



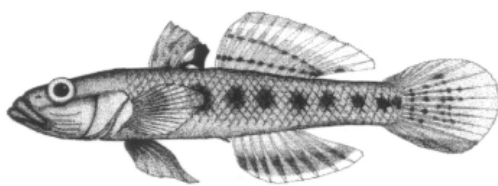
Using Rainforest Research

Fishes in the forest: High biodiversity and endemism

September 2001

Visitors to the Wet Tropics region are often captivated by the amazing diversity of plant and animal life to be seen. It is more difficult however, to see and appreciate the diversity of life that can be found under the surface of the region's abundant aquatic habitats. Unless you don't mind getting wet of course!

Getting wet in streams of the Wet Tropics area is what Dr Brad Pusey, Rainforest CRC Senior Research Fellow, has been doing since 1990 as part of his research which documents the biodiversity, distribution and ecology of the region's freshwater fish fauna. His work has revealed that the Wet Tropics region sustains a very high diversity of fishes, parallel to that seen among the birds, mammals or insects of the terrestrial environment. In addition, the Wet Tropics region contains many species not found anywhere else in the world.

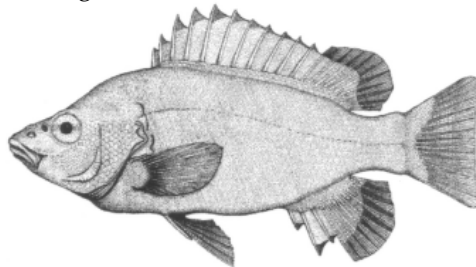


Mulgrave Goby
(*Glossogobius* sp B.)

Biodiversity

Over 70 species of fish have been recorded from freshwaters of the region and that number continues to increase as more research is undertaken. The Wet Tropics region is home to approximately 45% of Australia's freshwater fish species, 70% of genera and 70% of families.

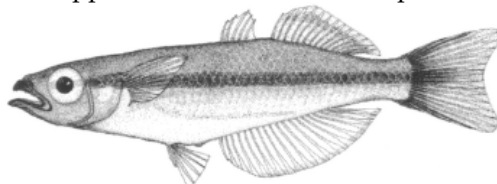
When this comparison is restricted to only those groups normally found in northern Australia, the proportions increase to 55%, 80% and 90%, respectively. This is exceptional diversity for a small strip of land less than 100 kilometres wide that passes through only 5 degrees of latitude!



Khaki Bream
(*Hephaestus tulliensis*)

Endemism

More impressive still is the number of endemic species, in other words, those species that occur only in the Wet Tropics region and nowhere else in the world. To date, nine endemic species have been identified, and recent genetic research by a Rainforest CRC student, Dugald McGlashan, strongly suggests the presence of another undescribed endemic species (a hardyhead). Comparable levels of endemism are seen only in the southwest of Western Australia which supports 12 known endemic species.



Cairns Rainbowfish
(*Cairnsichthys rhombosomoides*)

All drawings: Brad Pusey

The endemic species of the region cover a wide range of taxa including: rainbowfishes (*C. rhombosomoides*, *Melanotaenia eachamensis*), Utchee Ck catfishes (*Tandanus* sp.), grunthers (*Hephaestus tulliensis*), cod (*Guyu wujalwujalensis*), and gobies (*Stiphodon allen*, *Glossogobius* sp. B. and *Schismatogobius* sp.). Many species are yet to be formally described.

Links to the past

Four features of this endemic group of fishes are of interest:

- Two species, *G. wujalwujalensis* and *C. rhombosomoides* are paleoendemics – species that have very old origins. In the case of *G. wujalwujalensis*, this species may have been around when dinosaurs roamed through the forests of the Wet Tropics region.



Scaleless Goby
(*Schismatogobius* sp.)

- With the exception of *G. wujalwujalensis*, all of the endemic species are found in either or both the Johnstone and Russell/Mulgrave rivers. These rivers form the core of freshwater fish biodiversity and endemism in the Wet Tropics region.

