

Invasive plant protects Australian lizards from invasive toad

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Bluetongue lizards from tropical Australia like the Darwin specimen to the left die if they eat an invasive cane toad, whereas members of the same lizard species from southern Australia like the Sydney specimen to the right are very resistant to the toad's poison. That tolerance seems to be due to rapid evolution brought about by the presence of a toxic garden plant that has almost identical poisons to cane toads. Credit: Right: Travis Child Left: Sylvan Dubey

An invasive plant may have saved an iconic Australian lizard species from death at the hands of toxic cane toads, according to research published in the March issue of *The American Naturalist*. It's an interesting case of one invasive species preparing local predators for the arrival of another, says Richard Shine, a biologist at the University of Sydney who led the research.

Cane [toads](#) were introduced in Australia in the 1930s to control beetles that destroy sugar cane crops, but the toads quickly became an [ecological disaster](#) of their own. They produce toxins called bufadienolides, which have proven deadly to many native Australian species that feed on frogs

and toads.

Bluetongue lizards are one of the [vulnerable species](#), and their numbers began to shrink significantly after the toads arrived in [northern Australia](#). But there's reason to believe that bluetongue populations elsewhere Australia will fare better as the toads spread across the continent.

"Our study was stimulated by a puzzling observation that arose during research on the ecological impacts of invasive [cane toads](#) ... in Australia," Shine and his colleagues write. "Some lizard populations were vulnerable to bufotoxins whereas others were not—and the populations with high tolerance to bufotoxins included some that had never been exposed to toads."

Why would these populations have evolved a tolerance to the toad toxin when no toads were present?

The answer, according to Shine and his colleagues, is likely an invasive plant species known as mother-of-millions, which happens to produce a toxin that's virtually identical to that of the cane toad. After it was imported from Madagascar as a decorative plant some 70 years ago, mother-of-millions has since run amok in parts of Queensland and New South Wales and become part of the diet for local bluetongues.

Shine and his colleagues collected bluetongues from places with and without mother-of-millions, and injected each of them with a tiny amount of cane toad toxin. They found that toads from places where mother-of-millions is common had less of a reaction than those from places where it was absent. The results suggest that the plant drove strong selection for lizards that could tolerate bufotoxins—a remarkable example of evolution over a relatively short period of some 20 to 40 generations of lizards.

"Now it appears we have a population of eastern bluetongue lizards that are able to defend themselves well against cane toads—even though they've never actually met one—whereas the devastation of the cane toads on the northwestern lizard population continues," Shine said. "Eating this plant has pre-adapted the eastern blueys against cane toad poisons."

The Australian government has spent millions trying to deal with the toads and mitigate their ecological impact, but Shine's work suggests the eastern bluetongues might not need much help.

"We're now able to focus our conservation dollars on those populations that can't care for themselves," he said.

More information: Samantha J. Price-Rees, Gregory P. Brown, Richard Shine, "Interacting Impacts of Invasive Plants and Invasive Toads on Native Lizards." *The American Naturalist* 179: 3 (March 2012).

Provided by University of Chicago

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