

Biologists study imperiled lizard in Texas and Mexico to develop conservation plan

April 29 2016, by [Pic=592678:left]



Corey Roelke holds specimens of a spot-tailed earless lizard, left, and another *Holbrookia* lizard. Credit: UTA

University of Texas at Arlington biologists are studying a species of lizard found in parts of Texas and northeastern Mexico to find out why the reptile's numbers have been dwindling dramatically.

They are conducting fieldwork and [genome sequencing](#) to learn as much as possible about the spot-tailed earless lizard *Holbrookia lacerata*, which has experienced a steady decline in [population](#) in Central and South Texas. The work is being supported by a two-year grant from the Texas Parks & Wildlife Department.

"We are carrying out a comprehensive study of the natural history, morphology, phylogenetics and ecological genetics of *H. lacerata* to provide a thorough assessment on the conservation and management priorities for this imperiled species," said Corey Roelke, a College of Science biology lecturer and principal investigator of the project.

"While the factors causing the lizard's dwindling numbers are unknown, at least some of the decline is likely due to anthropogenic - meaning caused by human activity - habitat change," Roelke added. "Potential threats include the use of agricultural herbicides and insecticides; loss of habitat and habitat fragmentation due to conversion of land to agriculture use or road construction."

In addition to Central and South Texas, the spot tailed earless lizard is found in the Mexican states of Nuevo León, Tamaulipas and Chihuahua. Its habitat is typically flat, arid and open.

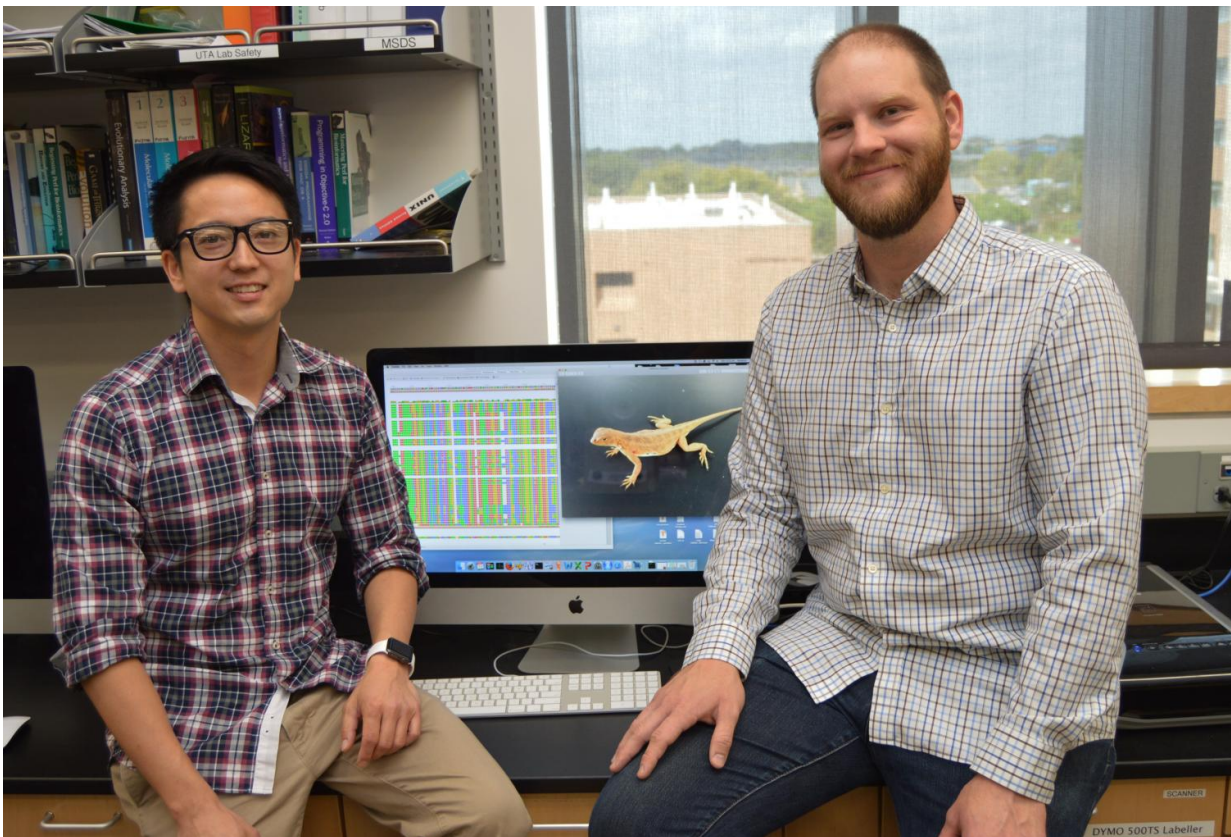
"The goal is to learn as much as we can about the spot-tailed lizard because of its rapid decline in central and southern Texas," said Matthew Fujita, an assistant professor of biology and co-principal investigator. "We need to quantify the sizes of their populations in addition to identifying any interactions among populations in order to assess the viability and persistence of this species."

Morteza Khaledi, dean of UTA's College of Science, praised the initiative.

"UTA is focusing strongly on global environmental impact within our Strategic Plan 2020: Bold Solutions | Global Impact," Khaledi said. "This project to help an imperiled lizard is a perfect example of where we can develop a plan to benefit both the [lizards](#) and private landowners in the area, generating real positive environmental impact."

Fujita and Roelke are joined on the project by researchers from the University of Texas at Austin and Texas A&M University, who are largely conducting field-based surveys of the lizard. Gene sequencing of the samples is being done in Fujita's laboratory.

"This collaboration will dramatically increase our sample sizes for more powerful genetic-based inferences of population size, migration rates and genetic diversity," Roelke said.



UTA biologists Matthew Fujita and Corey Roelke are with a photo of a spot-tailed earless lizard and DNA sequencing data. Credit: UTA

For the last two years, Roelke and Fujita have done fieldwork to collect the lizard and its close relatives within the genus *Holbrookia*. Fujita's lab has taken the specimens and sequenced the transcriptomes - which are collections of all the gene readouts present in a cell - along with some basic genetic markers to begin quantifying genetic diversity.

"So far, we have sequenced the transcriptomes, or the complete catalog of actively transcribed genes, for the spot-tailed lizard as the first major step in quantifying the genetic variation in this lizard," Fujita said. "This resource will be invaluable in pursuing the population genetics as soon as more [fieldwork](#) is done this year."

Roelke and Fujita plan to return to Central and South Texas in the coming months to conduct field assessments, take detailed natural history notes, and collect data and more samples to create a comprehensive natural history profile of the lizard.

They hope to answer questions such as what habitat requirements are necessary for local and range-wide population viability; where the lizard's population is most dense; whether subpopulations of *H. lacerata* exchange genetic material; and how distinct *H. lacerata* is from other species of *Holbrookia*.

The questions are important because the Central and South Texas populations of *H. lacerata* have distinct morphological differences and may represent distinct species, necessitating different conservation priorities and management plans, Roelke said.

The field work this spring will be followed by more genome sequencing in Fujita's lab in order to provide a phylogenetic context of the lizard's evolution; to test whether the Central and South Texas populations are distinct [species](#); and to quantify demographic parameters, including population sizes and gene flow between the Central and South Texas populations.

"These will have important conservation implications," Roelke said. "These inferences will provide the necessary data and context to recommend a conservation management plan that works to benefit the lizard and private landowners. It's an interesting project because this is a lizard that has declined greatly and unfortunately, we really don't know why."

Provided by University of Texas at Arlington

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