



MILKWEEDS &
Monarchs

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Acknowledgments

We thank Dr. David Horn, past president of the Ohio Lepidopterists, for his thoughtful review of this publication. Our appreciation goes to the Ohio Lepidopterists, and Monarch Watch. These organizations work tirelessly to promote the conservation of butterflies and moths.

COVER PHOTO BY KELLY NELSON

Introduction

Text and photos by Jim McCormac, Ohio Division of Wildlife, unless otherwise stated.

The Monarch butterfly (*Danaus plexippus*) is one of North America's most iconic insects. The gorgeous golden-brown and black butterfly is probably the most celebrated insect on the continent, and the migration of the eastern population is conspicuous and spectacular. Southbound Monarchs can appear anywhere, even in highly urbanized locales, and the butterflies often use backyard gardens as way stations. Occasionally a resting swarm of hundreds or even thousands of butterflies is encountered. The spectacle of trees dripping with living leaves of butterflies is unlikely to be forgotten.



PHOTO BY CHRIS FROST

A Pictorial Journey From Caterpillar to Chrysalis to Butterfly



PHOTOS BY STEVEN RUSSEL SMITH

Monarch Butterfly Life Cycle

Like all species in the order Lepidoptera (moths and butterflies), Monarchs engage in **complete metamorphosis**. This term indicates that there are four parts to the life cycle: egg, caterpillar, pupa, and adult. A vital component of the Monarch's life cycle is its **host plant**. Host plants are plant species that a moth or butterfly must have as food for the larvae (caterpillars). Caterpillars can only eat a select suite of plant species that is chemically compatible with that particular moth or butterfly species. In the case of the Monarch, the host plants are milkweeds and (in Ohio) one very closely related species. The butterfly lays its eggs on milkweed plants, and tiny caterpillars

soon hatch. The caterpillars begin eating the milkweed foliage, and grow rapidly. The growth process involves five molts where the caterpillar sheds its skin and emerges as a larger animal. The stage between molts is termed an **instar**. After reaching the end of its fifth and final instar, the Monarch caterpillar forms a beautiful chrysalis, in which its tissues are transformed and reorganized into the adult butterfly. Once the transformation is complete, the butterfly forces its way from the chrysalis and fluid is pumped into the wings to make them expand. Once the wings harden the butterfly is ready to take flight. The entire process, from egg to adult butterfly, takes four to five weeks.

Monarch Migration

There are numerous migratory insects, including many moth and butterfly species. However, because of the Monarch's large size and conspicuous coloration, its migration is the most obvious of our butterflies. Depending on the length of the season, which can be dictated by weather, Monarchs might have from two to four different broods in Ohio. The adults produced from the last hatch will make an incredible journey to high elevation oyamel fir forests in central Mexico. This journey might entail traveling nearly 2,000 miles, one way. Once in Mexico, the butterflies congregate in massive numbers in a very few favored locales. Roosting trees are blanketed with butterflies, creating one of North America's greatest natural spectacles. Northward migration reaches the U.S. in early March. Females lay eggs on emerging milkweeds throughout most of the green area on the map. The offspring of this first brood then colonize the remainder of the breeding range in eastern North America.



