

Monarch butterflies increasingly plagued by parasites

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Scientists have found that monarch butterflies are increasingly plagued by parasites. Credit: Emory University

Monarch butterflies, among the most iconic insects in North America, are increasingly plagued by a debilitating parasite, a new analysis shows.

The *Journal of Animal Ecology* published the findings by scientists at Emory University and other institutions.

The U.S. National Science Foundation-supported analysis drew from 50 years of data on the infection rate of wild [monarch butterflies](#) by the protozoan *Ophryocystis elektroscirrha*, or O.E. The results showed that the O.E. infection rate increased from less than 1% of the eastern monarch population in 1968 to as much as 10% today.

"We're seeing a significant change in a wildlife population with a parasitism rate steadily rising from almost nonexistent to as high as 10%," says Ania Majewska, first author of the paper. "It's a signal that something is not right in the environment and that we need to pay attention."

The rise in parasitism, the researchers warn, may endanger the mass migration of the monarchs, one of the most spectacular displays in the [animal kingdom](#) involving hundreds of millions of butterflies.

The O.E. parasite invades the gut of monarch caterpillars. If the adult butterfly leaves the pupal stage with a severe parasitic infection, it begins oozing fluids from its body and dies. Even if the butterflies survive, as in case of a lighter infection, they do not fly well or live as long as uninfected ones.

"This research offers an important clue to the mystery of why one of the most iconic North American animal migrations has been threatened," says Betsy von Holle, a program director in NSF's Division of Environmental Biology.

Each fall, the western monarch population flies hundreds of miles down the Pacific Coast to spend the winter in California. Meanwhile, on the other side of the Rocky Mountains, eastern monarchs fly from as far

north as the U.S.-Canadian border to overwinter in Central Mexico, covering as much as 3,000 miles.

"Our findings suggest that tens of millions of eastern monarch butterflies are getting sick and dying each year from these parasites," says Jaap de Roode, senior author of the study. "If the infection rates keep going up, fewer and fewer monarchs will be able to survive to migrate to their overwintering sites."

One contributor to the rise in the parasitism rate is the increased density of monarchs in places where they lay their eggs, the study finds. The researchers posit that the increased density may be due to many factors, including the loss of wildlife habitat; the widespread planting of exotic, nonnative species of milkweed; and by people raising monarchs in large numbers in confined spaces.

More information: Ania A. Majewska et al, Parasite dynamics in North American monarchs predicted by host density and seasonal migratory culling, *Journal of Animal Ecology* (2022). [DOI: 10.1111/1365-2656.13678](https://doi.org/10.1111/1365-2656.13678)

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