Why have the butterflies moved?

These sensitive sentinels have little tolerance for changes to their environment, says **Annie Roth**

More than 1,700 butterfly species across 105 countries are not living where they once did, according to a study published in the journal *Nature Ecology & Evolution*. That translates to nearly 1 in 10 butterfly species with a new range.

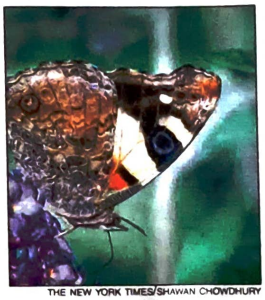
"Butterfly species are shifting their ranges on every continent where they occur," said Shawan Chowdhury, head of the Global Change Ecology Lab at Monash University in Melbourne, Australia, and lead author of the study. This trend, Chowdhury and his colleagues say, can be attributed to a combination of factors but in most cases to climate change, extreme weather and industrial agriculture.

The study found evidence of range shifts in about 10 per cent of known butterfly species in what the authors say is the largest such study ever conducted.

When Chowdhury began studying butterflies near his childhood home in Bangladesh, it didn't take long for him to notice they were leaving the area. "When I started doing fieldwork, it was quite easy to find 60 to 70 species of butterflies in a small urban green space," he said. A few years later, however, "it became very difficult to find just 15 species".

After earning his doctorate and moving to Monash University, Chowdhury decided to see if what he had witnessed in Bangladesh was happening elsewhere. He compiled research and noticed something perturbing — previous studies on the shifting ranges of butterflies worldwide were focused largely on Europe, which is home to less than 3 per cent of the world's butterfly species. Roughly 90 per cent of butterfly species live in the tropics, yet few studies had included data from those regions.

Hoping to get a better sense of global butterfly movements, Chowdhury began collecting non-English language studies and data from researchers based in the tropics. This "changed everything", he said.



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Chowdhury and his colleagues found that in 32 of the countries included, at least a quarter of the native butterfly species weren't living where they once did. In 10 of those countries, the proportion jumped to more than half.

While all the butterfly species examined had undergone some degree of range expansion or shrinkage, many species experienced both. Eighty per cent of the butterfly species the researchers studied expanded their ranges, establishing themselves in areas that had previously been unsuitable for them to inhabit.

For example, an orange butterfly with black spots known as the tawny coaster was once found only in India, Bangladesh and Sri Lanka, but it has now expanded its range all the way to Australia.

The ranges of 27 per cent of the species the scientists looked at had shrunk, including the small blue butterfly in Britain, whose range has decreased by over 40 per cent since 1983. Whether a butterfly species was gaining ground, losing it or both, in 79 per cent of cases, climate change and extreme weather were the main drivers. Habitat loss, industrial agriculture and other factors also played a role.

"We've known that butterflies are shifting their ranges in response to climate change but this is the first study to present evidence across such a large geographic and taxonomic scale," said Candace Fallon, a conservation biologist at the Xerces Society for Invertebrate Conservation who was not involved with the study.

While range shifts are natural for the survival of sensitive species like butterflies, scientists are concerned about what's driving these shifts. In the US, total butterfly abundance dropped by 22 per cent between 2000 and 2020.

Chris Grinter, a senior collection manager of entomology at the California Academy of Sciences, US who was not involved with the study, argues that butterflies act as canaries in the coal mine that is our planet and that their movements often signal profound ecological changes. He says the findings show the need for more global monitoring of butterfly populations and increased conservation efforts. For those who want to help, he recommends planting native plants, leaving lawns unmown and reporting butterfly sightings on platforms like iNaturalist. "A lot of impact can be made in your backyard," he said.

NEW YORK TIMES NEWS SERVICE