2016 Report
Issue 1 *2016 Farm Progress Reports*

Number RFR-A1611

2017

Monarch Oviposition and Larval Survivalon Nine Native Milkweed Species Duringthe 2016 Breeding Season

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Introduction

The Iowa Monarch Conservation Consortium was established March 2015. Adding milkweeds to agricultural landscapes is one of many Consortium goals. In order to further monarch butterfly conservation efforts, scientists need more information about milkweed phenology and persistence on the landscape, and how monarchs are using these plants, because milkweeds now are absent from most agricultural fields. This is the second year of a study to examine both oviposition preference and larval survival on nine milkweed species endemic to Iowa. These data will be used as a baseline for informing monarch habitat conservation and restoration efforts across the Midwest.

Materials and Methods

Milkweeds grown in the Iowa State University (ISU) Forestry Greenhouse without the use of pesticides were planted across Iowa at 11 ISU Research and Demonstration Farm sites in 2015. Each of nine milkweed species was randomly assigned to a $1m^2$ plot within one row. Each block was separated by 1m. Five milkweeds of the same species were placed within each $1m^2$ plot. The milkweed species included common, *Asclepias syriaca;* swamp, *A. incarnata;* butterfly, *A. tuberosa;* whorled, *A. verticillata;* showy, *A. speciose;* poke, *A. exaltata;* Sullivant's, *A. sullivantii;* tall green, *A. hirtella;* and bluevine, *Cynanchum laeve.* Milkweeds that did not survive the winter were replaced at the start of the 2016 monitoring season. Once per week, each plant was examined for the presence of monarch eggs and larvae by carefully inspecting each leaf. When a larva or egg was found, the milkweed species and plant position within the plot were recorded. This protocol was modified from the Monarch Larva Monitoring Project.

Results and Discussion

Monarch eggs and larvae were observed throughout the summer, but most findings were recorded in July and August during the second breeding generation. Monarch eggs and larvae were found on all nine milkweed species, indicating all the milkweeds were suitable monarch hosts. The highest number of average eggs per plant was recorded from August 22–28, 2016 (6.07 eggs/plant; Figure 1). Common milkweed (*A. syrica)* had the highest average number of eggs (1.04/plant) when all monitoring data were pooled (Figure 2); this represents 37 percent of all egg observations.

Peak larval observations occurred from September 5–11, 2016. Swamp milkweed (*A. incarnata)* had the highest average number of larvae (0.8/plant) when all monitoring data were pooled (Figure 3). This represents 27 percent of all larval observations (data not shown). Swamp milkweed (*A. incarnata)* grew well at all locations, while tall green milkweed (*A. hirtella)* did not regrow at several locations.

Conclusions

All nine milkweed species included in the demonstration plots are suitable host plants for monarch butterflies. Peak egg laying in 2016 occurred during the last week of August, three weeks later than the 2015 peak. Common milkweed (*A. syriaca)* had the highest number of eggs, on average, across all sites.

Swamp milkweed (*A. incarnate)* was the species with the highest number of larvae, on average, at all sites across the entire summer. Bluevine (*C. leave)* was most often used as a larval host in September, although all species were used for egg laying and as larval host plants.

Acknowledgements

This research was supported through grants from the Iowa Native Plant Society, The Center for Global and Regional Environmental Research, and Prairie Biotic Research, Inc., as well as the Iowa Monarch Conservation Consortium. The authors would like to thank Chris Beedle, Nick Howell, Steve Jonas, Dallas Maxwell, Warren Pierson, Ken Pecinovsky, Matt Schnabel, Chad Huffman, Josh Sievers, Myron Rees, Lyle Rossiter, Nick Piekema, and Vince Lawson for milkweed plot planting and maintenance assistance; and Randy Breach, Brandyn Chapman, Cory Haggard, Jackie Appelhans, and Nancy Shryock for plot monitoring assistance.

