



Encyclopedia of Life

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Anoles Podcast Script and Scientist Interview

Anolis equestris; Anolis occultus

EOL fellow Rosario Castañeda takes us to the back rooms of Harvard's Museum of Comparative Zoology, searching through dozens of jars of pickled anole lizards to see the traces of evolution in action. These faded specimens don't much resemble these vivid animals in life, as they skitter along branches and tree trunks in their native tropics. But to the trained eye, they're revealing secrets.

Transcript

Ari: From the Encyclopedia of Life, this is One Species at a Time. I'm Ari Daniel Shapiro. Rosario Castañeda can't get her 1-gallon jar to open.

Castañeda: I'm gonna need help with that.

Ari: Oh yeah, do you want me to help?

Castañeda: Yeah, please.

Ari: The lid won't budge. Oh, boy...Until finally –The jar's brimming with ethanol. And submerged in that preservative are half a dozen lizards the size of turkey basters. They're called anoles. And in this story, we're going to use anoles to talk about eco-morphology – that is, the study of the relationship between the environment and the way bodies evolve.

Castañeda: Let's get one of these out.

Ari: Castañeda – an evolutionary biologist here at Harvard's Museum of Comparative Zoology – uses a pair of long tweezers to pull an anole out of the ethanol.

Castañeda: You don't want to take them out from the tail because anoles can actually lose their tail.

Ari: She has the preserved anole by the belly. The lizard's a dark chocolate brown. It came all the way from Cuba, where it lived up in the forest canopy.

Castañeda: They can actually move into, like, really small branches proportional to their body size. The other thing is that they have these really large heads. They eat larger prey and harder prey as well.

Ari: Like what?

Castañeda: Beetles, things that are a little bit crunchier.

Ari: This species is *Anolis equestris*. Then Castañeda pops open a much smaller jar, which contains *Anolis occultus*, from Puerto Rico. It's tiny – about the size of a twig. Which is no coincidence. *Occultus* lives on small twigs, and they're masters of camouflage.

Castañeda: Like when you see them in the field, you have to look really hard to make sure that this is not a twig. And they stay still so perfectly that you'd have to wait to see them move and really realize there's a lizard there.

Ari: Castañeda leads me into the anole collection at the museum. She turns a handle on the end of a row of shelves, and it glides to the right. The shelves are filled with jars of anoles of all shapes and sizes. Many of these specimens come from the Caribbean where you find not just big anoles like *equestris* in the forest canopy and little ones like *occultus* clinging to tree twigs, but also mid-sized ones living only on the trunks of trees, and others that split their time, scuttling between the base of the trunk and the forest floor and nowhere else.

Castañeda: So you have a huge diversity in what would look at the beginning as a single habitat.

Ari: Namely, a single tree. But for an anole, a tree's made up of half a dozen different micro-habitats, and the various types of anoles have adapted accordingly, over and over again. Take the big anoles. They scamper about the forest canopies on all the Caribbean islands – Cuba, Puerto Rico, Jamaica, Hispaniola – but they're not the same anole. Each island has a different species of big anole in the canopy. And each island has a different species of little anole on the twigs. And so on. The anoles have repeatedly evolved in more or less the same way throughout the Caribbean, on every island. It's an example of eco-morphology. Again, that's where a variety of habitats reliably produce the same spectrum of body shapes.

Castañeda studies anoles in South America – in Colombia, where she's from, and in Ecuador and Venezuela. She's looking for a pattern, maybe one that's similar to the Caribbean. The first step was establishing who's related to who. So she set out to collect anole DNA. Altogether, she spent about 8 months in the field. She always collected at night. Unlike in the Caribbean where you can't help but see lizards...

Castañeda: Lizards everywhere.

Ari: In South America, there are far fewer.

Castañeda: During the day, you will hardly see them. So it would be easier to go at night because at night they sleep over leaves. You need a really good flashlight, so when you flash them with the light, they look whitish over the background of the green leaf.

Ari: Then she moves a little loop on the end of a fishing rod into position.

Castañeda: Then you'll pass the loop around the head of the lizard, then you'll grab your lizard.

Ari: The DNA work's helped Castañeda sort out which anoles belong to which species. She found that within a single species of anole in South America, there can be a lot of physical variation.

Castañeda: Variations in size, the number of scales, and coloration.

Ari: Now she's moved on to measuring the anoles – the length of their bodies and their legs, for example. She'll try to match those characteristics with their habitats and see if there's any evidence for eco-morphology. But already things look different than the Caribbean. She's found South American anoles living near water, or on boulders and rocks – and they don't match anything that's been reported before. Even the ones living in the trees look different.

Castañeda: Species that you would expect would have longer tails, they have shorter tails, or things like that.

Ari: Any one of a number of reasons could have steered anole evolution in a different direction on the South American mainland. Maybe the snakes and birds snacking on the anoles attack differently. Perhaps there are other types of lizards competing with the anoles for food and territory. Or maybe the habitats are just plain different. Castañeda spends half her time working her way through this puzzle. The rest of the time she earns her keep as a fellow for the Encyclopedia of Life – a website that devotes a separate web page to every creature on the planet, (and it supports this series, by the way). Castañeda's in charge of the anole pages.

Castañeda: The idea is to get people to compile high quality data on species. So you know that whatever you're reading on Encyclopedia of Life, somebody that really knows about the topic is writing that. And that the content of the pages is really accurate.

Ari: Castañeda is working on all the anole species.

Castañeda: They're roughly 385 species.

Ari: As for how many she's done?

Castañeda: Complete? Like, 5 at this point.

Ari: Only 380 jars to go. To check out those anole web pages and to see a few photos of Castañeda in her habitat – the lab – visit eol.org. Our series, One Species at a Time, is produced by Atlantic Public Media in Woods Hole, Massachusetts. I'm Ari Daniel Shapiro.

Anoles Podcast: Meet the Scientist

Meet Rosario Castañeda, the scientist featured in our Anoles podcast:

Where do you work?

I work at the Museum of Comparative Zoology at Harvard University, as a postdoctoral researcher. I am also an EOL Rubenstein Fellow.

What do you study?

Anolis lizards, commonly known as anoles. I study the evolution of morphology and ecology in mainland species.

What are three titles you would give yourself?

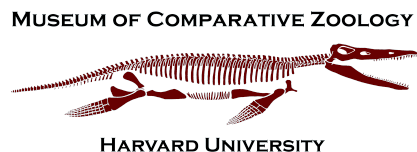
Evolutionary biologist, conservation enthusiast, traveler.

What do you like to do when you are not working?

When I'm not working I like to go to the movies, cook and when there is more time, travel (especially to places with a historical background or interesting animals, like lizards!).

What do you like most about science?

What I like about science in general and research in particular is that is a never ending process. You discover one thing and that leads to a million other interesting questions.



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