

Proposed surveys, greenhouse experiments, and field experiments for monarch butterflies (*Danaus plexippus*) and preferred milkweed species (Asclepiadaceae) in Texas.

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PROJECT SUMMARY

Colony estimates at central Mexico overwintering sites indicate that monarch butterfly (*Danaus plexippus*) populations have declined over the past two decades. Among the leading causes of this long-term trend are (1) deforestation and forest degradation in the butterfly's overwintering sites; (2) climate change punctuated by episodic extreme weather conditions in the butterfly's migratory range (central Mexico, United States, and southern Canada); and (3) loss of milkweed (Asclepiadaceae) host plants in the spring and summer breeding habitat in the United States. Although citizen scientist groups are accumulating invaluable data (eg. Texas Parks and Wildlife Department-sponsored Texas Milkweeds and Monarchs Project), integration of this information and additional correlative research is required to shape future management objectives for the monarch butterfly in Texas, particularly as these relate to changes in monarch populations and/or their larval host plant (milkweed) and important adult butterfly nectar source.

A combination of roadside and site-specific surveys, greenhouse experiments, and field experiments will be used to (1) determine the density of native milkweed populations in seven (of the ten) Texas ecoregions; (2) determine the species of milkweed preferred by monarch butterflies; (3) determine seed viability and growth requirements for preferred milkweed species; and (4) evaluate the temporal effects of mowing and the spatial/density influence of *Solenopsis invicta* (fire ants) on milkweed and monarch butterfly eggs and larvae.

We expect to find that current densities of milkweed populations are similar to those reported by W. H. Calvert in 1999. We expect that native milkweed species will prefer (and possibly even require) disturbed habitats. We expect that monarch butterflies favor some milkweed species and expect to corroborate others' work that the preferred host plants are *Asclepias asperula*, *A. viridis*, and *A. oenotheroides*. We expect to find that poor seed viability is not to blame for failed attempts at propagation, but, rather, unmet growth requirements are the limiting factor. We expect to find that most milkweed species exhibit characteristics of species that prefer disturbed habitats; that is, they require high light intensities, low soil nutrients, and are drought-tolerant. We expect to find that timely mowing will encourage new growth of milkweed, with a resulting increase in the number of monarch eggs and larvae, and that fire ant infestation may interfere with successful completion of developmental stages.

This research will update Calvert's 1996 east to west survey data and, for the south to north transect, fill a gap in baseline data. The end result will be a comprehensive report on the current status of native milkweeds for a large swath of Texas. The study will also determine which milkweed host plants are preferred by monarchs which, when combined with findings about the milkweed species' optimal growth requirements, will guide statewide management strategies and conservation efforts. Ultimately, this research will help refine recommendations by the U.S. Fish and Wildlife Service that rely on the current areal status of monarch butterflies and milkweed habitat.