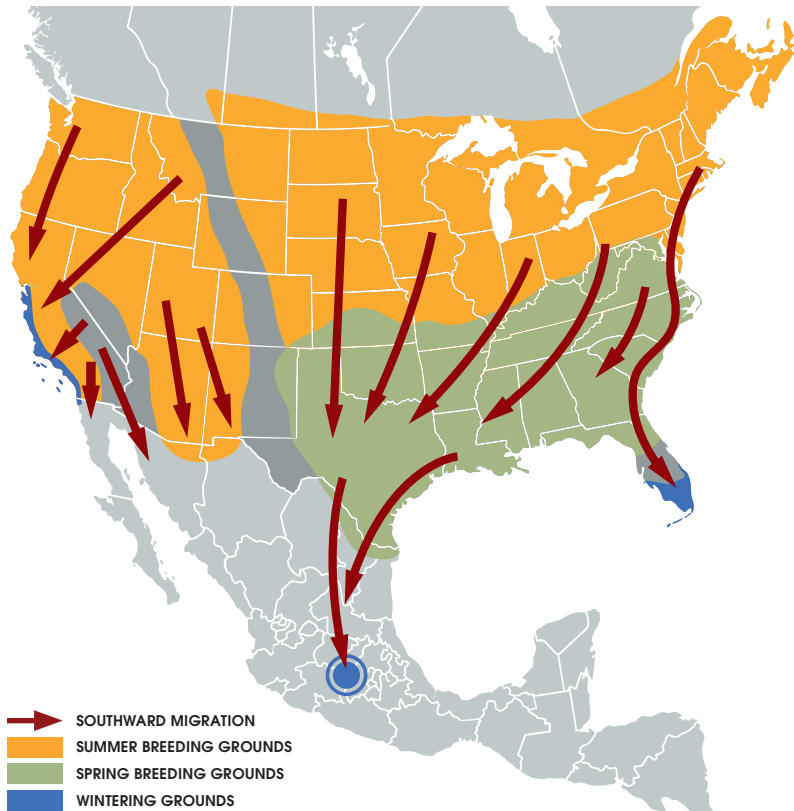
Monarch nectaring on ox-eye sunflower, *Heliopsis helianthoides*.



Monarch egg on common milkweed leaf; caterpillar in back.



Monarchs resting after crossing Lake Erie, Cleveland, Ohio.



The Problem

Monarch populations have declined alarmingly in recent years. The wintering population in Mexico was at its lowest recorded level in winter 2013-2014, and many observers reported seeing few if any Monarchs in eastern North America in summer and fall of 2013. The two next lowest wintering population levels were recorded within the last decade. Experts estimate that the eastern population of Monarchs has diminished by 90% over the past twenty years. This incredible downturn in numbers serves as an environmental red flag, and efforts should be made to correct the conditions which have led to losses in the Monarch population.

Reasons Behind the Decline

Scientists who study Monarchs cite several causes for population declines. 1) Timbering, and possibly increased infestations of bark beetles and perhaps an escalation of air pollution, have been detrimental to the Mexican oyamel fir forests where Monarchs overwinter. 2) An apparent increase in untimely weather events characterized by hail, freezing temperatures, and high winds have buffeted Monarchs on the wintering grounds and during their northbound migration. The mortality caused by storm events in 2010 was thought to be 50%. 3) A precipitous decline in milkweeds in much of eastern North America is likely a major factor in Monarch declines. The organization Monarch Watch calculates that about 2.2 million acres of potential milkweed – and thus Monarch – habitat is lost in the United States each year. Much of the loss in milkweeds stems from conversion of land to agricultural uses and other development, and the increasing efficiency of herbicides used in control of non-crop plants.

