Using Rainforest Research

The new and the known: describing freshwater fish species

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The discovery of new vertebrate species is a very rare event in Australia. Rainforest CRC researcher Dr Brad Pusey has recently described not one, but two new species of freshwater fish endemic to the Wet Tropics region. Their description sheds light on the uniqueness and antiquity of the fauna.

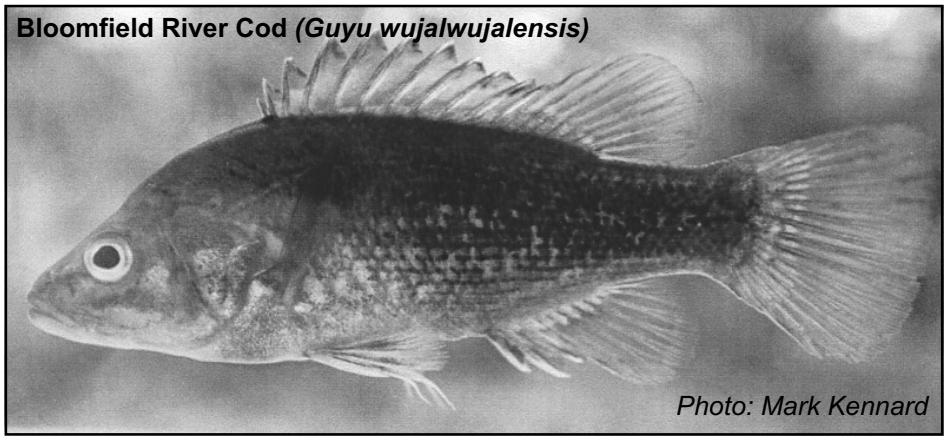
Describing a new species

In 1993, Brad and his co-workers, Mark Kennard of Griffith University and Andrew Sheldon of the University of Montana, surveyed the fish fauna of the Bloomfield River as part of a larger study of the freshwater fish diversity of the Wet Tropics. Among the many interesting fishes collected, were 13 specimens of a very odd looking little fish. They recognised that the fish belonged to the family Percichthyidae, which contains the well-known Murray Cod and Yellowbelly, but were puzzled as to its specific identity. Even more puzzling was the fact that no Percichthyidae had ever been collected from tropical Australian freshwaters. Additional specimens were collected in 1994 and laboratory work on them commenced. The specimens were measured, dissected and x-rayed,their physical features were counted and specimens genetically tested for comparison with other species within the family. The result – not only a new species but a new genus as well! Groups of closely related species are placed in a genus. A formal description was prepared and circulated amongst Australian fish taxonomists before being accepted by the specialist journal *Ichthyological Explorations of Freshwaters*. The species description finally appeared in print in 2001. A long time but worth the wait.

Naming the species

The name selected for the new species was *Guyu wujalwujalensis*. The genus name is a departure from the usual practice of using latin.

We were most fortunate in being granted permission by the Kuku-Yalangi Aboriginal people to use a traditional word in the description and also in being so generously granted access to the beautiful Bloomfield River. The genus name is derived from the Kuku-Yalangi word "kuyu" which means freshwater fish. The letter "k" is pronounced phonetically as "g" in Aboriginal languages. Kuyu is used similarly by other language groups of north Queensland. The species name *wujalwujalensis* denotes that the new species occurs near the township of Wujal Wujal. It was felt that the name not only suits the new species well but also conveys some impression of the strong link between Aboriginal people and their relationship with the land.



Bloomfield River Cod *(Guyu wujalwujalensis)*

Photo: Mark Kennard

Guyu wujalwujalensis occurs nowhere else but the Bloomfield River and is further restricted to only that part of the river between the downstream Bloomfield Falls and the upstream Roaring Meg Falls. As such it has one of the most geographically limited distributions of any of the region's freshwater fishes. Its origins are probably very ancient, and may date back to the late Cretaceous, some 70-100 million years ago. It may represent what remains of a previously more widespread fauna that is now confined to temperate and sub-tropical Australia. Given these factors, it has a very high conservation significance and is therefore listed as "Vulnerable" by Environment Australia. It is likely that the single greatest threat to its continued existence is the introduction or translocation of fish into the Bloomfield River.

