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The Monarch Butterfly

PART I. MIGRATION AND LIFE CYCLE

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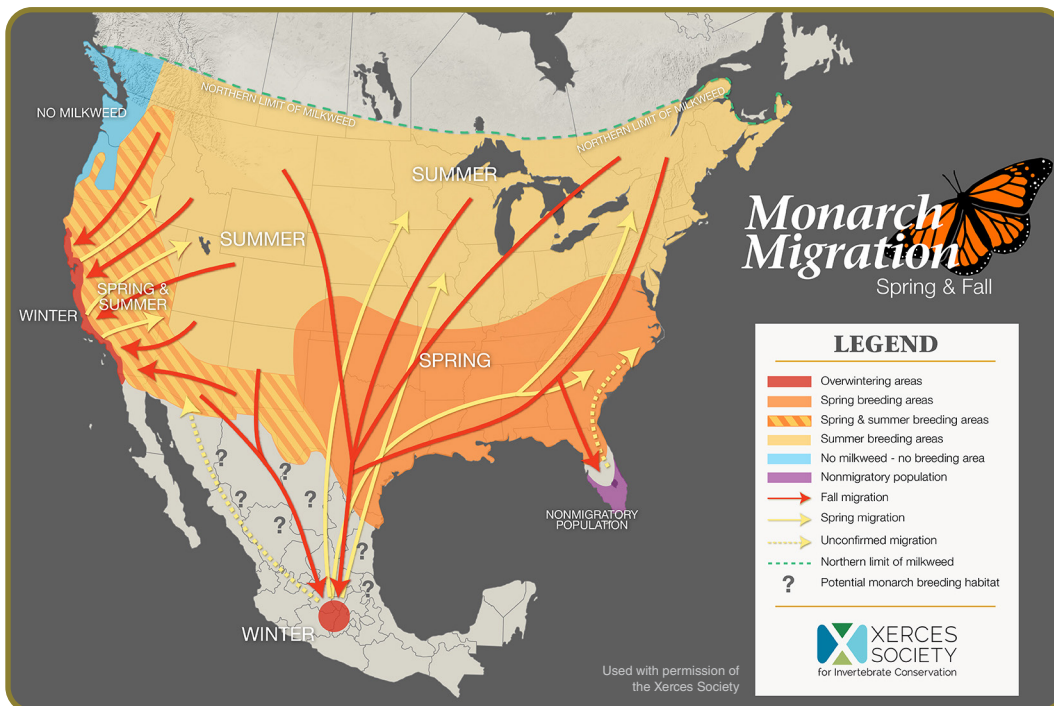
The monarch butterfly (*Danaus plexippus*) population is decreasing, and it is more important than ever to be educated about the needs of this charismatic species. The eastern and western monarch populations are much smaller today compared to their historic numbers. In the last 50 years, the eastern migratory population has declined by 80% from habitat destruction (loss of host plants and nectar sources) and increased pesticide use in prairie and agricultural landscapes in the monarch's migratory range.

Due to this severe decline, monarchs were listed as endangered by the International Union for Conservation of Nature in 2022. This decision is not binding on the United States. The U.S. Fish and Wildlife Service (USFWS) has

the authority to list the monarch as either a threatened or endangered species under the U.S. Endangered Species Act. While the USFWS considers the monarch a justifiable candidate for federal listing and protection, the agency has postponed this determination but will revisit this decision in the near future. In the interim, homeowners and property managers are advised to plant gardens and habitat to provide food to nourish both the larvae and adult butterflies.

The eastern migratory population of monarchs is found along the central corridor of North America from the Rocky Mountains to the Atlantic Ocean. In contrast, the western population is much smaller and resides to the west of the Rockies. This publication will focus on the eastern

population, which overwinters in the Sierra Madre Mountains in Mexico. Each year, population estimates are taken by measuring the number of hectares of trees occupied by monarch butterflies at the overwintering site in the Mexican oyamel (fir trees) forests. Unfortunately, these populations have greatly diminished over the years.



