

MYSTERIOUS MALE CLAIMS NURSERY SPACE

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ABOVE
The researchers set their nets in the remote Marrakai Creek in the Northern Territory.

Few researchers have to battle the Northern Territory's iconic saltwater crocodile in a quest for answers. But for **TIM BERRA** and **DION WEDD**, it's all in a day's work as they conduct the first research on the nurseryfish in almost a century.

In a tributary called Marrakai Creek just off the Adelaide River in the Northern Territory, two researchers stand aboard their 4.9 metre boat gently hauling in their catch. Fat clouds of humidity hang in the sky above the murky water. The deep silence along this tributary is broken only by the splash of fish, including large barramundi and threadfin salmon, being returned to the water.



MAIN PICTURE

The nurseryfish has some unusual characteristics including the male having a small hook on its head that holds the egg mass.

RIGHT

Nurseryfish are found only in northern Australia and southern Papua New Guinea.



The researchers, Professor Tim Berra and Dion Wedd, are single-minded in their fishing. They are not interested in the highly prized table fish, the barramundi, or the salmon. They want just one species from the creek: a little-known, hatchet-shaped fish that carries its eggs resembling a bunch of grapes on a small hook on its head.

As the dinghy carrying our *Origins* team approaches the researchers, we hear a splash. Within moments, the large head of a saltwater crocodile emerges near the bank, a sobering reminder of the perils of undertaking this research. All limbs are pulled well within our vessel.

As we come alongside their boat, Professor Berra tells us of being stalked by the resident five-metre saltwater croc that locals call “Agro”. And it’s easy to see how he gained his name. Attracted to the catch the researchers were hauling in, Agro tore a huge hole in the fish net just before our arrival.

Despite the real dangers, Professor Berra says he finds the crocodile-rich environment stimulating, and after 10 years of working on the hatchet-shaped nurseryfish (*Kurtus gulliveri*) he is determined to discover the reasons for its unique adaptation of the hook found on the head of the male fish and why he carries the eggs.

Professor Berra has seen males carrying eggs and has collected males and egg masses separately, but he has been unable to catch one with an egg mass attached, which could potentially solve the question of genetics and whether the males are carrying their own offspring.

“I have caught more than 1300 nurseryfish, some with nearby egg masses suggesting they were dislodged from the male’s hook, but never any actually attached,” he says, retrieving a male and female nurseryfish to show us the structural features that distinguish them.

While the female has a small hump on the top of the forehead, the male has a significant hook-like protrusion. “These egg masses can hold thousands of eggs, each connected by a long filament that the male carries on his clamp-like hook. What we don’t know is how the eggs become attached to the hook and whether the male fish is a paternal match.

“DNA analysis that I published recently has revealed very low genetic variation within the nurseryfish population, which makes it difficult to say with certainty that any given male is the genetic father of the embryos within the egg mass,” Professor Berra says. “However, we strongly suspect that the male carrying the egg mass is the father of those embryos. Multiple paternity is not involved.

“We think that egg carrying is an adaptation that protects the eggs from tidal flow and siltation and enables the male to move the eggs to a safe location.”

The fish itself is iridescent silver, shimmering blues and purples, with translucent ribs and mouth parts. “You can actually see light through the ribs of the fish,” Professor Berra explains as he holds the fish up to the sun.

To find out more about how these fish live, Professor Berra and co-researcher Dion Wedd, Territory Wildlife Park curator, sit in the boat removing the otoliths (ear bone) of their catch. “The otolith records the age and locality of



ABOVE

Three-time Fulbright Fellowship winner Professor Tim Berra.

LEFT

Co-researcher and Territory Wildlife Park curator Dion Wedd.



the fish,” Mr Wedd says, as he places the tiny scale-like bone into a small yellow envelop and Professor Berra calls out the fish weight and measurements for recording.

Like the rings of a tree, the otolith can provide insights into the life of the fish. When cut into ultra-thin layers and analysed under a powerful microscope, the bones can provide detailed information on the activities of the fish.

Mr Wedd first saw nurseryfish in another iconic Northern Territory waterway, the Daly River, which also is known for its crocodile population. “I guess you could call me a fish nerd,” he confesses as he diligently labels envelopes containing samples. “I like to collect fish and the first time I caught a nurseryfish I thought it was weird and totally unlike anything I had seen before.”

Formerly head of the aquarium at the Territory Wildlife Park located just outside Darwin, Mr Wedd is now curator of the park. “Because the environment is so hostile the only way we will find out more about the breeding behaviour of these fish is by breeding them in captivity,” he says. He has tried, but even with all his years of experience with Territory fish, he has been unsuccessful so far.

“These fish are very difficult to keep in captivity. They won’t eat and are very docile. We think the next step would be to try to grow them from juveniles in captivity.”

Professor Berra’s research in the NT is supported by CDU and the Northern Territory Government through the Territory Wildlife Park and NT Fisheries. He has received previous support from the National Geographic Society.



LEFT

Living up to his name, the five-metre saltwater croc “Agro” leaves a huge hole in the researchers’ net.

SOLVED!

This is not the first fishy mystery for Professor Tim Berra, a three-time winner of Fulbright Fellowships to Australia (1969, 1979, 2009) and author of more than 75 scientific papers and six books.

Inspired by legendary American explorer William Beebe, Professor Berra is an international expert in freshwater fish, with a reputation for solving long-standing mysteries.

He taxonomically separated the trout cod from the Murray cod in the Murray River, and solved the mystery of the disappearance and reappearance of the tiny salamander fish in south-western Australia. He found that the salamander burrowed into the watertable when its freshwater pools dried up and reappeared when the pools replenished.

He also was involved in the preservation of a five-metre megamouth shark in 1988, a species seen only twice previously.

Professor Berra is a University Professorial Fellow at CDU, and Research Associate the NT Museum, Darwin. He is a world-renowned Charles Darwin specialist and Emeritus Professor of Evolution, Ecology and Organismal Biology at the Ohio State University, USA.

