Northern Habitat – Cane Toads (Discussion Paper 2)

Strategies to Control an Unwanted Amphibian – *Bufo marinus*, the Cane Toad

Produced by Russell Gueho
Northern Habitat
Broome
Western Australia
April 2004

Introduction

Following on from the discussion paper released by Northern Habitat in March 2004 (*A Tourism Nightmare – Potential social, cultural and environmental impacts caused by the introduced feral predator the Cane Toad (Bufo marinus) on the Kimberley Region of Western Australia*) a number of respondents have requested further information on possible directions to take to achieve a tangible solution to the potential menace that cane toads present to the wildlife and habitats of the Kimberley Region of Western Australia.

The following avenues provide an insight into existing and potential control and management strategies that require further investigation and discussion.

"**The toad virus**" – **GMO (Genetically modified organism)**

Attempts have been made to get information on this proposal/area of research from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) – unfortunately no response to email requests for further information have been successful.

This apparent lack of transparency or lack of interest in sharing information from this agency has resulted in a range of questions about the suitability of this technique to be of any benefit.

The most important concern is the distinct possibility that any disease being genetically engineered has the possibility of becoming a *pest* itself.

A pest not only in Australia but with every likelihood that anything genetically manufactured could reach other parts of the world where cane toads or other members of the *Bufo* genus occur and are a part of the natural order.

Indeed some members of the *Bufo* genus are actually threatened species within their natural habitats.

The threats associated with a genetically modified organism should be taken seriously as it may impact on a range of Australian wildlife including frog species, reptiles, fish and birds.

Furthermore, the inability of the CSIRO to contain "manufactured" organisms in the past (i.e *myxomatosis* and *calicivirus*) does not promote their security procedures in the least.

In the 1980's and 1990's Australian government researchers transported several amphibian ranaviruses (*Rana* – a frog) from the cane toads original source in Venezuela and Brazil (*these are held at the Animal Health Laboratories in Geelong, Victoria*) with the idea of developing these to control toads.

Toads are already capable of developing antibodies to ranaviruses that naturally occur in Australia so it would appear probable that the same would apply with any genetically engineered product.

Ranaviruses are a threat to all "cold" blooded animals including frogs, fish and reptiles and they have the ability to adapt and change to environmental conditions.

Some virus groups also have a history of skipping over to different taxa when mutations to environmental conditions occur (SARS, Crutzfeld Jakob disease (Mad Cow disease)).

There are two types of virus – RNA and DNA based. Although the toad ranavirus is DNA based and can potentially be difficult to mutate the possibility does exist for it to occur. Consequently it is impossible for the government to guarantee that this virus will not mutate when it is released.

It would appear that there is much funding being applied to this GMO approach whilst little is being applied to researching of other diseases impacting on Australia's "under pressure" amphibians.

Immunity of Native Species

There has been anecdotal evidence presented from the Northern Territory that an Australian snake species, the Keelback (*Tropidonophis main*) is immune to the toads' toxin.

This evidence requires further research as there is debate as to whether the snake is really immune or if there is a non – toxic stage during the toads' development.

If the Keelback proves to be resistant to toad toxin then there are possible antivenom avenues to be researched.

The possibility that there is a non-toxic stage of toad development is also an important area of research that should be further investigated as it may provide avenues for control.

Biological Control

As the toad has progressed across the Northern Territory there is further anecdotal evidence that suggests a natural control agent may exist.

Lavender Beetles (*Cydnidae*) are a naturally occurring insect family comprising some 43 species that feed mainly on roots, seeds and plant detritus. Sometimes, especially after rains, they emerge in massive numbers and can become an annoyance when they are attracted to house and streetlights.

Also known as the burrowing bugs, apparently these beetles are refused as a food resource by native frog species due to the toxins (formic acid?) that they produce as a defence mechanism. This frog adaptation is not yet present in cane toads and evidence suggests that when cane toads eat these beetles they die.

Obviously this natural control requires further investigation particularly to determine the efficacy of Lavender beetle toxin and whether the possibility exists to "distil" this toxin and find a suitable delivery method.

Further immediate research should also be initiated into the use of pheromones as an attractant to cane toads with a view to developing a workable trapping system to eliminate both male and female toads in conjunction with other control measures.

Barrier Control

At present there exists one border protection facility in the Kimberley. This is located on the Western Australian (WA) – Northern Territory (NT) border and it requires that every vehicle entering WA must stop and declare potential threats to the agricultural activities that occur in WA.

Unfortunately there is also an uncontrolled entry point from the NT into WA along the Duncan Highway that could allow entry into the Kimberley of cane toads (among other things).

It is imperative that this entry be subject to the same controls that occur east of Kununurra. Not only will the establishment of a barrier checkpoint create social benefits to the town of Halls Creek its presence will indicate that Western Australia is serious in its intents to protect its agricultural industries.