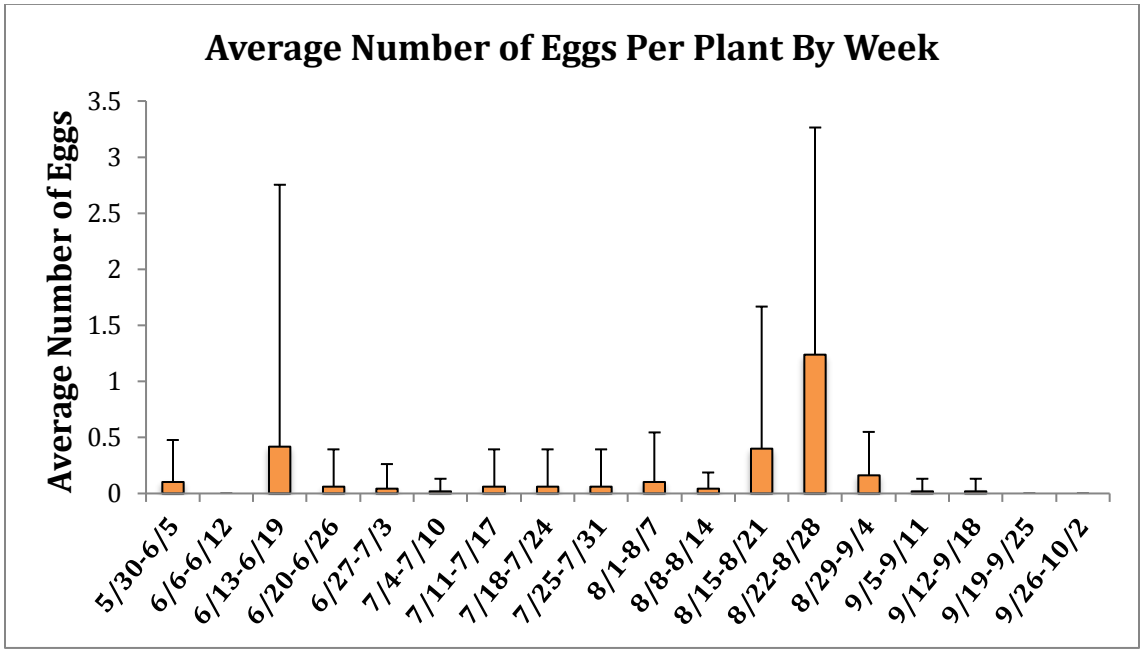

Figure 1. Average number of eggs counted per plant by week during the 2016 breeding season. All ISU Farm sites and species were pooled.

