

# Fragmented habitats will lead to loss of insect species diversity in the near future

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Most of Ecuador's dry forests are located in the southwest of the country, in the Tumbes-Chocó-Magdalena region. Credit: P. Hildebrandt/ TUM

Together with their colleagues from the Senckenberg Nature Research Society, scientists of the Technical University of Munich (TUM) were able to show that widespread insects are threatened with a serious

decline in species diversity in the near future. The research team lists the fragmentation of habitats and the intensification of agriculture as reasons for the decline of these insect generalists. According to the study, published today in the scientific journal *Biological Conservation*, the genetic diversity among the examined butterfly species is also expected to decline sharply in the future—as a result, the insects will become more sensitive to environmental changes.

The number of insects continues to decrease—in some regions, a dramatic 75 percent [decline](#) has been recorded in recent decades. "Until now, we assumed that it is primarily the specialists among the insects, i.e., animals that depend on a specific [habitat](#), that are threatened with extinction," explains Professor Dr. Thomas Schmitt, director of the Senckenberg German Entomological Institute in Müncheberg, and he continues, "In our recent study, we were able to show that even so-called "ubiquitous [species](#)" will be facing massive threats in the [future](#)."

In its study, the scientists explain that species with low habitat requirements depend on the exchange between different populations. "Our studies clearly show that widespread species have a much more diverse intraspecific gene pool than species that are adapted to a specific habitat," explains Dr. Jan Christian Habel of the Technical University in Munich. Explaining the danger of fragmented habitats, Habel says, "Once these animals lose the opportunity to maintain this [genetic diversity](#) by means of exchange, they will no longer be able to adapt to changing environmental conditions in the future."

The insect researchers from Munich and Müncheberg refer to a "temporal shift in the potential causes for the decline of species." Initially, it is primarily those insects that specialize in a particular ecosystem, e.g., the Mountain Apollo (*Parnassius apollo*) butterfly, which will be threatened by the loss of high-quality habitats. But over time and with the further deterioration of habitats as well as the collapse

of entire habitat networks, the threat to widespread, "undemanding" species such as the Pearly Heath (*Coenonympha arcania*) also increases.

"In terms of practical nature conservation, these results signify that in the future it will no longer be sufficient to preserve small, isolated reserves—while these benefit specialized species with a simple genetic structure, the bulk of species that depend on an exchange between local populations will lose out in the medium to long term," predicts Schmitt, and he adds in closing, "This will lead to a further decline of numerous insect species—with dramatic consequences for entire food webs and ecosystems."

**More information:** Jan Christian Habel et al, Vanishing of the common species: Empty habitats and the role of genetic diversity, *Biological Conservation* (2018). [DOI: 10.1016/j.biocon.2017.12.018](https://doi.org/10.1016/j.biocon.2017.12.018)

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