

Monarch Conservation



By Roy DuVerger

Fall used to be the time when millions of monarch butterflies in North America would journey upwards of 2,000 miles to a warmer winter habitat.

But these days the iconic butterfly's numbers are dwindling. The western migratory population is down 97% since the 1980s — a survey this month found fewer than 2,000 — and the eastern population has slipped 80% in just the past 15 years.

Because of these grim numbers the U.S. Fish and Wildlife Service ruled in December 2020 that monarchs deserved protection under the Endangered Species Act, but it would still be several years before the butterflies were listed as threatened or endangered.

It's time the species may not have.

Halting the precipitous decline of North American monarch populations hinges, in large part, on milkweed, which is crucial to the butterflies' life cycle, providing food for monarch larvae and adding the necessary touch of poison that makes monarch colors so bright.

Monarch caterpillars are entirely dependent on milkweed for two weeks of their life cycle, with each one munching through about 30 leaves before it transforms into a jade green chrysalis to eventually emerge as a butterfly. It's the sole plant the caterpillars eat and where monarchs lay their eggs.

The nectar in all milkweed flowers provides valuable food for other butterflies, bees and pollinators, too.

However, milkweed is quickly disappearing due to increased urbanization, herbicide and pesticide use. A recent study conducted by the University of Nevada, Reno, found an average of nine different pesticides on each milkweed plant analyzed.

Since monarchs can't survive without milkweed, conservation efforts have focused on planting more milkweed. But a solution is not as simple as it sounds.

And monarchs may also be facing indirect threats from global heating. Scientists have found they are emerging from their wintering sites earlier in the spring. Yet the milkweed they need to survive their migrations may not be blooming yet.

Conservation Gardens

The University of Florida and the University of Kentucky conducted studies on building conservation gardens. We decided to see how this information translates to a tropical environment, such as that found in the Caribbean.

We tried to identify whether more diversity of wildflowers in milkweed gardens would be a boon to the beleaguered butterflies or if plots should contain only milkweed plants.

We did find that butterflies like an untidy, natural environment. And while biological diversity in ecosystems is usually a good thing, our study showed that a more diverse habitat may not be good for species like monarchs that are so specialized in what they eat, and diversity may actually reduce monarch success.

One reason is that a more varied garden can make it harder for the monarchs to find their host plants when they're obscured visually or chemically. Butterflies have an acute sense of "smell" using chemical receptors in their tongues, antennae and feet. Heavily perfumed, strong-scented, old-fashioned flowers may actually mask the scent and block their view of the milkweed.

A recent study from researchers at the University of Kentucky found that monarchs did better when milkweed was planted on the perimeter of gardens.

We found that a "garden" environment leads to increased predation.

The difference in the results may be related to the environment in which the University of Kentucky study was conducted and that they seemed to be concerned only with the number of predatory insects that they found. Whereas in a tropical environment, we have a more deadly predator.

Planting milkweed in a garden environment was like providing a buffet to the geckos. We could watch the female monarch butterflies lay their eggs, then we'd return several hours later to find the geckos had cleaned up every egg from the leaves.

Allowing a heavy border of tall grass to form around the milkweed garden provided the best results as geckos, being mostly border hunters, did not like to traverse the heavy grass to reach the milkweed. However, this did nothing to stop the Jack Spaniard wasps (Hymenoptera: Vespidae) from collecting some of the eggs.

We tried planting the milkweed in with Porterweed, another very popular pollinator flower, in a garden environment. While the monarchs did visit the milkweed/Porterweed area, they preferred the milkweed that grew in a more field like environment.

As shown by us trying to apply the information provided by a study conducted in a dissimilar environment from our own, we found the results were not the same.

This is because scientists collect data, analyze the results, and establish a logical argument to explain what they observe: making the reasoning behind their claim equally as important as the observations.

However, many scientists take these specific, local studies and overgeneralize those findings to try and apply them to the world at large. Even when those specific studies are good science overall, projecting the results universally can cause unscientific overgeneralizations, particularly when ecological context is ignored.

Like pulling a quote out of context and assuming you understand its meaning, you end up with a mixed metaphor, at best.

Thus, when using the information from studies such as the ones I reference, you must look at the environment and ecosystem in which the study was conducted. If not identical to where you live, the results will most likely not be the same. Some, if not a lot, of experimentation on your part will be required to achieve the desired results.

Incomplete

Reviewing the different studies, looking at garden plans, and reading about restoration projects, has revealed a glaring hole in the information being provided for us to use in creating conservation gardens.

When we read the articles and documents, we almost always see this comment. "Milkweed is quickly disappearing due to increased urbanization." Yet nobody ever talks about the fact that urbanization is the cause for the removal of the monarch roosting sites along the migration routes.

