

# A SEVEN-YEAR COMPARISON OF EGG, LARVAL AND ADULT REPRODUCTIVE POPULATIONS IN ARLINGTON, TEXAS, 1999-2005

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## Introduction

To date, there are few long-term studies of fall monarch reproductive populations in Texas. It has been generally accepted that fall southbound monarchs are in a state of reproductive diapause (Goehring and Oberhauser, 2002). However, in many parts of the south including Texas, eggs, larvae, and mated females are observed after a period of absence during the summer months (Prysby and Oberhauser, 2004).

The purpose of this study is to document monarch reproductive behavior in Arlington, Texas during the months of August, September and October for the years 1999 – 2005 and to compare the data with local weather data in an attempt to identify trends and possible environmental stimuli for the reproductive behavior.

## Preliminary Questions

- Are migratory monarchs in Arlington, Texas in late August and early September a different population than the main migratory population?
- Did the fall reproductive population observed in Texas break diapause upon arrival or are they part of a later reproductive population that extended its range into Texas?
- If the reproductive migrants broke diapause, what environmental factors, if any, stimulated the break?
- Are the monarch observed in larger numbers in October in Arlington, Texas part of the main southbound migration, or are they the offspring of the August/September reproductive population, or both?

## Methods

Three different larval monitoring sites were used over the seven-year period, two abandoned fields in which *A. viridis* was the predominant milkweed species and the Lamar High School butterfly garden in which *A. curassavica* was the predominant species. Abandoned field #1 was monitored in 1999 and 2000. Abandoned field #2 was monitored in 2001 and 2002. The butterfly garden was monitored from 2002 through 2005. Larval monitoring was done according to the Monarch Larval Monitoring Project protocol (Prysby and Oberhauser, 2004). Adult data was obtained using a tagging protocol (Borland et. al, 2004) in which adults were sexed, weighed, measured, and scored for wing condition and damage. The abdomen of all females was palpated to check for the presence of a spermatophore.

## Results

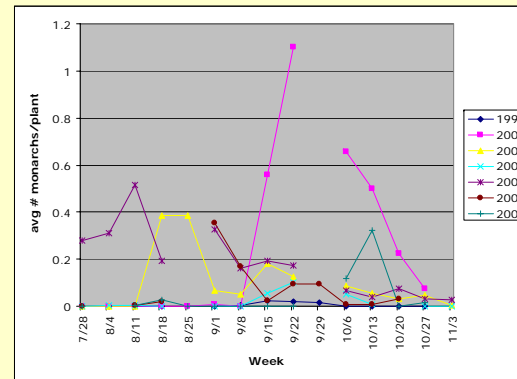


Figure 1. Average # monarchs per milkweed plant per week, August through October, 1999-2005

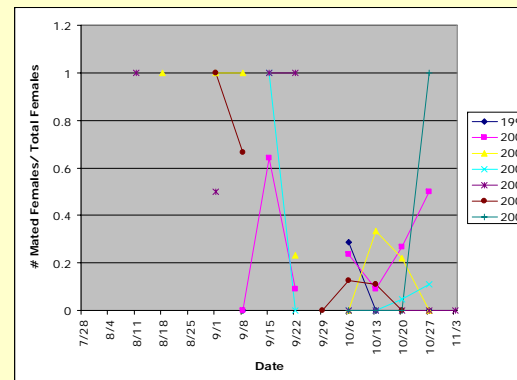


Figure 2. % mated females per total females captured, August through October, 1999-2005

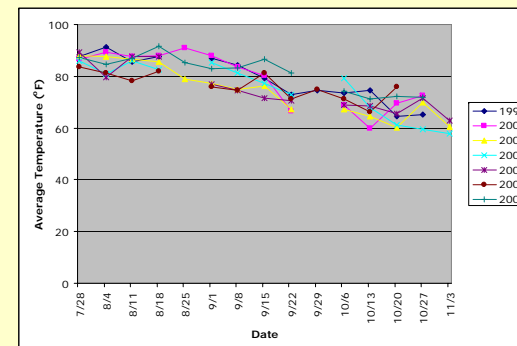


Figure 3. Average Weekly Temperature (°F) August through October, 1999-2005

## Results

In general, the data indicates that after an absence of eggs, larvae and adults throughout the summer, a smaller pre-migration reproductive population moves into North Central Texas. This is verified by both the presence of eggs and larvae as well as mated females. The reproductive populations generally peak in September, tapering off in October, but levels vary widely from year to year. The largest influx of adults generally occurs in early to mid October each year, presumably representing the main migratory population. A comparison of reproductive activity with local weather conditions including weekly rainfall, min/max temperatures, wind speed and direction showed no correlation to reproductive activity. In years where both a native field with *A. viridis* and the garden with *A. curassavica* were monitored, larval frequencies were generally higher in the garden.

## Conclusions and Future Objectives

Although the study shows general trends for monarch reproductive activity in North Central Texas in the fall, there is enormous fluctuation from year to year and no specific stimuli were noted. Future comparative studies between native fields and domestic gardens are needed to determine the effect of *A. curassavica* on fall monarch populations in Texas. Studies comparing wing scale wear with age to scale wear in September versus October migrants could provide insight into the origin of the fall populations in Texas.

## References

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- Prysby, M., and K. Oberhauser. Temporal and geographic variation in monarch densities: citizen scientists document monarch population patterns. The Monarch Butterfly. Cornell Press. 2004. 5-20