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Scientists Find Fewer Tropical Insect Species Than Expected

An eight-year National Science Foundation-funded study of New Guinean rainforest insects and the plants they feed on has yielded a new and dramatically lower estimate of the number of arthropod species on the planet. The estimate, which lowers the number from approximately 31 million to between four and six million, is based on the finding that insects specialize their feeding not on individual plant species, but on plant genera and families.

The principal researchers of the cross-disciplinary study, which was published in the April 25 issue of *Nature*, were plant expert George Weiblen of the University of Minnesota; insect expert, project coordinator, and ESA member Scott Miller of the Smithsonian's National Museum of Natural History; and insect community ecologists Yves Basset of the Smithsonian's Tropical Research Institute and Voytech Novotny of the Czech Academy of Sciences.

The team compared insect communities feeding on 51 tropical plant species, most belonging to the fig, mulberry, or coffee families. Previously, scientists had assumed that each plant-eating insect species tended to feed on one or very few plant species.

"Instead, most insects turn out to be specialized not to plant species, but rather to a genus or family of plants," Weiblen said. Also, "we found that many insects share their food plants with other insect species. There are actually few extreme specialists among tropical insect herbivores," he added.

The team also found that the tropical forest plant community was dominated by clusters of closely related plant species and that insects tended to feed on multiple close relatives in a given plant genus or family. Because the number of insect species was tied to broader—and therefore less numerous—categories of plants, estimates of their numbers had to be diminished, Weiblen said.

Once the estimate of herbivorous insects had been made, the researchers estimated the total number of species in the world. Depending on whether insects as a whole follow the pattern of beetles, whose food preferences are quite broad, or moths and butterflies, which are more particular, they estimated that the world contains a total of between about 4.8 million and 6 million arthropod species.

"Our estimates bring some reality to predictions about declining biodiversity in the sense that the consequences for insect herbivores of losing a particular host plant species may not be as dire as previously thought," Weiblen said. "But that is no reason to ignore the decreasing number of species worldwide…Because the consequences are so severe, we've got to refine our predictions and conserve as many species as possible."

***Source**: University of Minnesota-Twin Cities*. **Photo:** *Caterpillars feeding on leaves of* Ficus nodosa *in New Guinea. Photo courtesy of George Weiblen.*