

Forest lizards genetically morph to survive life in the city

January 14 2023, by Dánica Coto



In this photo courtesy of evolutionary biologist Kristin Winchell, an *Anolis cristatellus* lizard stands on a gate in Rincon, Puerto Rico, Jan. 6, 2018. Credit: Kristin Winchell/New York University via AP

Lizards that once dwelled in forests but now slink around urban areas

have genetically morphed to survive life in the city, researchers have found.

The Puerto Rican crested anole, a brown lizard with a bright orange throat fan, has sprouted special scales to better cling to smooth surfaces like walls and windows and grown larger limbs to sprint across open areas, scientists say.

"We are watching evolution as it's unfolding," said Kristin Winchell, a biology professor at NYU and main author of the study published Monday in the *Proceedings of the National Academy of Sciences*.

As urbanization intensifies around the world, it's important to understand how organisms adapt and humans can design cities in ways that support all species, Winchell said.

The study analyzed 96 *Anolis cristatellus* lizards, comparing the genetic makeup of forest-dwellers to those living in Puerto Rico's capital, San Juan, as well as the northern city of Arecibo and western city of Mayaguez. Scientists found that 33 genes within the lizard genome were repeatedly associated with urbanization.

"You can hardly get closer to a smoking gun!" said Wouter Halfwerk, an evolutionary ecologist and professor at Vrije University Amsterdam who was not involved in the study.

He said he was impressed that the scientists were able to detect such a clear genomic signature of adaptation: "The ultimate goal within the field of urban adaptive evolution is to find evidence for heritable traits and their genomic architecture."

Winchell said the lizards' physical differences appeared to be mirrored at the genomic level.

"If urban populations are evolving with parallel physical and genomic changes, we may even be able to predict how populations will respond to urbanization just by looking at genetic markers," she said.



In this photo courtesy of evolutionary biologist Kristin Winchell, an *Anolis*

cristatellus lizard stands on a gate in Rincon, Puerto Rico, Nov. 22, 2018. Credit: Kristin Winchell/New York University via AP

The changes in these lizards, whose lifespans are roughly 7 years, can occur very quickly, within 30 to 80 generations, enabling them to escape from predators and survive in urban areas, Winchell added. The larger limbs, for example, enable them to run more quickly across a hot parking lot, and the special scales to hold onto surfaces far more smooth than trees.

"They can't dig their claws into it. ... (Or) squirrel around to the backside," she noted.

The scientists chased after dozens of lizards for their study, catching them with their hands or using fishing poles with a tiny lasso to snag them.

"It takes some practice," Winchell said.

On occasion, they had to ask permission to catch lizards off people's homes.

Among Winchell's favorite findings was a rare albino lizard. She also found a nearly 8-inch (20-centimeter) one, rather large for the species, that she nicknamed "Godzilla."

The study focused on adult male lizards, so it's unclear if females are changing in the same way or at the same rate as males, and at which point in a lizard's life the changes are occurring.

Halfwerk, whose own research showed how one frog species changed its

mating call in urban areas, said scientists should look next for possible constraints on the evolutionary response and how morphology relates to mating behavior.

"Ultimately, to cash in on adaptive traits for survival, they need to lead to higher reproduction," he said.

More information: Winchell, Kristin M. et al, Genome-wide parallelism underlies contemporary adaptation in urban lizards, *Proceedings of the National Academy of Sciences* (2023). [DOI: 10.1073/pnas.2216789120](https://doi.org/10.1073/pnas.2216789120). doi.org/10.1073/pnas.2216789120

© 2023 The Associated Press. All rights reserved. This material may not be published, broadcast, rewritten or redistributed without permission.

Citation: Forest lizards genetically morph to survive life in the city (2023, January 14) retrieved 23 June 2024 from <https://phys.org/news/2023-01-forest-lizards-genetically-morph-survive.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.