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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

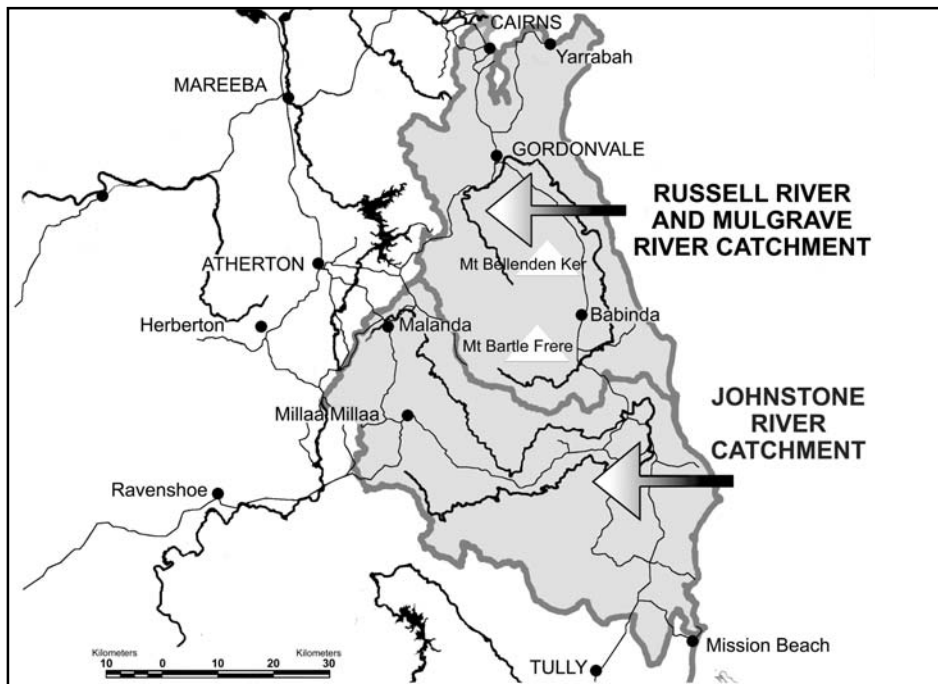
- Most of the endemics are found predominantly in tributary streams and not the main channel.
- Most occur predominantly in *riffle* and *rapid* habitats, whereas elsewhere in Australia, species found in riffles and rapids are a very minor component of the freshwater fish fauna.

Endemic species persist through time

Why are these features of interest? Because they indicate that the endemic species have persisted in the region for a very long time during periods of extreme climate changes.

A large body of research, much of it undertaken by Rainforest CRC researchers, indicates that historical climate change has repeatedly caused drastic contractions and expansions in the amount of rainforest cover as well as fragmentation and extinction of many terrestrial vertebrate group. This applies particularly to the glacial periods of the Pleistocene. The distribution, persistence and habitat requirements of the region's endemic fish fauna suggest that historical climate change did not impact as strongly on the aquatic environment as it did on the terrestrial environment.

Some of the region's rivers functioned much as they do today, with permanent tributary streams a feature of the landscape, although total discharge would have been reduced in keeping with a reduced rainfall. It is in these streams that the endemic freshwater fishes persisted while extinctions of terrestrial fauna were occurring



Map showing the Russell/Mulgrave and Johnstone River catchments which form the core of freshwater fish biodiversity and endemism in the Wet Tropics region

around them. It is notable that the Johnstone and Russell/Mulgrave rivers contain Queensland's highest mountains, Mt Bellenden Kerr and Mt Bartle Frere, within their catchments. These mountains are likely to have exerted a powerful influence on the distribution of rainfall in the area throughout the Pleistocene.

The current challenge facing the region's freshwater fish fauna is not natural climate change, but the immediate human pressures of habitat degradation (ie, wetland drainage, riparian destruction, invasive grasses), the translocation of native fishes and increased water resource use. In the longer term, global climate change caused by human activities does pose

a threat to the maintenance of overall fish biodiversity if rising sea levels flood important lowland riverine habitat. However the endemic fishes, because of their upland distribution, should not be impacted so strongly by rising sea levels. Whilst not currently imperilled, it would be a great pity not to ensure the future survival of the amazing endemic fishes of the Wet Tropics region.

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