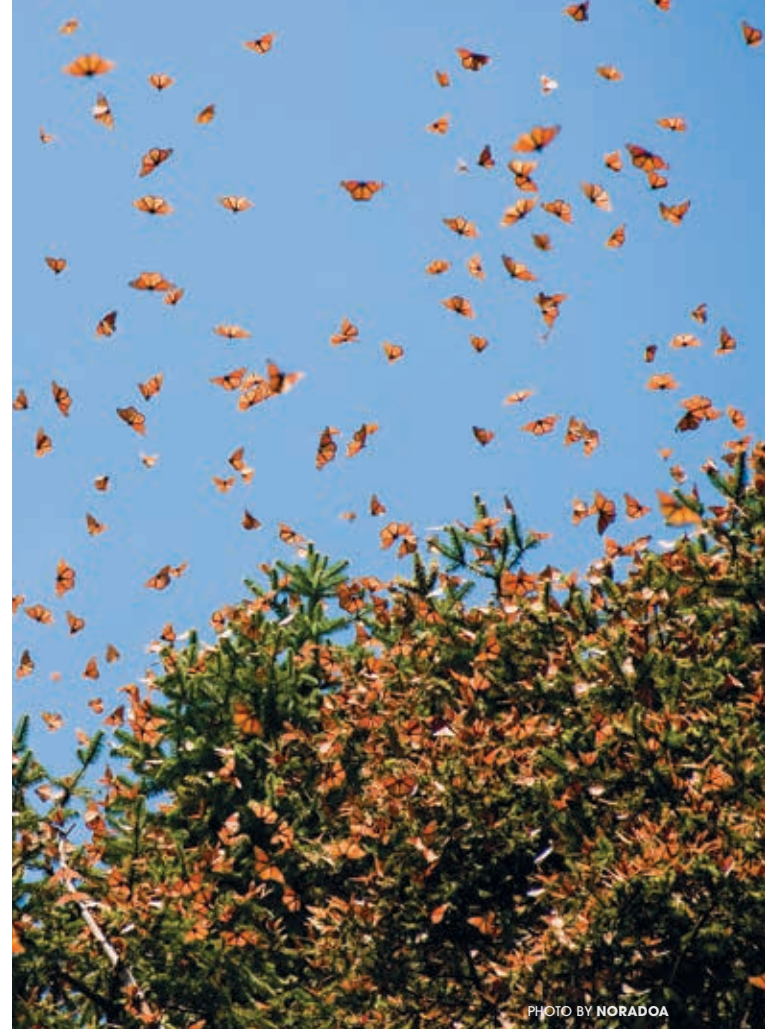


PHOTO BY NORADOA

Monarchs gather at the Monarch Butterfly Biosphere Reserve in central Mexico.



PHOTO BY TIMOTHY EPP

Illicit logging has threatened monarch wintering grounds.

Milkweeds

Monarchs depend on milkweeds as host plants. The butterflies deposit eggs on milkweed plants, which then provide nutrition for the caterpillar phase of the butterfly's life cycle. Plants in the milkweed family contain poisons known as cardiac glycosides, which render them unpalatable to most insects. Monarch caterpillars, and a handful of other insects, have evolved the ability to assimilate milkweed toxins. As the caterpillars, and subsequently the butterflies, sequester these toxic compounds in their bodies, they become distasteful to many predators.

While milkweeds were long placed in their own family (Asclepiadaceae), they are now generally considered a subfamily of the much larger dogbane family (Apocynaceae). There are 17 native species in this group in Ohio, and Monarchs will use at least 13 of them as host plants (see page 10 for complete list). If you plant milkweed, avoid using tropical milkweed, *Asclepias curassavica*, which is often sold as an ornamental plant attractive to Monarchs. It is indigenous from southern Mexico south into South America. Stick to species native to Ohio, or whatever region you live in. Monarch Watch is an excellent source for milkweeds, visit their website at monarchwatch.org/milkweed/market.



Tiny Buck's plume moths, *Geina bucksii*, nectaring on purple milkweed.



Milkweed tussock moth caterpillars, *Euchaetes egle*, resemble a mass of pipe cleaners twined together. They are a charismatic component of milkweed fauna.



Large milkweed bugs, *Oncopeltus fasciatus*, are often a fixture on milkweed plants.



The unexpected cynthia moth, *Cycnia inopinatus*, is endangered in Ohio. Its caterpillars feed on milkweed and dogbane.



Milkweed blooms attract many nocturnal pollinators such as this banded tussock moth, *Halysidota tessellaris*.



Butterfly-weed attracts scores of interesting pollinators such as this great golden digger wasp, *Sphex ichnumoneus*.

Milkweed leaf beetles, *Labidomera clivicollis*, are colorfully ornate, and prefer swamp milkweed.



