

New research finds cane toads use poison as a last resort

May 16 2019



Cane toads can be distinguished from frogs because they sit upright. Credit: Greg Brown.

Cane toads are exhausted by releasing their deadly toxin and will go to great lengths not to release it. They far prefer to run or freeze when a

predator approaches.

The cost to the [cane toad](#) for releasing the poison is substantial, including reduced growth and activity. The toad takes several months to replenish its toxin after using it to repel a [predator](#), which could explain why it uses it frugally.

This is good news for Australian wildlife, said Dr. Gregory Brown, the lead author on the paper published today in *Proceedings of the Royal Society B*.

"Although cane toads possess outrageously [potent toxin](#), they aren't out there using it to maliciously slaughter everything they encounter," said Dr. Brown, an honorary associate in the School of Life and Environmental Sciences. "Instead, they will go to great lengths to avoid using it because manufacturing more is so costly. These animals are reluctant warriors."

The study, co-authored by acclaimed evolutionary biologist Emeritus Professor Rick Shine and Associate Professor Kim Bell-Anderson, has three major findings:

- Cane toads produce potent toxin to protect themselves against predators but they are miserly with it.
- The costs of producing toxin are more than just time and energy. There are flow-on costs, such as reduced growth and activity, that can be more substantial.
- Although the researchers measured the cost of deploying toxin specifically in cane toads, the concept is likely to apply to many toxic and venomous animals.

The cane toad is an invasive species in Australia and a fatal source of poison for many native fauna and pets. Toads mostly eat insects,

including honey bees, ants, termites and beetles, but they have been known to eat small native frogs, snakes and mammals. They have few predators in Australia.

"The cane toads possess toxin that is outlandishly lethal to many Australian predators, such as goannas and quolls," Dr. Brown said. "The toxin is less lethal to the toads' [natural predators](#) in South America because they have been engaged in an arms race with toads for millions of years and have had time to evolve resistance to their toxin. But many Australian predators are naive, and so sensitive to the toxin that even ingesting a tiny bit will quickly kill them."

Cane toads: fight or flight?

Cane toads prefer to run away from a predator, or freeze and rely on their camouflage, rather than release their toxins, Dr. Brown said. They also try puffing up to look bigger or jumping towards the predator to spook them.

"These tactics are often successful, the toad escapes and the predator is stymied but still alive," Dr. Brown said. "It's only as a very last line of defence, usually when the predator has them in its mouth and chewing on them, that toads use their 'nuclear option'. But you can imagine that a lot more predators would end up dead, if toads slathered themselves in toxin as a first, rather than a last, line of defence."



The cane toad is not "malicious." Credit: Greg Brown.

Cane toad invasion

Dr. Brown said the research probably doesn't have a practical application in slowing the spread of cane toads but it does have implications for understanding the factors that affect their rate of spread.

"Predator density could have a big influence on the rate of spread," Dr. Brown said. "If toads continually encounter threats and have to repeatedly deploy and replace their toxin, they won't have the energy or inclination to disperse very far. Another implication is that the fastest invading toads, may be individuals less disposed to use their toxin. It's possible the best dispersers are braver, bolder individuals who rarely

release [toxin](#)."

More information: Ryann A. Blennerhassett et al. The cost of chemical defence: the impact of toxin depletion on growth and behaviour of cane toads (*Rhinella marina*), *Proceedings of the Royal Society B: Biological Sciences* (2019). [DOI: 10.1098/rspb.2019.0867](https://doi.org/10.1098/rspb.2019.0867)

Provided by University of Sydney

Citation: New research finds cane toads use poison as a last resort (2019, May 16) retrieved 26 April 2024 from <https://phys.org/news/2019-05-cane-toads-poison-resort.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.