

# CASE STUDY: Introduction of the cane toad to Australia

A historical case study of the events surrounding the release of Australia's most hated invasive animal and the lessons learned

The introduction of cane toads (*Bufo marinus*) to Australia in the 1930s is one of the foremost examples of an exotic animal release gone wrong. Originally imported from Hawaii and released in Queensland as a biological control for beetle pests of sugar cane, the cane toad is now a well-established pest itself. Cane toads currently range across Queensland, the Northern Territory and into New South Wales and Western Australia. Despite being less widespread than foxes or rabbits, community surveys consistently rank the toad as our most hated invasive animal<sup>1</sup> and it is listed as a key threatening species under the [Environment Protection and Biodiversity Conservation Act 1999](#)<sup>2</sup>. Today, most people know the cane toad was deliberately released as a biological control, but may not be familiar with the events that led to their release.

**Background:** Sugar cane had been commercially grown in Queensland since the 1860s and losses caused by white grub attacks began to be a serious problem in the 1880s. The grubs – the larvae of up to 13 different species of native beetles – eat the roots of the cane, causing the plants to die. The problem was significant enough for the Queensland government to bow to pressure from canegrowers and establish the Queensland Bureau of Sugar Experiment Stations (BSES) in 1900. By 1935, entomologists employed by BSES had been studying the biology of the cane beetles and investigating solutions to their impacts for around 25 years<sup>3</sup>.

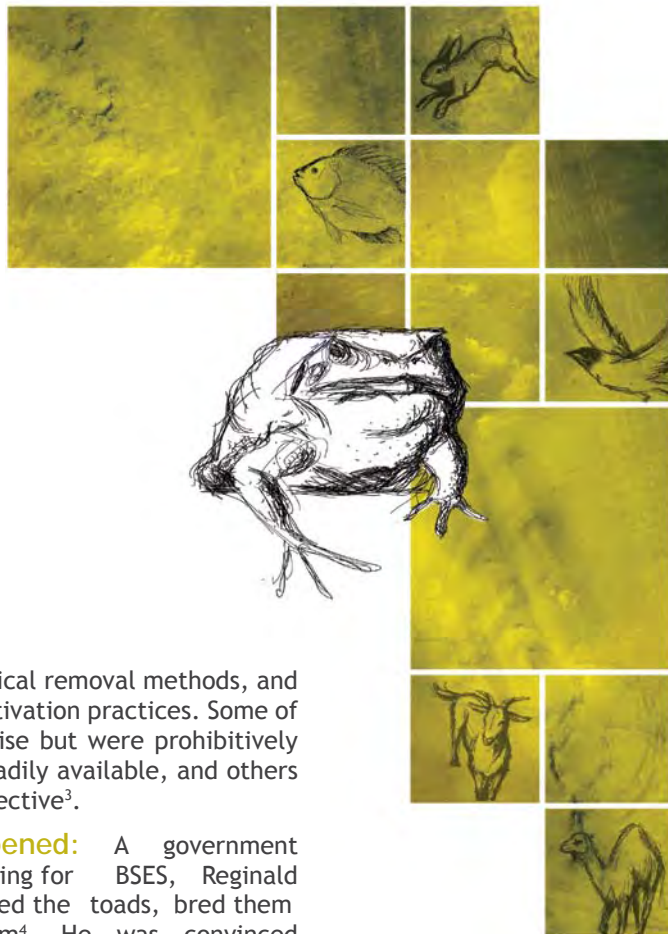
Plenty of good science was produced during this time – the life cycles of several beetle species were described and an understanding of their biology and ecology had been worked out enabling more focused control measures. Many field and lab trials were done in a bid to develop effective controls including the use of various chemical insecticides, soil-fumigation methods, biocontrols such as parasitic fungi and

native insects, physical removal methods, and agricultural and cultivation practices. Some of these showed promise but were prohibitively expensive or not readily available, and others were simply not effective<sup>3</sup>.

**How it happened:** A government entomologist working for BSES, Reginald Mungomery, imported the toads, bred them and released them<sup>4</sup>. He was convinced the cane toad was the answer to a major agricultural crisis in the sugar industry, as they had reportedly solved similar beetle problems in Hawaii, the Philippines and Puerto Rico<sup>5</sup>.

