

Published: 26 September 2011

Is *Tilapia* the new cane toad?

Matt Bradford

Northern Australian waterways are facing a new environmental threat. *Tilapia mariae*, a highly invasive fish that can tolerate and adapt to a range of environmental conditions, is rapidly expanding its range.



Credit: Noel Burkead

Australia has a history of highly invasive plant and animal species that cause massive environmental damage and cost millions of dollars to control or eradicate. Just think of the rabbit, cane toad, prickly pear or lantana.

Exotic and invasive fish are less in the spotlight, although the carp (*Cyprinus carpio*) is now a much despised species in more southern areas of Australia [after first being imported around 1900](#)

However, a group of mainly freshwater fish from Africa, the tilapiines, are emerging as new threats to Australia's river systems.

In a recent study published in the journal *Marine and Freshwater Research*,¹ I teamed with North Queensland-based staff from CSIRO and the Department of Employment Economic Development and Innovation (DEEDI) to document the introduction and biology of one tilapiine species *Tilapia mariae*.

T. mariae is a freshwater and estuarine species that grows to a length of approximately 300 mm in its native range in coastal western Africa. Due to its hardiness and high fecundity, it is a sought-after aquarium species around the world.

However, these features also make *T. mariae* a perfect invasive species. It can tolerate a wide range of temperatures, salinity and oxygen concentrations. Importantly, it can adapt its diet and reproductive strategies according to environmental conditions, increasing its ability to spread rapidly. Unlike many Australian native species, it thrives in highly disturbed and poorly vegetated watercourses.



Credit: Matt Bradford CSIRO

The species was first recorded near Cairns in the early 1980s and has since been a commonly occurring inhabitant of eastern-flowing rivers within 100 km of that first record. More recently, a population has been discovered in a tributary of the western-flowing Mitchell River, which runs into the Gulf of Carpentaria. This is of great concern to biologists and land managers, as the species has the potential to spread over much of northern Australia via overland water flow and movement through saltwater reaches.

In the United States, *T. mariae* is already a huge environmental concern. In Florida, the species contributes to more than 50 per cent of fish catches. A density of more than one breeding pair per metre has been recorded along disturbed canal edges. Densities of this magnitude cause disruption of breeding and localised extinction of native species.

The species' impacts are poorly documented in Australia due its comparatively recent introduction. However, we know that its reproductive strategies, diet and habitat overlap with many of our freshwater species, including freshwater catfish, gar and bream.

We hope that the information in our recent paper will stimulate further research into the species that will eventually lead to effective control or eradication measures. At the moment, control is limited to education and awareness, and spot eradication using chemicals and electro-fishing.

Localised tilapia populations have recently been successfully eradicated using the chemical rotenone in small areas of northern Queensland, but this approach is not an option for entire catchments.

Management strategies focusing on controlling the characteristics that give *T. mariae* a competitive advantage may provide the best chance to reduce its abundance and distribution. These may include the species' variety of diet and substrate for egg deposition, as well as reducing extremes in water temperature, salinity and oxygen

One way of controlling the *T. mariae* invasion is by maintaining and rehabilitating the integrity and resilience of native aquatic ecosystems.

Matt Bradford is a research projects officer at CSIRO Sustainable Ecosystems' Tropical Forest Research Centre in Atherton, Queensland.

¹ M Bradford, F. Kroon and J. Russell (2011) The biology and management of *Tilapia mariae* (Pisces : Cichlidae) as a native and invasive species: a review. *Marine and Freshwater Research* 62 (8) 902-917

From ECOS online <http://www.ecosmagazine.com/?paper=EC11052>