

# Florida lizards evolve rapidly, within 15 years and 20 generations

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A flatbed digital scan of the left hind foot of *Anolis carolinensis*, or green anole. Toepad measurements were taken on the expanded scales at the end of the longest toe. Credit: Yoel Stuart

Scientists working on islands in Florida have documented the rapid evolution of a native lizard species—in as little as 15 years—as a result of pressure from an invading lizard species, introduced from Cuba.

After contact with the invasive species, the native [lizards](#) began perching higher in trees, and, generation after generation, their feet evolved to become better at gripping the thinner, smoother branches found higher up.

The change occurred at an astonishing pace: Within a few months, native lizards had begun shifting to higher perches, and over the course of 15 years and 20 generations, their toe pads had become larger, with more sticky scales on their feet.

"We did predict that we'd see a change, but the degree and quickness with which they evolved was surprising," said Yoel Stuart, a postdoctoral researcher in the Department of Integrative Biology at The University of Texas at Austin and lead author of the study appearing in the Oct. 24 edition of the journal *Science*.

"To put this shift in perspective, if human height were evolving as fast as these lizards' toes, the height of an average American man would increase from about 5 foot 9 inches today to about 6 foot 4 inches within 20 generations—an increase that would make the average U.S. male the height of an NBA shooting guard," said Stuart. "Although humans live longer than lizards, this rate of change would still be rapid in evolutionary terms."

The native lizards studied, known as Carolina anoles or green anoles, are common in the southeastern U.S. The [invasive species](#), Cuban anoles or brown anoles, are native to Cuba and the Bahamas. Brown anoles first appeared in South Florida in the 1950s, possibly as stowaways in agricultural shipments from Cuba, and have since spread across the

southeastern U.S. and have even jumped to Hawaii.



Native green anoles (left) have evolved better gripping feet in response to an invasion of brown anoles (right) on islands in Florida. Credit: Todd Campbell and Adam Algar

This latest study is one of only a few well-documented examples of what evolutionary biologists call "character displacement," in which similar species competing with each other evolve differences to take advantage of different ecological niches. A classic example comes from the finches studied by Charles Darwin. Two species of finch in the Galápagos Islands diverged in beak shape as they adapted to different food sources.

The researchers speculate that the competition between brown and green anoles for the same food and space may be driving the adaptations of the green anoles. Stuart also noted that the adults of both species are known to eat the hatchlings of the other [species](#).

"So it may be that if you're a hatchling, you need to move up into the

trees quickly or you'll get eaten," said Stuart. "Maybe if you have bigger [toe pads](#), you'll do that better than if you don't."

Stuart's co-authors are Todd Campbell at the University of Tampa; Paul Hohenlohe of the University of Idaho; Robert Reynolds of the University of Massachusetts, Boston; Liam Revell at the University of Massachusetts, Boston; and Jonathan Losos at Harvard University.

**More information:** Rapid evolution of a native species following invasion by a congener, by Y.E. Stuart et al. *Science*, 2014.  
[www.sciencemag.org/lookup/doi/10.1126/science.1257008](http://www.sciencemag.org/lookup/doi/10.1126/science.1257008)

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