

# Aquatic ecologist wants to free species from evolutionary traps

July 10 2013, by Evelyn Perez

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A Cuban tree frog swallows a Christmas light that looks like one of its insect prey. Credit: James Snyder

Jennifer Schopf Rehage, assistant professor in the FIU Department of Earth and Environment, has co-authored an article on evolutionary traps, a relatively new phenomenon affecting species in rapidly changing environments.

Human-induced rapid environmental changes, such as [climate change](#) and the introduction of exotic species, have caused a broad, global decline in species. These rapid changes often cause animals to resort to resources, like habitats, mates and food, with the lowest rewards for their survival – a maladaptive behavior known as evolutionary traps.

"Organisms are used to making choices based on an old sense of what's good for them, but because of human-induced changes some can't yet tell the difference between what's good and what's not," Rehage said.

"This behavior is capable of causing rapid [population declines](#) and is a conservation concern. Their occurrence is predicted to only increase as humans continue to reshuffle environments."

Evolutionary traps impact a broad range of animals, including mammals, birds, reptiles, amphibians, fishes and insects. Traps also exist in a variety of contexts, including [habitat selection](#), [foraging behavior](#), navigation, oviposition or the laying of eggs, and [mate selection](#).

A [story published by National Geographic](#) illustrates how a Cuban [tree frog](#) swallowed a Christmas light thinking it was a meal. For thousands of years, the only glows the frog's ancestors ever saw on a tree came from luminescent insects. Those who ate these insects were more likely to survive and successfully find a mate to reproduce with. Because Christmas lights have been introduced into their lives only recently, the frog could not make the distinction between a nutritious meal and the little electric light. The story also shows how, in Australia, male [jewel beetles](#) are often found mating with beer bottles since they mistake their gleaming brown surface for a female beetle.



A jewel beetle tries to mate with a beer bottle whose gleaming brown surface looks like a female beetle. Credit: Darryl Gwynne

The paper is the first to provide a comprehensive review and present a framework for predicting the susceptibility of an organism to being trapped. They found that evolutionary traps are more likely to work the more they resemble cues animals once relied on in the past. The researchers also claim that restoration efforts can also become traps, which may result when efforts are not ecologically sound nor account for the behavior of organisms. Given this finding, they made recommendations on how to better manage natural resources and wildlife conservation to mitigate and eliminate traps.

"We've created these cues that confuse them, so we have an ethical responsibility to make things better for them," Rehage said. "We should care because there are things we can do, as opposed to other problems that are very large to tackle. In Australia, a major beer company is

changing the bottles they produce so they are smoother and resemble a female beetle less. Small changes can make a big difference."

The paper, titled "Ecological novelty and the emergence of evolutionary traps," was published in the scientific journal, *Trends in Ecology and Evolution*, last month. It is co-written by Bruce A. Robertson from Bard College and the Smithsonian Conservation Biology Institute and Andrew Sih from the University of California-Davis.

Rehage is an aquatic ecologist. Her research interests include behavioral, population and community ecology; species interactions; predator-prey dynamics; anthropogenic disturbance; ecology of biological invasions; hydrologic disturbance; fish ecology; and aquatic and wetland ecology. She earned a bachelor's degree in environmental studies from FIU and a Ph.D. in ecology, evolution & behavior from the University of Kentucky.

**More information:** [www.cell.com/trends/ecology-evolution/newarticles](http://www.cell.com/trends/ecology-evolution/newarticles)

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