In 1932, a paper was presented by a woman named Raquel Dexter at the 4th Congress of the International Society of Sugar Cane Technologists in Puerto Rico on the use of *Bufo marinus* as a biological control for beetle infestations in sugar crops there<sup>4</sup>. The toad was subsequently taken from Puerto Rico to Honolulu to control beetle infestations in Hawaiian sugar cane fields. In June 1935, Mungomery travelled to Hawaii where he captured 102 toads and brought them back to Australia. When he arrived at the Meringa experimental farm near Gordonvale in far north Queensland on 22 June 1935, all but one toad had survived the journey. The toads were housed in a purpose-built enclosure and left to breed. On 19 August that year, 2400 toads were released into sites around Gordonvale<sup>4</sup>. In less than two months the number of toads had increased at least 24-fold. Further releases of toads in the Cairns and Innisfail areas soon followed.

**Opposition:** Another Australian entomologist, Walter Froggatt, voiced concerns about the release around this time, writing prophetically 'this great toad, immune from enemies, omnivorous in its habits, and breeding all year round, may become as great a pest as the rabbit or cactus'<sup>6</sup>. He lobbied the federal government to exercise caution and the

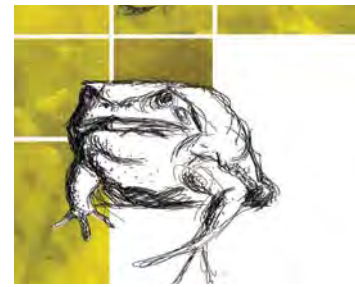


Adult male cane toad. Image: Arnaud Gourret

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Director-General of Health banned any further release of toads in December 1935<sup>3</sup>. But this ban was to be short lived. BSES and local cane growers subsequently lobbied the Queensland Premier and Minister for Agriculture, who in turn pressured the Prime Minister Joseph Lyons, who rescinded the ban in September 1936<sup>4</sup>. Toads were then released throughout the sugar cane regions of Queensland.

**Shortfalls in risk assessment:** As reported by Griggs<sup>3</sup>, 'all the cautious testing characterizing the previous investigations into cane grub control methods was completely forgotten when it came to the cane toad. There is no evidence of any pre-release testing by the BSES entomologists to determine if the toads even ate the cane beetles'. The extremely short timeframe between the toads arriving in Australia and the first release supports this. The beetles that the toads were supposed to control were native Australian species, different to those causing problems in Hawaii and Puerto Rico, yet no trials were carried out to see if this translated to Australian conditions. Risk assessments of potential harms from the introduced species were not done.

It is not surprising that cane toads were imported and released with apparently little-to-no checks or control measures in place. Colonial Australia had a rich history of acclimatisation societies and settlers who introduced foxes, rabbits, deer, blackberries and other species in the 1800s, mainly for food, hunting, or the purpose of making the new country feel more like mother England<sup>7</sup>. Acclimatisation societies were viewed as scientific organisations and were the precursor to many zoological societies that still exist today. Quarantine was a state responsibility in the early 1900s and mainly focused on human health, with animal health only coming into focus after the second World War<sup>8</sup>.

The cane toad was first recognised as a pest in Western Australia where it was listed as vermin under the state's *Vermin Act* in 1950<sup>9</sup>. No serious attempts were made to raise cane toad control as a national issue until the early 1980s. The Commonwealth first took some responsibility for the problem in 1986, with federal funding and establishment of a cane toad Research Management Committee<sup>10</sup>.

**Conclusion:** There is little doubt that those involved believed they were doing the right thing by importing and releasing the cane toad. Despite warnings from other scientists, appropriate pre-release testing of potential impacts was not done and initial control measures were overturned in the face of industry pressure. It is likely that the lessons from the cane toad debacle have influenced the strict quarantine laws and risk assessment procedures Australia has in place today<sup>11</sup>.

## Further information:

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5. Giant toad kills grubs; saves Puerto Rican sugar (1934). [\*The Science Newsletter\*, 25:391](#).
6. Froggatt WW (1936) The introduction of the great Mexican toad *Bufo marinus* into Australia. [\*The Australian Naturalist\* 9:163-164](#).
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9. Molloy KL and Henderson WR (Eds) (2006). [\*Science of Cane Toad Invasion and Control\*](#). Proceedings of the Invasive Animals CRC/CSIRO/Qld NRM&W Cane Toad Workshop, June 2006, Brisbane. Invasive Animals CRC, Canberra.
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11. [\*Risk Assessment for the Import and Keeping of Exotic Vertebrates in Australia\*](#). feral.org.au, Invasive Animals CRC, Canberra.



Cane toads. Image: Arnaud Gourret

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