

Tropical Bugs: Squashed by Global Warming?

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It's fashionable to fret about how climate change will harm polar bears and penguins. But scientists now predict that, at least among insects, global warming will take its biggest toll in the tropics--home to more than half the world's species.

Climate change models agree that temperatures will increase more near the poles than near the equator. Where it's currently chilly, a couple of degrees of initial warming could launch a positive feedback loop: as snow and ice melt, they can't reflect heat from the earth, which then warms even more. Because tropical warming will be less extreme, scientists sometimes suppose that tropical species will suffer less from climate change.

That's a bad assumption, says Curtis Deutsch, an oceanographer at the University of California, Los Angeles. He notes that temperatures in the tropics are more stable year round than they are at higher latitudes, so tropical organisms--particularly ectothermic, or "cold-blooded," ones like insects--are adapted to cope with a narrow range of temperatures. Their greater sensitivity to temperature variation might put them at risk, even with less warming.

Deutsch and his colleagues searched for scientific papers about how insect population growth varies with temperature. They found laboratory data for 38 insect species--including butterflies, beetles, and true bugs--with native ranges that spanned latitudes from 50° north to 40° south. For the locations where each species had been collected, Deutsch and his colleagues looked up the predicted temperature in the year 2100 based on climate change models. They plotted those future temperatures onto the population growth curves and found that, 100 years from now, the reproductive rates of tropical insects could be as much as 20% slower than they are today. Most high-latitude insects, on the other hand, could breed faster, the team reports online today in *Proceedings of the National Academy of Sciences*. Diminished reproduction could spell extinction for many tropical insect species, unless they adapt or migrate (and some insects already are: [ScienceNOW](#), 9 November 2001; [ScienceNOW](#), 10 June 1999). Deutsch says that the final outcome will depend on a cascade of ecological changes. "It's pretty hard to predict how all that's going to play out," he says.

Stuart Pimm, a conservation biologist at Duke University in Durham, North Carolina, says that the study is a "thoughtful thing to do," but maintains that a species' survival will ultimately depend more on its ability to migrate away from higher temperatures rather than its ability to tolerate them.

Chris Thomas, a conservation biologist at the University of York in the U.K., sees the paper as a call to action for more research on the tropics. "If there's going to be a major extinction crisis, then we have to start documenting it." He says that only hard evidence of extinction, not predictions, will spur changes in climate change policy.