



Mr Kelvin Lim (left), curator of vertebrates, and Dr Tan Heok Hui, curator of fish, at the National University of Singapore's Lee Kong Chian Natural History Museum. Both curators have published work on species of freshwater fish from the region. ST PHOTO: GIN TAY

# New freshwater fish species emerges from case of mistaken identity

## The saddle barb had for decades been treated as another species

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A new freshwater fish species has been identified in Singapore, in a discovery that was almost 30 years in the making.

The saddle barb (*Barbodes sellifer*) is an inhabitant of Singapore's freshwater streams.

These are rare habitats in urban Singapore, and are confined largely to the country's remaining forest pockets, such as the Central Catchment Nature Reserve.

But the lack of awareness of the fish's existence had not been because of its scarcity. It was, instead, a victim of a series of mis-

taken identities.

The *B. sellifer*, as well as another new species, *Barbodes zakariaismaili*, had initially been treated as a different species, said Mr Kelvin Lim, one of two researchers behind the study.

Both had for decades been treated as *Barbodes binotatus*, which was thought to be highly variable, with individuals having colour patterns that vary from one region to the next.

"*B. binotatus* was believed to range from Indochina and the Philippines to Malaysia and western Indonesia," said Mr Lim, the curator of vertebrates at the National University of Singapore's (NUS) Lee Kong Chian Natural History Museum.

Vertebrates refer to animals with a backbone, and include bony fish and mammals.

Freshwater bodies are usually isolated as they are separated by



The saddle barb (*Barbodes sellifer*) has a triangular-to-rectangular dark blotch beneath the dorsal fin. Mr Kelvin Lim, curator of vertebrates at NUS' Lee Kong Chian Natural History Museum, said the species went through multiple name changes. PHOTOS: TAN HEOK HUI, GIN TAY

land, unlike the marine realm of interconnected oceans and seas.

To differentiate between *B. binotatus* populations found in various regions, scientists had over the decades given names to some regional populations to differentiate them.

For example, the population with a dark bar under the dorsal fin that occurs in Peninsular Malaysia, Singapore and Sarawak is *Puntius binotatus banksi*.

In 2013, however, further research was done that proved that this group of fish was distinct enough from the umbrella group to be considered a species of its own – *Barbodes banksi*.

Now, the latest work by Mr Lim and freshwater fish expert Maurice Kottelat from Switzerland shows that there are distinct variations even within *B. banksi*.

Through an examination of more than 500 specimens in the mu-

seum identified as *B. banksi*, the researchers could distinguish three groups based on colour pattern and body shape.

For instance, *B. sellifer* has a broader triangular-to-rectangular dark blotch beneath the dorsal fin, while *B. zakariaismaili* has a more slender body, a dark bar beneath the dorsal fin and a dark mid-lateral stripe on the front part of its body. The original *B. banksi*, has a narrow black bar on its sides beneath the dorsal fin.

And since each specimen in the museum's collection is labelled with when and where each was collected, the researchers could also map out the morphological differences to location.

*B. zakariaismaili* is found to be restricted to one part of the Pahang River basin in Peninsular Malaysia, while *B. sellifer* is more widespread, occurring throughout Peninsular Malaysia, Singapore, central eastern Sumatra and the Riau, Anambas and Natuna Islands of Indonesia, said Mr Lim.

The original *B. banksi* appears to be restricted to Borneo, and the original *B. binotatus* to Indonesia's Java island, he added.

"The saddle barb was known to us all along, just that it went through multiple name changes, from *B. binotatus*, to *B. banksi*, to *B. sellifer*," said Mr Lim.

Now, *B. sellifer* replaces *B. banksi* on Singapore's checklist of freshwater fish species. There are an estimated 42 species of native freshwater fish in Singapore. The latest work, published last December in the scientific journal *Raffles Bulletin Of Zoology*, spanned almost 30 years, with Mr Lim and Dr Kottelat working on a review of this group of fish since the 1990s.

But Mr Lim was coy about the effort, which required spending long hours hunched over a microscope analysing and measuring dead fish.

He said: "The principal author and I have been toying with this group on and off since the early 1990s. It really is not amazing. We were slow."

Fish scientist Tea Yi-Kai, a PhD candidate at the University of Sydney who was not involved in the latest study, said the new barb species from Singapore is a great example of why taxonomy – or the science of classification – is so important.

"When you have several species misidentified and hidden under one name, they are all perceived as a single, widespread species, which means that when it comes to conservation management, they may not be receiving adequate protection," he said.

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