The likelihood that cane toads will enter WA as "hitch-hikers" is high, particularly given their preponderance to do so in other parts of Australia. It is important that these checkpoints be vigilant in their inspection of vehicular traffic into Western Australia.

Employment opportunities and suitable training should be supplied to inspection personnel and be supported by upgrading legislation to recognise the threat associated with the introduction of this feral predator.

Furthermore, it is should be recognised that a systematic public education and marketing strategy be developed to ensure the environmental, social and cultural issues associated with the impacts attributed to cane toads are fully understood by the residents of Western Australia – after-all it is likely that this amphibian menace will eventually impact on the southern parts of the state also.

The potential for a disgruntled individual to deliberately introduce toads into the region under some misguided sense of atonement or "pay back" could possibly be circumvented through this process.

Further research into man made barriers should be undertaken with a view to identifying strategic areas where barriers could be erected and maintained.

This could be undertaken either through community related projects or the initiative of a lead management agency that understands the regional issues and is committed to dealing proactively with the concerns of the industries and individuals that operate in the Kimberley.

Threat Status

The Western Australian government should immediately support the Northern Territory government in seeking a reclassification of the cane toad to the Menace category under the Environmental Protection and Biodiversity Conservation Act of 1999 (Federal legislation).

Research and Future Directions

Large amounts of public money has been spent by the CSIRO on genetically manufacturing a disease to kill toads and will continue to be spent investigating all of the possible scenarios and potential impacts on native animals – whilst this is good for keeping this agency's researchers in jobs the wildlife of northern Australia doesn't have this luxury or the time.

There is an opportunity here for a proactive response to the threat to the natural systems in the Kimberley that are presently "exploited" in social, cultural and environmental fashions.

- Resources should be allocated to immediately setting up a joint research program with the NT Government to review the current status of cane toad knowledge in Australia.

- This research facility should undertake as a matter of urgency assessments of present and potential control methods that may be of use in managing the cane toad threat.

- In particular a reassessment of the current program to mutate ranaviruses should be undertaken. This research program appears to be a long drawn out process and part of an agenda for the CSIRO to become proficient in genetic mutation. Convincing Australians of its usefulness would appear to be difficult.

- All assistance should be given to determining the efficacy or otherwise of the Lavender beetle toxins (and indeed other natural control possibilities) and if proven potent this avenue of control should become the main focus.

- Continued assessment of physical control methods, further assessment of the use of pheromones as a control and trapping option, barriers and the provision of resources to undertake in field and border protection activities should be undertaken

It is difficult to reconcile approval being given to another government agency to manage this threat, particularly given the "hope and see" attitude and the less than transparent activity that appears to have prevailed to this point in time.

Unfortunately the system exists where this will be the most likely scenario – it should be stressed however, that the opportunity to achieve a tangible outcome must be communicated to elected representatives, economists, agronomists and land and wildlife mangers.

If attending to this threat requires placing on hold funding to the study of agricultural, terrestrial and other wildlife habitats then so be it. If it requires reallocation of consolidated revenue resources then it also must be recognised as a land-care priority.

- Other avenues for resourcing should also be investigated using the LandCare Australia model – already there has been commitment from Kimberley tourism businesses to contribute to cane toad research. One operator has already allocated several thousand dollars to undertake faunal survey work in the East Kimberley on Kachana Station. This proactive response appears to be lacking in existing management agencies.

Ignoring the issue and refusing to address this threat with the urgency it demands may produce the outcome where many wildlife managers and researchers will be out of work.

Furthermore the tourism industry will suffer with its attendant social disruptions, and the impacts on the cultural requirements of indigenous Australians could be catastrophic.

- Initially an immediate scoping study addressing the present state of Australian and international research, cane toad impact, control measures, habitat protection and species conservation strategies should be sourced through Federal funding supplied by the National Heritage Trust.

- The study should be mandated to make specific recommendations in respect of future research and control measures.

Perhaps the 400 million dollars allocated by government to bail out the sugar industry in Australia in recent times could be matched by this industry to demonstrate a commitment to rectify past mistakes that now affect the broader Australian community.

References.

P.Zborowski and R. Storey. *A Field guide to the Insects of Australia*, Reed New Holland, 1998.

Captive **cane toads** will allegedly eat everything from dog food to mice and they keep growing until they reach 25cm in length and over 4 kilos. **...**
www.fdrproject.org/pages/**toads**.htm

Australian Museum Online: Canetoad factsheet
www.amonline.net.au/factsheets/canetoad.htm

Frogwatch
www.frogwatch.org.au

CSIRO Fact Sheet on Cane Toads
www.csiro.au/index.asp?type=faq&id=CaneToadControl