Other Milkweed Specialists

It isn't just Monarch butterflies that depend upon milkweeds. These plants spawn a blizzard of biodiversity, especially when one includes the legions of pollinators that visit the flowers. In addition to Monarchs, there are numerous other insect species that are milkweed obligates – milkweeds are the only plants that meet their nutritional requirements. It doesn't take much inspection of milkweed plants to find milkweed specialists. Most of the insects that specialize on milkweeds are boldly marked in colors of black and orange. Such “loud” coloration is termed aposematic – the bright hues serve to warn would-be predators that the colorful insects are toxic, and predators quickly learn to shun them. These insects' toxicity is derived from consuming the poisonous cardiac glycosides in milkweed sap. If you plant milkweeds, chances are great you will soon attract one or more of the species on this page and the previous one.



Orange assassin bugs, *Pselliopus barberi*, are one of many tiny predators that hunt in milkweed flowers.

Build a Monarch Nursery Garden

The following five species might be considered über-milkweeds – species that Monarchs seem especially attracted to for egg-laying purposes. All are fairly easy to grow, attractive, and available in the native plant trade. Any Monarch nursery garden in Ohio should be stocked with at least one of these species, and the more, the better! To the right are five of the native Ohio milkweed species that are excellent larval hosts for the Monarchs. On page 10 is a list of all native Ohio milkweeds known to host monarchs. Pages 10 and 11 show a small selection of native plants that are prime nectar sources for adult Monarchs, and make for attractive companion species in a milkweed garden. Don't mow down the old plants once they have flowered. The fruit pods of milkweeds are attractive, and release their wind-borne seeds well after the plants have bloomed. American goldfinches make use of the silky hairs (comas) attached to milkweed seeds for their nests. Long-dead milkweed stalks that are still standing the following spring sometimes have their fibers harvested by Baltimore orioles and other birds for nesting material.



Baltimore oriole nests often incorporate the fibers from milkweed.

BUTTERFLY-WEED

Asclepias tuberosa

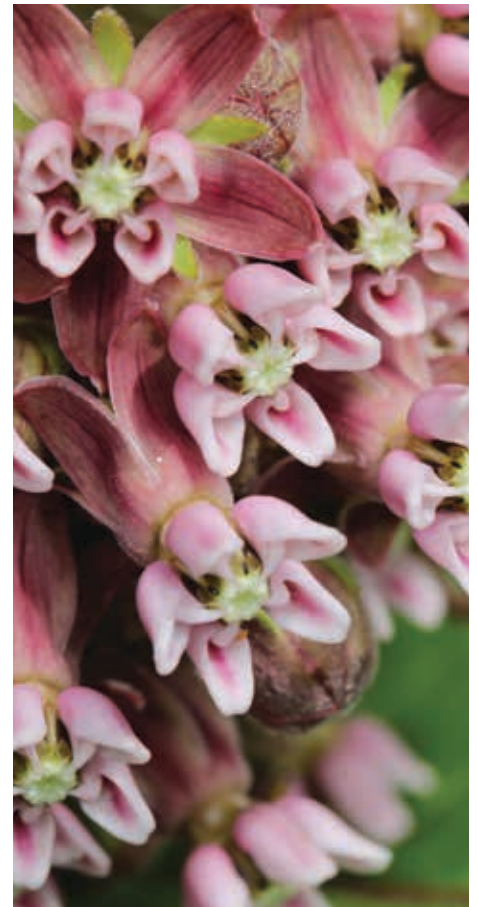
This is one of only a handful of native Ohio plants with bright orange flowers. Butterfly-weed is a real attention-getter, both to people and insects. While Monarchs may not use it as a host plant as frequently as they do some other milkweed species, butterfly-weed more than carries its weight in the garden. Its flowers are a magnet for all manner of pollinating insects. Not only are Monarchs attracted to its blooms, so are numerous other species of butterflies.



COMMON MILKWEED

Asclepias syriaca

The aromatic flowers of this species exude a powerfully sweet scent that can be detected many feet away. Common milkweed is aptly named, as it is by far the most frequent species in the state, and occurs in every county. This is the species that produces the majority of Monarchs in Ohio. Unfortunately, common milkweed is often derided as a weed, and efforts are made to eradicate it. Common milkweed can spread rather aggressively, so gardeners may have to rein it in on occasion.



