrive:* larvae first eat normally, then nibble or stop eating, then die without obvious cause. *Died of another cause:* eggs don't hatch, miring in latex, unsuccessful molt, disease.

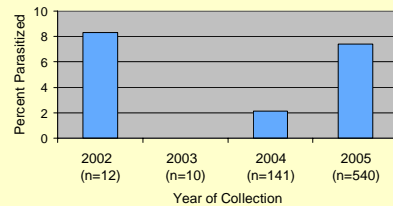


Figure 4. % tachinid fly parasitism of eggs and L1-L5 across sites and years.

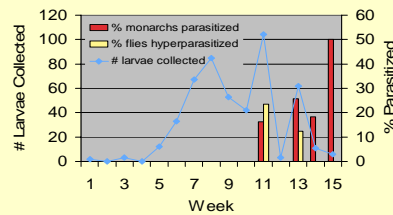


Figure 6. # monarch larvae collected each week in 2005 at Pond View site (week 1 = 29 May – 4 June, mid-Aug. dip represents a vacation), % larvae parasitized by flies and % flies hyperparasitized by wasps. Two of the six hyperparasitized monarchs produced both flies and wasps.

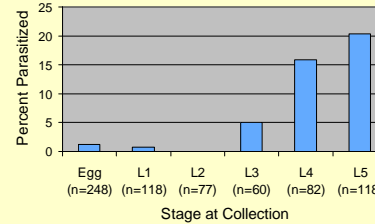


Figure 3. Tachinid fly parasitism for all sites and years.

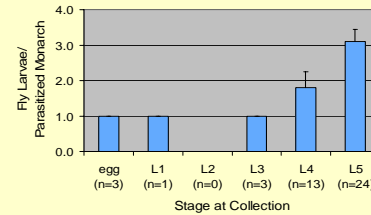


Figure 5. Mean # tachinid fly larvae per parasitized monarch (+ s.e.) across years and sites.

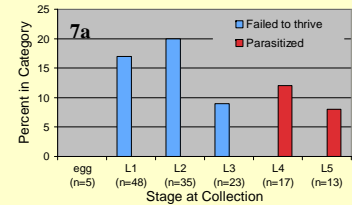


Figure 7a. Failed to thrive syndrome and parasitism in 2004. **7b.** A larva collected as an L3 in 2005 that failed to thrive and died as 5th instar. **7c.** A half-grown tachinid fly larva found inside this monarch larva.

Flies from Pond View site were identified as *Lespesia archippivora* in 2004 (figure 8a). It is likely that they were the same species other years. Wasps (figure 8b) were identified to family Perilampidae and are probably *Perilampus hyalinus*; hyperparasitism of tachinid flies by this species was reported previously (Prysbly 2004).



Figure 8a



Figure 8b

Conclusions: Tachinid fly parasitism of monarchs appears to occur across immature stages, although parasitism occurring after collection cannot be ruled out; milkweed leaves were not inspected under the microscope for tachinid fly eggs or larvae before feeding. Hyperparasitoids were fairly common, and warrant further study. Monarch larvae dying from the “fail to thrive” syndrome should be dissected and inspected for the presence of tachinid fly larvae to determine if this syndrome is commonly due to fly parasitism.

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References:

- Monarch Larva Monitoring Project Newsletter, Tachinid Flies: Where were they in 2003? Volume 5, Issue 1, February 2004, Page 3.
- Prysbly, M. D. 2004. Natural Enemies and Survival of Monarch Eggs and Larvae, *The Monarch Butterfly: Biology and Conservation*, Oberhauser, K. S. and Solensky, M. J. Editors, Cornell University Press, page 32.