MONARCH LIFE CYCLE

The eastern monarchs have a multi-generational life-cycle, taking three to four generations to complete their annual migration from their overwintering grounds to North Dakota and southern Canada. In late summer, the fourth generation and some late third generation butterflies make the long trip back to Mexico. These adults will fly up to 3,000 miles, at a pace of 25-30 miles per day, to reach their overwintering destination. Monarchs convert sugar from nectar into fat to sustain them during those long migratory flights. With a sufficient supply of flowering plants along migratory routes, most monarchs are able to store enough fat that they do not need to eat while overwintering. The overwintering populations are the longest lived of all the generations and do not mate until the following spring. Their offspring then carry on their migration north, and the multi-generational migratory cycle begins again.

Egg (~4 days): Female adult monarchs lay eggs on the undersides of milkweed leaves. Monarch larvae eat only milkweed and will grow to adulthood on no other plants. All species of milkweed contain steroids called cardenolides, which make the caterpillar and adult butterflies toxic to predators and is essential to the monarch larvae's survival.

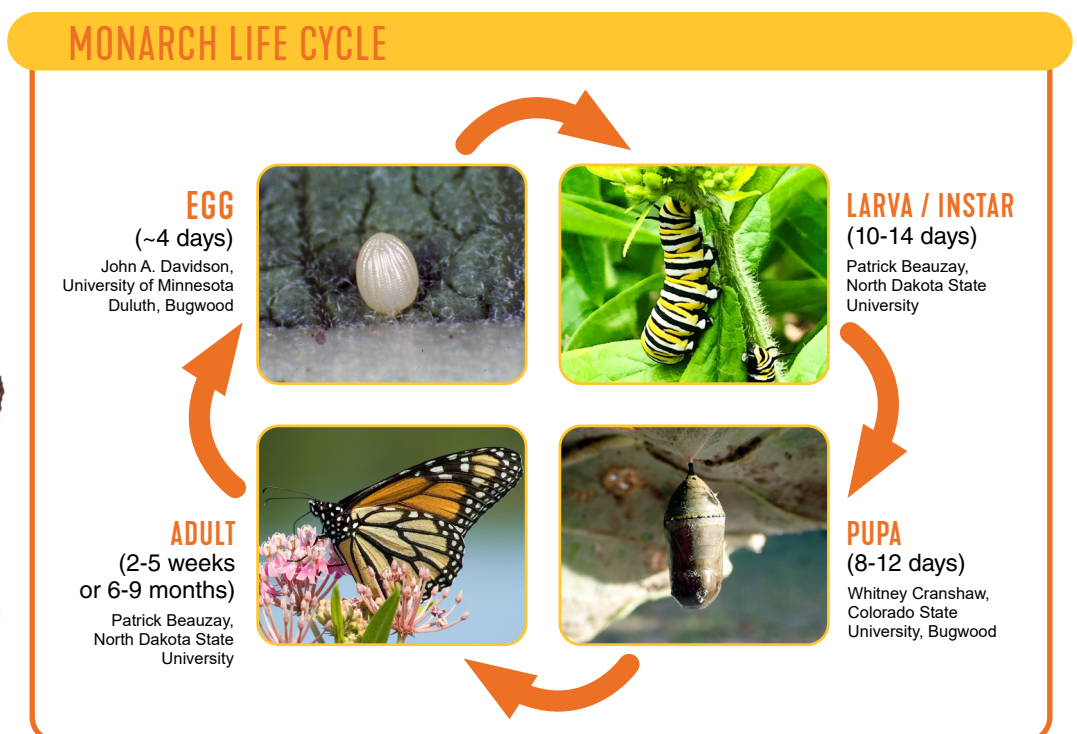
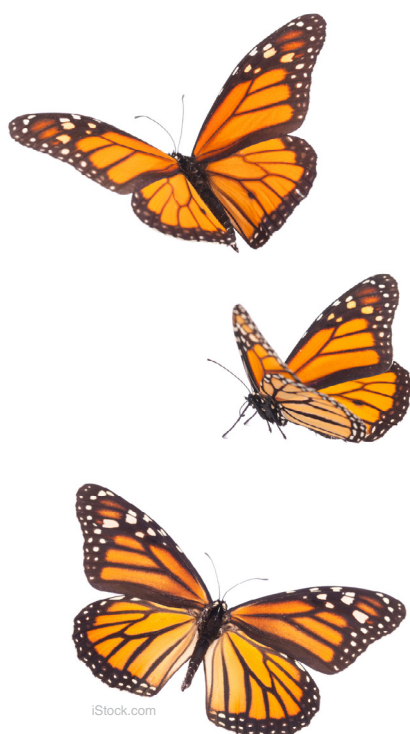
Larva / Instar (10-14 days): After the egg hatches, the larva (caterpillar) eats constantly until it is ready for metamorphosis. When a larva grows too large for its skin, it molts. Larvae will undergo this process five times, called "instars." The mature larva will grow to almost 2,000 times its mass as an egg. Monarch larvae are most vulnerable during the early instar stages when they have not ingested enough cardenolides to become toxic to predators.