PURPLE MILKWEED

Asclepias purpurascens

Few milkweeds can match the gorgeous magenta flowers of this species. So striking is purple milkweed when in full bloom that it might be mistaken for an exotic ornamental. It is fairly tolerant of a variety of conditions, from partial shade to full sunlight, and dry to moist soil. Blooming period is typically in June and July. In addition to numerous species of butterflies, the flowers attract a variety of interesting moths.



SULLIVANT'S MILKWEED

Asclepias sullivantii

A true prairie species, Sullivant's milkweed is exceptionally attractive to Monarchs for use as a nursery plant. This species was discovered by William Starling Sullivant in a prairie west of Columbus, Ohio in the 1840's and was named in his honor. This species is one of about 98 species of vascular plants originally discovered in Ohio. Sullivant's milkweed is one of the handsomest plants in the family, and lends itself well to prairie gardens and milkweed plots.



SWAMP MILKWEED

Asclepias incarnata

This is our only wetland milkweed species, and will flourish along pond margins or other damp sites. Swamp milkweed normally grows well in rich, well-drained soils of gardens, too. While its flowers are normally a stunning rose-pink coloration, a form with snow-white flowers is found on occasion. It seems to be a favorite of the gorgeous milkweed leaf beetle, *Labidomera clivicollis*, and Monarchs are strongly attracted to this species.



Native Plants in the Garden

When gardening for wildlife, native plants are immeasurably preferable to nonnative species. Insects, including butterflies and moths, often have specific relationships with select native plants species that is dictated by the chemical composition of the plant. Non-native plants are often chemically incompatible with native insects, and as a consequence alien plants add little if anything to the food web. The species pictured to the right are all native to Ohio, and would be excellent additions to a milkweed garden.

Monarch Host Milkweeds

The following list of species are plants in the milkweed subfamily native to Ohio and known to be used as host plants by Monarchs.

Butterfly-weed, *Asclepias tuberosa*

Clasping-leaved Milkweed, *Asclepias amplexicaulis*

Common Milkweed, *Asclepias syriaca*

Green Milkweed, *Asclepias hirtella*

Green-flowered Milkweed, *Asclepias viridiflora*

Honey-vine, *Cynanchum laeve*

Poke Milkweed, *Asclepias exaltata*

Purple Milkweed, *Asclepias purpurascens*

Spider Milkweed, *Asclepias viridis*

Sullivant's Milkweed, *Asclepias sullivantii*

Swamp Milkweed, *Asclepias incarnata*

White Milkweed, *Asclepias variegata*

Whorled Milkweed, *Asclepias verticillata*



ASHY SUNFLOWER
Helianthus mollis



BLACK-EYED SUSAN
Rudbeckia hirta



DENSE BLAZING-STAR
Liatris spicata



NEW ENGLAND ASTER
Symphyotrichum novae-angliae



OHIO GOLDENROD
Oligoneuron ohioense



OX-EYE SUNFLOWER
Heliopsis helianthoides



PRAIRIE-DOCK
Silphium terebinthinaceum



PURPLE CONEFLOWER
Echinacea purpurea



RATTLESNAKE-MASTER
Eryngium yuccifolium



SHALE-BARREN ASTER
Symphyotrichum oblongifolium



SMOOTH ASTER
Symphyotrichum laeve



SPOTTED JOE-PYE
Eutrochium maculatum



STIFF GOLDENROD
Oligoneuron rigidum



TALL IRONWEED
Vernonia gigantea



NARROW LEAVED MOUNTAIN MINT
Pycnanthemum tenuifolium

PUBLICATION FUNDING

Funding for this publication was provided by donations to the state income tax checkoff program, sales of the cardinal license plate, and the Ohio Wildlife Legacy Stamp.

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PUBLICATION 5474 (0115)

Total Quantities Printed: 10,000 Unit cost: 0.221 Publication date: 03/15

Enjoy gardening for wildlife!



PHOTO BY CATHY KEIFER