



A. homolechis © T. H. Brown

Suburban populations of a Cuban endemic lizard, *Anolis homolechis*: how do they maintain themselves?

conservation # urban ecology

DATES
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COUNTRY
Cuba

STUDENT
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EDUCATION LEVEL
Doctorate



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Context

Human demographic growth is reflected, almost everywhere in the world, by a strong trend towards urbanization at the expense of natural and cultivated environments. However, the urban environment presents conditions radically different from the natural habitat of native species. A drier and warmer climate with a reduced vegetation cover and a high density of humans and exotic predators are consequences of urbanization which have a negative impact on local biodiversity. However, some native species manage to maintain relatively abundant populations in urban settings. Understanding how they achieve this is a major challenge for biodiversity management. The Caribbean islands comprise relatively small territories, which, nevertheless, are home to a significant number of endemic species. In these small areas considered to be a biodiversity hotspot, the effect of increasing and relatively recent urbanization on native fauna is expected to be greater. Lizards from the *Anolis* genera are an emblematic to the Antilles fauna, thanks to their diversity and abundance, and provide us with an ideal model to study this topic.

Objectives

The aim of this project is to compare suburban populations of the Cuban endemic lizard species, *Anolis homolechis*, with forest populations in nature reserves on the basis of different traits :

- Exhibition behaviour of the dewlap;
- Body morphology;
- Structure of the population;
- Survival of individuals;
- Genetic structure of populations.

Methods

Biological model

The lizard *A. homolechis* is a common species, widely distributed in the Cuban archipelago, in rural or urban areas. Naturally inhabiting moderately illuminated areas at the edge of forests, it can be easily distinguished by its dark brown colour and the white gular dewlap, highly developed in males and reduced in females. As with most medium-sized anoles, its life expectancy is only two years, with predators being raptors, rats, cats, snakes, spiders and other species of anoles.

Marking of individuals

In Cuba, data collection was carried out along transects at each study site (two towns and two forests), following streets or forest paths, monthly, for more than two years. The capture was made with a lasso. More than 1,000 captured lizards have been tagged with elastomeric implants, placed under the skin of the ventral area of the extremities of the body. Implants with different colours, placed on different body parts, were used to create a code allowing the individuals to be recognized at each recapture throughout their entire life.

Behavioural analysis

A subsample of 80 individuals was identified using temporary numbered marks placed on the back and visible from a distance. These marks were used to locate and video-record individuals a few days after their capture without disturbing them. Behavioural data was collected from the videos. The analysis on different variables of the dewlap exhibition behaviour (frequency, intensity and proportion of time dedicated to the activity) will make it possible to better understand how the suburban populations communicate in an open environment and exposed to a predation pressure different from that of the natural environment

Demographic analysis

Sex, age class, size, weight and reproductive condition (in females) are used to characterize populations in relation to morphology, proportion of sexes and age classes. The reproduction rate (for females) and the survival rate are estimated via multistate analysis for each variable. The probability of capture of the animal is taken into account as a confounding factor

Genetic analysis

In order to determine the degree of genetic differentiation between the populations studied, samples from the extremity of the tail (3 mm) are taken. Since anoles have the capacity to regenerate their tail, this sampling method is not very invasive. Following DNA extraction, individuals will be genotyped on the basis of around twenty polymorphic microsatellites previously validated for different species of anoles. The results in terms of genetic differentiation and gene flow between populations will make it possible to validate or invalidate certain mechanisms that could potentially explain the persistence of populations in suburban areas.




Results

The results, still in the process of being acquired, are expected to be particularly innovative since they will provide a solid scientific basis for the management of a species of anole endemic to Cuba which is still little documented, and which can also meet the conservation needs of other species. To date, morphological and gender analyses have shown that there are significant differences between suburban and forest populations, suggesting that suburban populations are adapted to this new environment.

About the research team

Annabelle began her doctorate in 2017, at the University of the Antilles, Guadeloupe. However, fieldwork and data analysis are done in Cuba, at the Instituto de Ecología y Sistemática (IES) in Havana, the national institution for research about the country's biodiversity. The thesis and research fundings are mainly covered by Caribaea Initiative. Part of the funding for the research is covered by the IES, as well as by the administration of the Sierra del Rosario Biosphere Reserve and the Medina Ranch at the Escaleras de Jaruco reserve. This work is part of the scientific cooperation agreement recently signed between the Sociedad Cubana de Zoología and Caribaea Initiative, under the auspices of the Cuban Academy of Sciences.



Annabelle passed her Bachelor's degree in Biology at the University of Havana. After working in the management of natural reserves in Cuba for more than five years, she resumed studies in France to obtain a Master's degree in Biology of Organisms and Populations from the Université de Bourgogne, in Dijon. She joined Caribaea Initiative in 2017, which enabled her to undertake a doctorate upon her return to Cuba. She got a job at IES the same year.

The thesis is co-supervised by Dr. Roger Pradel (UMR 5175 Centre d'Écologie Fonctionnelle et Évolutive, Montpellier, France) and by Prof. Jérôme Guerlotté (UMR 7205 Institut de Systématique Évolution et Biodiversité, Guadeloupe). Research is also supported by Prof. Frank Cézilly (UMR CNRS 6282 Biogeosciences, Université de Bourgogne, Dijon) and Dr. Carlos A. Mancina (IES). Training for working with lizards was provided by the curator of the IES Herpetology Collection, the MSc. Manuel Iturriaga, as well as important contributions related to knowledge on the biological model. More than twenty colleagues from several Cuban institutions (IES, Museo Nacional de Historia Natural, Sociedad Cubana de Zoología) participated in the fieldwork, ensuring the viability of the project.

Publications

The first results were recently submitted to a journal specializing in Urban Ecology.

