

# Endangered quolls taught to turn their noses up at toxic toad

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File photo of a poisonous cane toad. Australian scientists have said they have successfully taught an endangered marsupial to avoid eating toxic cane toads -- a move they believe could help other at-risk species survive.

Ecologists in Australia have successfully trained a critically endangered marsupial - the northern quoll - to turn its nose up at toxic cane toads. Their results, including fascinating behavioural video footage, are published today in the British Ecological Society's *Journal of Applied Ecology* and could provide conservationists with a vital new weapon in the fight against invasive species.

In their new study - inspired by children's fairy tale 'Little Red Riding Hood' - Professor Rick Shine, Stephanie O'Donnell and Dr Jonathan Webb from the University of Sydney tested whether quolls could be

taught to avoid eating cane toads through "conditioned taste aversion" (CTA).

Cane toads are highly toxic when eaten and have driven the northern quoll (*Dasyurus hallucatus*) - a cat-sized marsupial - to extinction in many parts of northern Australia. Cane toads are continuing to spread and will soon invade the Kimberley, one of the quoll's last strongholds.

The main problem for predators like the quoll is that they eat large toads, which usually kill the quolls rather than merely making them feel nauseous. Consequently, most predators do not learn to avoid toads as food.

According to Dr Webb: "I was reading a modern version of 'Little Red Riding Hood' to my kids, and in that story Grandma sews raw onions into the wolf's stomach, so when the wolf wakes up he feels sick and refuses to eat another Grandma again. It dawned on me that if we could teach northern quolls to associate sickness with cane toads, we might have a way of conserving them."

Working with the Territory Wildlife Park [captive breeding](#) and reintroduction programme, the researchers took a group of 62 young quolls and taught half (the so-called "toad-smart" group) to associate eating a cane toad with feeling sick.

A few days before the quolls were reintroduced to the wild, members of the toad-smart group were fed a small dead cane toad laced with nausea-inducing thiabendazole. The cane toad, which weighed less than 2 grams, was not large enough to kill the quoll but the chemical made them feel sick.

To test whether the taste aversion process worked, both groups of quolls were given a small, live cane toad in plastic container to see whether or

not they attacked it. Their behaviour was videoed using a hidden camera, and the quolls were then fitted with radiocollars and released.

Dr Webb and his colleagues found that CTA made the quolls less likely to attack the toad in the plastic container and once released into the wild, the toad-smart quolls survived up to five times longer than "toad-naive" quolls.

"Our results show that this kind of approach works. If you can teach a predator that cane toads make you sick, then that predator will leave them alone afterwards. As a result, animals like quolls can survive in the wild even in a toad-infested landscape," Dr Webb says.

According to Professor Shine: "The next challenge is to see if we can scale up our results to really make a difference to wild populations of endangered predators like quolls, goannas and bluetongue lizards. First, we have to check that the aversion we create to cane toads is long-lasting. If it is, the next step is to refine our delivery methods - for example, perhaps wildlife agencies could aerially deploy 'toad baits' ahead of the [cane toad](#) invasion front to educate quolls to avoid attacking cane toads before the toads invade."

Conservationists urgently need new approaches to tackling the impact of [invasive species](#), which pose one of the gravest threats to global biodiversity. Particularly hard hit by invasive species has been Australia, which accounts for half of all mammal species extinctions worldwide over the past two centuries.

While invasive species can be eradicated from small islands, this is rarely possible on larger islands or continents. Long-term control programmes are costly and labour-intensive, and reintroduction programmes are of limited use if the threat is still present.

**More information:** Stephanie O'Donnell et al (2010). Conditioned taste aversion enhances the survival of an endangered predator imperilled by a toxic invader, *Journal of Applied Ecology*, [doi:10.1111/j.1365-2664.2010.01802.x](https://doi.org/10.1111/j.1365-2664.2010.01802.x) , is published online on 14 April 2010.

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