Pupa (8-12 days): Once a late fifth instar larva has reached sufficient body mass, it will pupate. During this stage, the larva will leave the milkweed plant in search of a secure location (for example: a garden trellis, a sturdy shrub or the underside of a picnic table) from which to hang upside down and molt into a hard exoskeleton known as a chrysalis.* The pupa will transform inside the chrysalis, after which the chrysalis will split open and an adult monarch butterfly will emerge sexually mature. These new adults pump fluid into their wings and spend several hours drying in the sun before they are ready to fly.

*The exoskeleton of pupating butterflies is called a chrysalis, and it is **not** a cocoon. Cocoons are a distinctly different structure and are unique to moths (*Heterocera*).

Adult (2-5 weeks or 6-9 months): No growth or physical changes occur during the adult stage. Instead, a monarch butterfly spends its time foraging for nectar to maintain its body and to fuel flight.

Adult butterflies emerging in the spring and summer months will typically live for two to five weeks, during which they will mate, and females will lay an average of 300-400 eggs. Those adults that emerge in the fall enter reproductive diapause, during which they cannot reproduce. These adult monarchs are the migratory generation, and on average, they will live between 6-9 months.



MONARCH MIMICS

Butterfly

Larvae

Adult

Monarch

Danaus plexippus



Viceroy

Limenitis archippus



Painted Lady

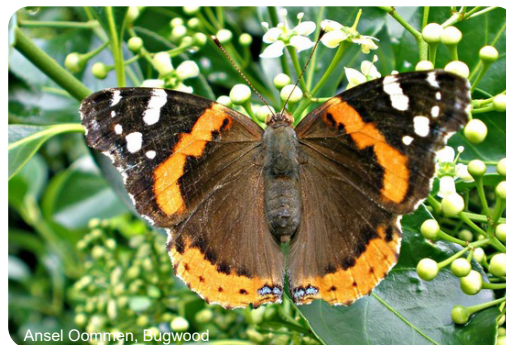
Vanessa cardui

Larvae is called the "thistle caterpillar."



Red Admiral

Vanessa atalanta



Queen Butterfly

Danaus gilippus





TAKE ACTION

Volunteer with the Monarch Larva Monitoring Project (MLMP)

The Monarch Larva Monitoring Project (MLMP) was developed by researchers at the University of Minnesota to collect long-term data on monarch populations and milkweed habitat. This citizen science project involves the general public in collecting data with which to develop a better understanding of the health of the monarch population during the breeding season.

MLMP volunteers participate in several in-person training sessions which cover monarch biology, monitoring procedures, data entry protocols and other important monitoring information. MLMP volunteer efforts contribute to monarch conservation and supply valuable knowledge of butterfly ecology in general.

To learn more about monarch conservation efforts and to volunteer for MLMP, visit

<https://mlmp.org>.

For more information about monarchs and other pollinators, and to stay up to date with conservation news and volunteer projects, follow NDSU Extension Pollinator Conservation on Facebook. Also, please see our NDSU Extension publication on planting milkweed and other beneficial plants, *The Monarch Butterfly: Part II Conservation Gardens in the Northern Plains*.



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