

C A N E



T O A D S

by Carson Creagh



**F**or five days at the end of September last year, the CSIRO Division of Wildlife and Ecology's Canberra headquarters suffered a cane toad invasion. The friendly invaders, however, comprised cane toad researchers rather than what is possibly Australia's most widely disliked terrestrial animal.

The 34 researchers represented universities, conservation bodies and scientific and medical research establishments from Melbourne to Manaus. They had gathered to discuss not only where cane toad research stands at the moment, but also which direction such research should take in the future if Australia is to succeed in meeting the target (set by then Prime Minister Bob Hawke in March 1990) of finding a biological control strategy to protect the native fauna and wetlands of northern Australia.

At that time, Mr Hawke announced \$1.25 million in funding for the project, to be augmented by funds from the relevant States, and gave CSIRO responsibility for co-ordinating the activities of the CSIRO/ANZECC (Australian and New Zealand Environment Conservation Council) Cane Toad Research Committee.

While the Committee has had to operate within a constrained and far less than desirable budget, it has nevertheless been given an opportunity to bring together research efforts on a sound, scientific basis: it has also, for the first time, placed previous work in the context of a broad strategy across institutions and countries, and has identified gaps in our knowledge of the pest.

Some of those gaps are large, and reveal how little we know about how cane toads live and what impact they have had on the Australian environment. In April 1991, scientists from James Cook University in Townsville began studying toad movements in northern Queensland, and have since found that these appear to fall into two main categories, ecologically speaking: some stay-at-home toads keep within relatively well-defined home ranges, while others disperse quickly over long distances during warm, wet weather. Cane toads, it seems, are not all 'on the march'.

The James Cook researchers have also identified the parasites and pathogens that infect the pest here and have found that almost all such organisms are Australian; the early introductions did not bring any of their natural pathogens from South America. This is an important finding, since it means other Research Committee members working in Venezuela may be able to isolate pathogens (such as viruses) that are specific to cane toads and that could assist in biological control.

A number of research groups are addressing the large question of precisely what impact cane toads have had on Australian native fauna. At the University of Sydney, Ms Wendy Seabrook leads a team that is examining the dispersal and habitat utilisation of cane toads in northern New South

Wales. At the Departamento de Ecologia in Manaus, Brazil, Australian scientist Dr Bill Magnusson and his Brazilian colleagues are looking at the population dynamics and biology of the cane toad (*Bufo marinus*) and a related species (*B. granulatus*) in their native tropical savanna habitat to provide a basis for comparison between the toad's success abroad and its behaviour at home.

One interesting observation to emerge from Dr Magnusson's work is that mortality among male toads appears to be much higher in Brazil than it is in Australia. This has the obvious implication that more male toads (which can live for 20 years in ideal conditions) are available for breeding in Australia, which could indicate a generally higher reproduction rate. Consequently — particularly in the absence of specially adapted parasites and pathogens, or of predators better able to resist its toxins than Australian animals — only environmental factors limit its reproductive success here.

A central feature of the meeting was our ignorance of the biology of the cane toad in Australia. Without detailed information about its diet, reproduction, rate of dispersal and, most importantly, its impact on native species, we cannot formulate approaches to controlling this species ... or even determine whether we need to control it. For example, it seems to have little impact in those areas where it has been in residence for many years; its greatest influence occurs in the 'frontier zone' of dispersal (whether aquatic, in the case of cane toad tadpoles, or terrestrial, in the case of juveniles and adults).

The question of whether the toad needs to be controlled involves considerations (which must be supported by extensive further research) of its reproduction, life history and environmental impact. We must also look at the bioclimatic factors that limit its distribution in South America and compare these with Australia; has the species already colonised all suitable habitats, or will it continue to spread westward to Kakadu and further south in New South Wales?

Until questions such as these are resolved, the Cane Toad Research Committee cannot proceed to refine its list of possible control strategies. At present, these include: habitat manipulation (traps, fences, elimination of shelter sites and so on); the identification of pathogens and vectors in Australia or the importation of pathogens from South America (pathogens that, researchers hope, could be spread by native Australian vectors); the identification and dispersal of species-specific predators of cane toad eggs and/or tadpoles; and immunosterilisation using similar techniques to those being developed at the CSIRO Division of Wildlife and Ecology for use on rabbits and foxes.

#### More about the topic

*Report of Workshop on Cane Toad Research.* H. Tyndale-Biscoe. CSIRO Division of Wildlife & Ecology, Canberra 1992.