

Refuges, YouTube Help Researchers Discover Frog Species

With help from YouTube and two national wildlife refuges, researchers have discovered a new species of frog in New York City.

The Atlantic Coast leopard frog's existence was ratified in the October 2014 *PLOS One* article "Cryptic Diversity in Metropolis: Confirmation of a New Leopard Frog Species (Anura: Ranidae) from New York City and Surrounding Atlantic Coast Regions." The discovery was a 10-year journey.

In the mid-2000s, after three years as a U.S. Fish and Wildlife Service term biologist with Long Island National Wildlife Refuge Complex, Jeremy Feinberg decided to pursue a PhD from Rutgers University and focus on why southern leopard frogs had vanished from his native Long Island. For two years, Feinberg spent countless hours in southern New Jersey, where southern leopard frogs thrive. He knew their mating call by heart.

One day he learned there might be a surviving leopard frog population on New York City's Staten Island. Those frogs would be more genetically and geographically relevant, so one evening in 2008 he visited the Staten Island site.

"Within five or 10 seconds of getting out of my car, I heard a vast chorus of leopard frogs from this big, wet meadow," he says. "The problem was: The call I was hearing was not the southern leopard frog call. Nor was it a northern leopard frog call. It was a call that I had never heard in my life."

But, because he was a field herpetologist inexperienced in genetics and taxonomy, he feared no one would believe that he might have found something unusual. He needed help. A series of fortuitous events brought it to him.

In 2009, Feinberg stumbled on a YouTube video that had been shot two years earlier at Great Swamp National Wildlife Refuge, 25 miles west of Manhattan. He contacted the poster, Brian Zarate, an amphibian-reptile zoologist with the New Jersey Division of Fish and Wildlife. "Pretty quickly, I said to Brian, I think it's a new species," Feinberg recalls.

In 2010, Catherine Newman, then a University of Alabama graduate student, agreed to run the genetics. "She started to see things in the tissues and DNA sequences that made her interested," says Feinberg. A year later, Newman told Feinberg that her molecular evidence strongly supported his hunch.

In all, nine researchers contributed to the project. In 2012, Newman, Feinberg and others authored an initial article in *Molecular Phylogenetics and Evolution* suggesting a new species had been discovered. But it needed to be formally described. Describing the new species involved three lines of evidence.

One line was molecular – showing it was a genetically distinct species. Many tissue samples for that work, which was largely covered in the 2012 paper, were gathered at Great Swamp Refuge. The second line of evidence was bio-acoustical – comparing mating calls of the new species to other known species. Feinberg used the call to identify the new frog at, among other places,

Wallkill River Refuge on the New Jersey/New York border. “It was crystal clear that they were everywhere, a massive population,” he says. “I think, to date, Wallkill has the most impressive chorus I’ve ever heard.”

The third line of evidence was morphology – physical characteristics and shape. The new species is a cryptic species (basically, a look-a-like). Still, there are differences. The Atlantic Coast leopard frog has a smaller, fainter white spot on its eardrum than the southern leopard frog does, and a wider body and stouter head, too.

Feinberg credits refuge biologist Colin Osborn, Great Swamp Refuge deputy manager Steve Henry and Wallkill River Refuge manager Mike Horne with wonderful cooperation. For Feinberg, the discovery’s locale makes it extra-special:

“As a guy who grew up in New York reading about the new Florida this species or the California that species, I always said, ‘Boy, how come there’s nothing ever from New York?’ So to be able to find a frog not only in the U.S. but to formally describe it from New York, and not just from New York, but in the five boroughs of New York City, was a real treat.”

CAPTION:

With the help of several collaborators and two national wildlife refuges, Jeremy Feinberg discovered this new frog species – the Atlantic Coast leopard frog – in New York City. (Jeremy Feinberg)