

Captive-bred monarch butterflies don't fly south, study says, as wild population shrinks

[By Rachel Hager](#)

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The monarch butterfly, with its majestic orange and black wings, is one of the most recognizable insects — and Idaho's state insect.

Western North American monarch populations have declined dramatically in recent years, and captive-breeding programs offer some aid, but [recent research](#) reveals that these butterflies don't fly south for the fall migration. According to researchers, captive-bred butterflies could cause more harm than good for struggling monarch populations.

“We don't refer to captive breeding as an appropriate breeding plan. It is not in the [monarch conservation plan](#) as a strategy,” said Rex Sallabanks, the wildlife diversity program manager for the Idaho Department of Fish and Game. “If you think about the risks with captive breeding, you've got issues like disease or parasite loading higher in captive situations. And the physical removal of wild butterflies needed to initiate a captive collection reduces the population.”

In addition to these risks, research released Monday reveals that captive-bred butterflies do not migrate.

“If people breed and release captive monarchs with the intention that they will migrate to Mexico, the chances are low they would make it there,” said Ayse Tenger-Trolander, a Ph.D. student in the department of ecology and evolution at the University of Chicago and lead author on the new study.

Every year, millions of monarch butterflies leave their summer habitat to fly 3,000 miles to southeastern Mexico to breed. But the migratory monarch populations were down 86% in 2018 compared to 2017, according to the [Xerces Society for Invertebrate Conservation](#), a nonprofit group that conducts an annual monarch survey in the western United States.

Captive-breeding programs are popular solutions to boost struggling populations and allow the general public an interactive experience with these charismatic insects. But there are potential harmful impacts.

To understand possible differences in migration ability between captive-bred and wild-collected monarchs, Tenger-Trolander and her collaborators mimicked butterfly flight in a simulator with a skylight at the top so the butterflies could see the sun.

“The flight simulator is basically a tube with a fan on the bottom; then the monarch is tethered to a stalk and it can spin on its axis in place,” Tenger-Trolander said. “The setup simulates flight, and so the butterfly thinks it is flying so we can record which direction the butterfly flies and it can indicate which direction the butterfly is headed: north, south, east or west.”

David Bohlken, the president of International Butterfly Breeders Association (IBBA), defended butterfly breeding in an interview with the Idaho Statesman. “There is absolutely no difference between these monarchs,” he said.

“They did it in a flight simulator and we’ve found in real life that the (captive-bred) butterflies do fly south. There have been multiple releases and recoveries,” Bohlken said. “It is incredible that the butterflies make it, and we don’t have a clue how they make it.”

Monarchs must fly to breed in Mexico over the winter to successfully continue their generational and migratory cycles.

Exactly how the monarchs know which way to go is not well understood, but scientists believe migratory creatures use a variety of environmental cues, including temperature changes and the position of the sun.

“Monarchs use the sun to tell the time of day. In humans, our circadian clock gives us a general sense of time of day. A monarch isn’t looking at a clock, but it too has an internal sense of time,” Tenger-Trolander said. “Monarchs know what time it is based on where the sun is across the sky and they use that to tell which direction they should be headed. It is called a time-compensated sun compass.”

If monarchs don’t fly south for the winter, they could deplete their energy reserves and not be able to replenish them with fresh nectar during the cold and flowerless winter in the North.

“If people bred captive monarchs with the intent that they would migrate, as a group captive monarchs are much less likely to migrate than local wild monarchs. Chances are they won’t migrate to Mexico to breed,” said Marcus Kronforst, associate professor in ecology and evolution at the University of Chicago and a collaborator on Tenger-Trolander’s monarch project. “It is hard to know how many people do release captive bred monarchs. We suspect what we found would apply to all breeders, but we only tested one breeder.”

Monarch having lunch on a butterfly bush. Photo by Debbie Courson Smith

Tenger-Trolander and Kronforst didn’t name the specific monarch butterfly breeder used for their research.

Tenger-Trolander and her collaborators also investigated monarch butterfly genetics by sequencing the genome of the captive-bred and wild-caught populations, and found the captive-bred lineage to be genetically different.

“Over many generations of breeding in a captive environment these monarchs have become their own populations. Raised side by side with wild monarchs, something about the genetics of this captive-monarch breed makes them incapable of wanting to fly south,” Kronforst said.

According to Tenger-Trolander, additional research is needed to further investigate these genetic differences and the impacts on the monarch butterfly populations.

Migrating monarchs continue to capture our imagination and remain one of nature’s great mysteries. Yearly monarch festivals across North America release tens of thousands of captive-bred monarchs, filling the skies with orange and black wings. And classrooms use monarchs as an educational tool to teach about migration and metamorphosis.

“We support schools and individuals and their children raising monarchs to watch them go through the life stages. It is a wonderful teaching tool, but you shouldn’t be collecting more than 10 per year,” Sallabanks said. “If you collect 5-10 to watch metamorphosis, that is a great way to have a personal encounter, but commercial rearing in hundreds to thousands of monarchs, that is completely different and it is something the scientific community would not encourage.”

In addition to their natural beauty, these butterflies are important plant pollinators. Monarchs drink nectar to fuel their journey and, by visiting flowers throughout their migration, they transfer pollen across the continent, assisting in native plant reproduction.

Tenger-Trolander said individuals can help monarch butterflies by leaving milkweed on the outer edges of fields and planting native flowering plants in their backyards.

Rachel Hager is writing for the Idaho Statesman this summer on a fellowship through the [American Association for the Advancement of Science](#). She is a master’s student in ecology at Utah State University and earned a bachelor’s degree in biology at Bryn Mawr College.