All we ever see is the creation of gardens, the planting of thousands of milkweed. Where are the monarchs going to sleep when they get there, how far away is the nearest stable roosting site that has not been disturbed by urbanization? This seems to be a taboo subject as it appears everyone is just ignoring it.

Yet, someplace to roost is a very critical part of their migration, as they cannot fly forever. It also appears to play a critical role in their feeding routine.

We are fortunate to live in a tropical dry rainforest, with trees of all types and ages. We followed agroforestry methodologies when planting our milkweed just as we would any other crop.

What we found was, those monarchs that showed up at our garden during the morning hours left and moved on around midday. Then the midday arrivals started looking for a place to roost as the sun was setting. They showed no interest in wanting to leave the area but wanted to stay next to the garden. The next morning, they were out feeding on the newly opened flowers, gathering the nectar before any of the other pollinators got there, only leaving late morning to continue on their way.

When it comes to creating conservation gardens, we should be following the guidelines laid out for agroforestry. It's not just the milkweed that's important to the monarchs' survival, but the availability of roosting along their migration path and around the gardens and restoration projects as well.

Native vs. Tropical

I happen to live in an area where tropical milkweed (*Asclepias curassavica*) is native, which gives me a different look at the life of this plant as opposed to those who live where it is non-native.

First, I would like to address some misconceptions regarding tropical milkweed.

Tropical milkweed plants do not live for extraordinarily long times in a natural environment. A single plant's life span is six to eight months long, similar to that of any native milkweed. Longer lifetimes may be possible when it is being cared for in a garden but are not typical when left to survive naturally.

Tropical milkweed is an excellent self-seeder, and many new plants will be seen in close proximity to the original plant, thus giving the perception that it is the same plant.

If I stand in Mexico, tropical milkweed is native, but if I step one foot over into Texas it's an invasive exotic. This thinking defies logic, given the fact that nature doesn't see lines on a map; doesn't understand borders between countries. All it understands is compatible ecosystems and survival of the species, especially given the current state of the world's changing climate.

While going over the technical data found in the book *The Next Great Migration - The beauty and terror of life on the move* by author and science journalist Sonia Shah, I found a multitude of facts that we need to consider before making critical decisions about so-called exotics. Studies have shown that the ranges of 80% of tracked terrestrial species are migrating northward at a rate of 20km per decade. This rate of migration may have increased as the temperatures have been increasing faster in the last decade.

What we're talking about here is the natural migration of terrestrial species as nature intended to ensure their survival and the possible survival of other species as well. When species move in this manner, with no help from humans either through transplanting or sowing seeds, these species become part of the "natural" environment. Labeling them as exotic is no longer factual.

Taking this one step further, it has been noted that one of the issues with monarch survival rates is they are emerging from their wintering sites earlier in the spring, yet the milkweed they need to survive their migrations may not be blooming yet.

However, when you look at the milkweed restoration projects being carried out all they are planting is native milkweed. Does having 100,000 non-blooming milkweed plants increase the monarchs' survival better than 1,000 non-blooming milkweed plants?

It's time to start looking at the natural migration of terrestrial species and examine how their uniqueness in growing and surviving in the changing environment may just solve this dilemma. After all, what is more important: having a pristine all-native environment with no monarchs to share it with, or saving the monarchs by accepting that the world's environment is changing, and our thinking needs to change with it?

Parasites

Ophryocystis elektroscirrha (OE) is a debilitating protozoan parasite that infects monarchs. It has long been believed that tropical milkweed is at the heart of this parasite's spread through the monarch population, and it should not exist in any butterfly garden. It is my opinion that this view was the result of an incomplete study.

Research by Jaap de Roode's lab at Emory University confirmed that butterflies infected by OE tend to prefer the tropical milkweed even more than usual. However, the tropical milkweed has been found to be "medicinal" in terms of improving parasite resistance, suggesting that they are self-

medicating their offspring. In the final analysis they determined the effect is certainly real.

These findings by Japp de Roode's lab demand that we do further research in this area. Because if these findings are correct then we have been taking the wrong course of action regarding the removal of *A. curassavica* from our gardens, and may actually be making the parasite problem worse rather than better.

Conclusion

Be it monarch butterflies or some other part of our environment we are trying to save, we must accept that climate change is happening. That studies performed even a couple of years ago may no longer be totally relevant. That the dispute over non-native plants and animals is not primarily about the science. Rather it is an ongoing debate over the ethics that ought to guide humanity's relationship with animals and nature.

We need to work with others within our communities, share information on what has been found to work or not work. When sharing that information with others be specific about the environment/ecosystem in which your study was conducted.

We all must open our minds and think outside the box if we are to have success in our efforts to save the flora and fauna that make up our world, and in turn, save ourselves.