The Rainforest CRC is a research partnership involving the Commonwealth and Queensland State governments, the Wet Tropics Management Authority, the tourism industry, Aboriginal groups, CSIRO, James Cook University, Griffith University and The University of Queensland

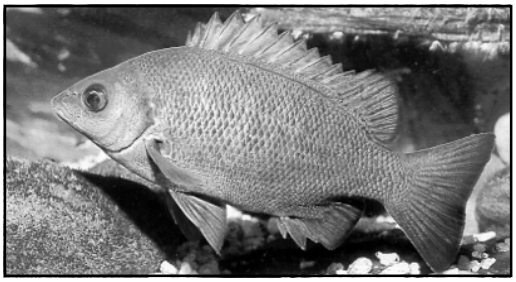
Redescribing a known species

The second fish proved more an exercise in redescribing than describing. This was the khaki bream (*Hepahestus tulliensis*) another endemic Wet Tropics species superficially similar to the black bream or sooty grunter (*Hepahestus fuliginsosus*), a widespread species of angling and culinary renown. While it has long been recognised as being distinct by anglers and some fisheries personnel, the specific identity of the khaki bream has remained a mystery. Brad and his co-worker, Dr Gerry Allen of the Western Australian Museum, commenced writing a formal description but in doing so found they had been beaten to the punch, by over 100 years!

Duplication and errors when species are described

The khaki grunter was originally described, as *H. tulliensis*, by C.W. De Vis in 1884. For reasons which remain difficult to fathom, the name was either never adopted or rapidly dropped out of usage. In a 1978 revision of the family Terapontidae, (the grunters) it was considered not to be a valid species, but rather a "synonym" of another species *H. fuliginosus.*

Synonomy occurs when two different authors describe and attribute different names to the same species. Synonomy in Australian freshwater fishes occurred fairly frequently in the late 19th century when many new species were being described but communication between researchers was limited.



Khaki bream (*Hephaestus tulliensis) photo: Gerry Allen*

In such cases, historical precedence determines which name is valid. The recognition of synonomy usually occurs when a taxonomic group such as a family or genus is being revised.

Such revisions are necessary to ensure that nomenclature remains correct and accurate and to ensure that taxonomic associations, such as species within genera or genera within families, accurately reflect evolutionary history. Sometimes this process may result in long familiar names being changed to something new. It may result in *lumping*, where species formerly considered distinct are collapsed into a single species, or alternatively in *splitting*, where a single species is divided up into several new species. On occasions, the decisions made during revisions may be in error, such as the recognition of the synonomy of *H. tulliensis* and *H. fuliginosus*. In this case, the error arose because of a failure to examine specimens of both species from the Wet Tropics region.

Why describe species at all?

What is the relevance of this rather technical and specialised activity? In addition to its importance to the purely scientific pursuit of understanding the evolutionary history and biogeography of different groups, the recognition of what constitutes an individual species has more immediate and practical concerns.

Many management strategies are focused on individual species. If we don't know what species we are trying to manage, how can we do so effectively? For example, *H. tulliensis* is found nowhere else but the Wet Tropics, in contrast to the more widespread distribution of its relative *H. fulignisosus*. Accordingly, *H. tulliensis* must be viewed as having a higher conservation significance. Moreover, the reproductive ecology and habitat requirements of *H. tulliensis* differ from that of *H. fuliginosus.* Management guidelines such as minimum size limits and bag sizes designed for the protection of one species may not adequately protect, and may in fact be detrimental, to another species if they are not recognised as being distinct.

Two of the region's endemic fishes now have scientific names. Other endemic fishes of the region are yet to be formally described, however. These include fishes from such diverse groups as rainbowfish, hardyheads, catfish and gobies. The work goes on!

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