

New digs for the spadefoot toad

November 18 2014, by Jacqueline Mitchell

A plump Eastern spadefoot toad sits placidly in a patch of meadow on Cape Cod, Massachusetts. Nearby, researchers Rachel Jania and Bryan Windmiller are house hunting for it, trying to figure out if the meadow might make a good home for the rare toad, whose habitats have been devoured by development. They wait to see whether the full-grown male, weighing less than one ounce, will burrow underground, where spadefoots spend much of their lives, emerging only to mate.

"What we don't know is whether the soil here is OK for them," says Windmiller, G90, G96, executive director of Grassroots Wildlife Conservation, which is working with the Massachusetts Audubon Society to save the Eastern spadefoot. "The primary thing they need to be able to do is to get underground. So we're running a real simple test for one not-so-willing candidate."

Windmiller and Jania, a third-year veterinary student at Cummings School, are toad-testing different sections of the 100-acre Long Pasture Wildlife Sanctuary in Barnstable as potential habitats. They hope that one neighborhood, whether meadow, marsh or forest, will strike the toad's fancy.

The meadow used to be farmland. The soil is so dense and loamy that the spadefoot (it gets its name from the projection on its hind leg that it uses to dig) may not be able to tunnel below.

Those doubts evaporate quickly. The toad has disappeared. "That might be the end of this particular experiment," muses Windmiller as he

contemplates a potential flaw in the study design. There's a moment of nervous laughter as he and Jania claw through the dirt, and then relief as they unearth the toad a few inches below.

"We're going to let him rest and try again at one other spot," Windmiller says. "We're pretty confident now that Long Pasture has good spots for the toads to lay their eggs."

Once plentiful throughout the Northeast, the Eastern spadefoot almost disappeared from southern New England during the 20th century. Today they are the rarest amphibian in Massachusetts, Windmiller says.

"One of the big problems is they don't have anywhere to breed," says Jania. "They have to have good access to breeding pools, and most of those have been filled in."

The breeding pools—ecologists also call them vernal pools—are basically rain puddles that appear and then evaporate in the spring. During their brief forays above ground, the spadefoots mate and lay their eggs in the pools. The toads were plentiful when the New England landscape was dominated by forests and farmland—and even when the roads in Boston and Cambridge were unpaved.

But development and its attendant asphalt have drained wetlands and lowered water tables, pushing the little spadefoot toad to the brink of local extinction except for a few places on Cape Cod. At Sandy Neck Beach, a six-mile-long spit of sand on the north side of Cape Cod, the toads are thriving—literally under the feet of thousands of humans.

"The adult toad population at Sandy Neck probably numbers in the thousands," says Windmiller. "That makes it one of the only decent-sized populations anywhere."

A Head Start for the Toadlets

With a grant from the U.S. Department of Agriculture, Jania had planned to study how the toads of Sandy Neck select breeding ponds in which to mate. But for the first time in six years, the toads didn't breed last spring, which Jania attributes to the unusually dry season. "It's not that uncommon. If there's not enough rain at the right time, they just won't breed," she says.

So she shifted the focus of her research and began investigating potential spots to relocate spadefoot toadlets that Mass Audubon scientists raise—a process known as headstarting—in vernal pools restored to the condition they were in before the European colonists arrived in the 1600s. Over the past few years, Ian Ives, director of the Long Pasture sanctuary, has overseen the construction of six breeding pools there and four more at the Ashumet Holly Wildlife Sanctuary in Falmouth, Massachusetts. More than 6,000 spadefoots have been headstarted and released on the two Audubon sites, thanks to the collaboration with Grassroots Wildlife.

But not much is known about the fate of those toads. So Jania implanted tiny radio transmitters in three toads from Sandy Neck. Once they healed up, they were released at the Falmouth sanctuary. As long as the transmitter batteries have juice—about six months or so—the researchers will be able to tune into each toad and know exactly where it is and what habitats it prefers.

Plenty of questions remain, among them how long before the [toads](#) are ready to breed. Windmiller estimates that the Eastern spadefoots live up to 15 years, and that they are juveniles for about five years. They won't turn up at the breeding pools until they are sexually mature, "which means you let them go as newly transformed little toadlets and you just have to hope for five or six years that they are doing OK," he says.

On a Friday afternoon in August, the parking lot at Sandy Neck is full. Beachgoers wait in line for sodas and novelty ice cream at the snack bar. Few of them notice as Jania and Windmiller walk by with a clear plastic pet carrier in tow. Contents: one toad.

Stopping just behind the snack shack, Jania and Windmiller put their gear down near a small clump of trees. Windmiller keeps his eye on a stopwatch as Jania releases the volunteer toad back where he came from. With the sound of the compressor keeping the Choco-Tacos and King Cones cold thrumming in the background, the toad makes a break for it, disappearing into the soft, sun-warmed sand in a blink.

Provided by Tufts University

Citation: New digs for the spadefoot toad (2014, November 18) retrieved 25 April 2024 from <https://phys.org/news/2014-11-spadefoot-toad.html>

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