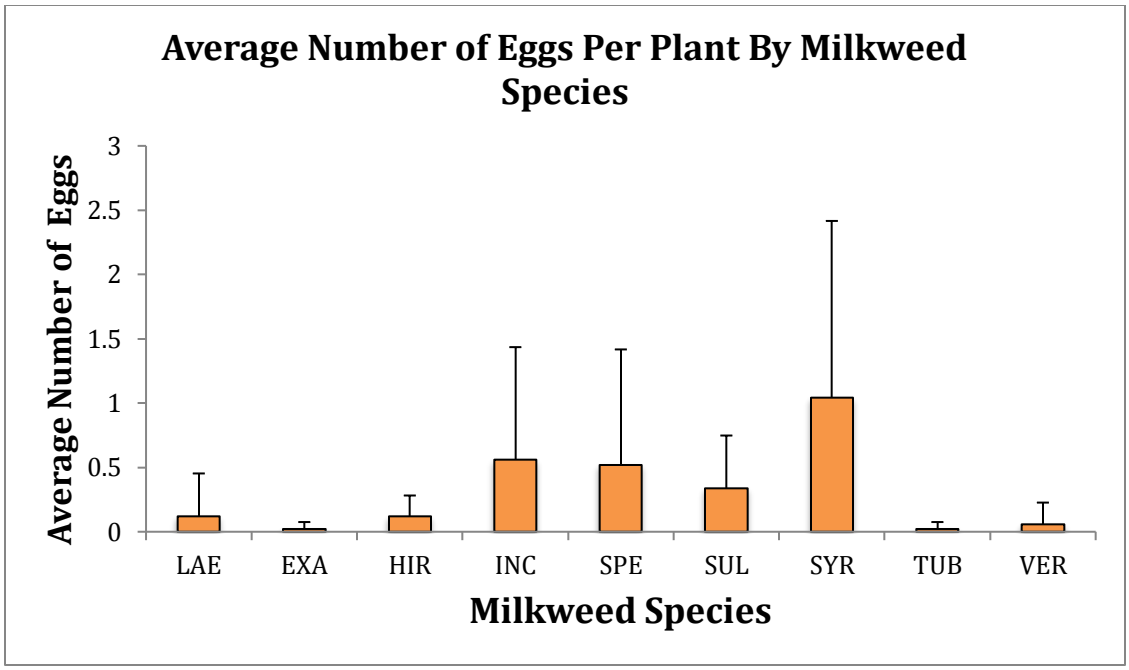

Figure 2. Average number of eggs counted per plant by species during the 2016 breeding season. All ISU Farm sites were pooled.

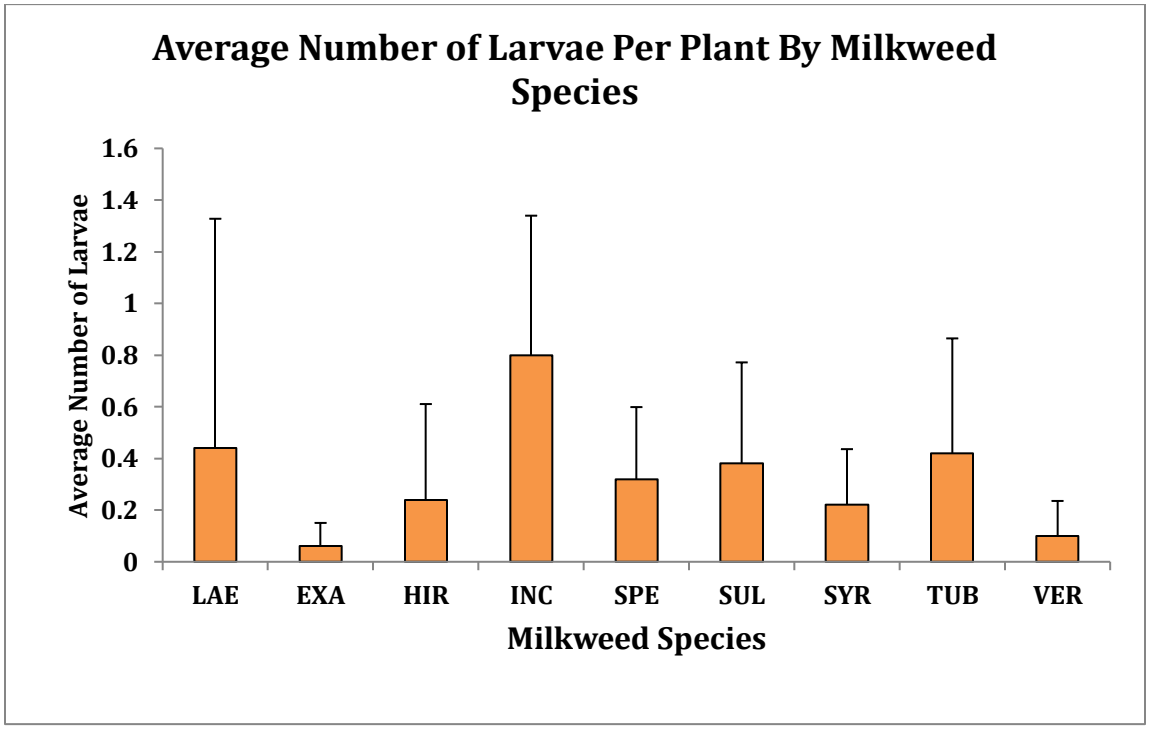

Figure 3. Average number of larvae counted per plant by species during the 2016 breeding season. All ISU Farm sites were pooled.

LAE = *C. laeve*, bluevine; EXA = *A. exultata*, poke; HIR = *A. hirtella*, tall green; INC = *A. incarnata*, swamp; SPE = *A. speciose*, showy; SUL = *A. sullivantii*; sullivant's; SYR = *A. syriaca*, common; TUB = *A. tuberosa*, butterfly; VER = *A. verticillata*; whorled.