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### Fighting fish: A model father

Researchers have found that evolutionary history and environmental factors may determine how the male fighting fish takes care of its young

By Chang Ai-Lien

MOTHERS who feel run off their feet can take a leaf from the fighting fish childcare manual.

Father knows best in the world of fighting fish, where the female's job is just to mate, lay eggs and swim off to resume her independent life.

It is up to the male to take care of the brood, either building bubble nests for the eggs and babies, or keeping them safe in his mouth.

Overtuning conventional wisdom, researchers here have come up with new findings that reveal why male fighting fish care for their young the way they do, which has made the cover of the journal *Evolution*.

By recreating the fish's evolution through DNA analysis, they found that very similar species of fighting fish could have different childcare habits, depending on their evolutionary history and where they lived.

One of the researchers involved was Associate Professor Peter Ng of the National University of Singapore's (NUS') Department of Biological Sciences, who is also director of the Raffles Museum of Biodiversity Research.

'We now believe that these extremely adaptable fish have evolved different forms of care, and this is dictated by the niche habitats and conditions where they live,' he said.

For about 20 years, scientists have argued the fundamental question of which came first: bubble nests or mouth brooding.

Some believed bubble nests came first - where the male takes the eggs and places them in a nest made of bubbles at the water's surface - followed by the mouth brooder, which takes care of the eggs and fry in its mouth, starving the entire time.

Other scientists thought that the breeding patterns depended on where the fish lived - stagnant water made it easier to build bubble nests, while fast-flowing streams called for mouth brooding.

The latest work was a collaboration between scientists from the NUS, Spain's National Museum of Natural Sciences, the Tubingen University in Germany and the Smithsonian Institution in the United States.

There are about 60 species of fighting fishes, not all like the famous Siamese fighting fish prized by many aquarium enthusiasts.

For fighting fish, found only in South-east Asia, there are giants and dwarfs - some are as small as 2cm long while others are 10 times the size at 20cm long.

All sport splendid jewel-like colours, and all breathe air like humans.

Many survive in waters that would be poison to other fish, say highly acidic swamps and oxygen-deficient ponds, fast-flowing streams or even tiny water-filled depressions in forest litter.



There are dwarfs and giants among fighting fish species such as the tiny betta brownorum (below), one tenth the size of the betta ibanorum, which can be up to 12cm long. Both can be found in Sarawak. -- NUS



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'Each of them has become a specialist in its own little world; that explains why so many species have evolved,' said Prof Ng.

Prof Ng and his research assistant Dr Tan Heok Hui have been working on the fish for more than a decade.

Regarded as Singapore's 'Indiana Jones' by his colleagues for his treks into the depths of jungles in Thailand, Borneo, Java, Sumatra and Malaysia in his search for new fish, Dr Tan has discovered more than half the existing species through his expeditions in the region.

Prof Ng said the work had wider implications than for the world of fighting fish.

'It gives us a new perspective on how animals evolve and adapt, and maybe this will become a framework to test similar ideas on other species.'

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