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THROUGH FEEDBACK LOOP, SPECIES' EVOLUTION FOUND TO DRIVE ENVIRONMENTAL CHANGES

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A new research in the small islands of Bahamas has found that evolutionary change in leg length of a lizards species, in turn, fed back into the environment by making ecological changes to aspects like vegetation growth and spider populations. | Photo Credit: AP

A new research in the small islands of Bahamas has found that evolutionary change in leg length of a lizards species, in turn, fed back into the environment by making ecological changes to aspects like vegetation growth and spider populations.

A classic example of how environmental change drives species evolution is that of the textbook evolutionary story of peppered moths.

According to the story, during the Industrial Evolution, as the coal smoke darkened tree barks near England's cities, black-bodied moths, being less conspicuous targets for predators, thrived and became dominant. The numbers of white-bodied ones, on the other hand, quickly reduced.

But could a feedback loop exist in nature through which the reverse process happens? Could species evolution drive ecological change?

This study from the University of Rhode Island, US, said that it provided evidence for this, which scientists have begun thinking about in recent years.

"We really need to understand how those dynamics work so we can make predictions about how populations are going to persist, and what sort of ecological changes might result," said Jason Kolbe, a professor of biological sciences and one of the study's senior authors.

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For this study, published in the *Proceedings of the National Academy of Sciences*, Kolbe and his team wanted to see how the evolved limb-length trait of anole lizard populations, which they have been studying for the last 20 years, on a chain of tiny islands in the Bahamas might affect the ecosystems there.

The chain is made up of around 40 islands ranging from a few dozen to a few hundred metres in area - small enough that the researchers can keep close tabs on the lizards living there, and far enough apart that lizards can not easily hop from one island to another, enabling isolation of distinct populations.

Brown anoles have been known to adapt to surrounding vegetation in that where the diameter of brush and tree limbs is smaller, natural selection favours lizards with shorter legs, enabling them to move more quickly when escaping predators or chasing a snack.

In contrast, lankier lizards tend to fare better where the tree and plant limbs are thicker.

The idea in this study was to separate short- and long-legged lizards on islands of their own, then look for differences in how the lizard populations affect the ecology of their island homes.

The team captured hundreds of brown anoles with especially long or especially short limbs, using specialized lizard wrangling gear. Once they had distinct populations of both, they set each free on islands that previously had no lizards living on them.

After eight months, the researchers found substantial differences in the ecology of both the islands.

On islands with shorter-legged lizards, populations of web spiders - a key prey item for brown anoles - were found to be reduced by 41 per cent compared to islands with lanky lizards. The researchers expected the short-legged lizards to be better adapted to the environment, because of their maneuverability and being better at catching prey in the trees and bush.

Further, because the short-legged lizards were better at preying on insect herbivores, plants were found to have flourished.

On islands with short-legged lizards, buttonwood trees had twice as much shoot growth compared to trees on islands with long-legged lizards, the researchers found.

The results, Kolbe said, could help predict environmental outcomes, particularly as human activities accelerate the pace of both evolutionary and ecological change worldwide.

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