The devil is in the detail

January 9 2015

The red devil cichlid

Researchers have looked at a species of fish to help unravel one of the biggest mysteries in evolutionary biology.

In many species of plants and animals, individuals from the same population often come in different colour variants. But the mystery has remained as to why one colour doesn't eventually replace the other through natural selection.

Research published in the *Journal of Evolutionary Biology* has looked at a species of Central American freshwater fish to look at how different colours are maintained in the species.

Lead researcher, Will Sowersby, a PhD student at Monash University, said the reasons why different colour morphs (colour variants) existed in a population - when in theory they should be equally subjected to natural selection - was still a major question for evolutionary biologists and remained unknown for many species.

"The importance of this work lies in the fundamental question: how and why do variants of the same animal exist in nature," he said.

"Colour variants of the same species are a striking example of biological variation, yet the adaptive significance and what evolutionary processes maintain them, remains unknown."

Sowersby said the team looked at a species of fish called the red devil cichlid, which comes in two colours - one is dark (grey through black with dark patterns) and the other is gold, (yellow through red).

The gold coloured fish is genetically dominate but the darker coloured fish is much more common.

"With this species, the darker individuals appear to be able to alter the shade of their body colour and patterns to better match their environment," he said.

"We wanted to assess whether this had a part to play in how different colour morphs (colour variants) can exist in a population, and why the gold colour fish is rarer."

The researchers filmed the red devil cichlids over both dark and light surfaces. Screenshots were then analysed to measure the amount of change to the shade of the fish's body colour. After analysis they found that the darker fish could alter its brightness to match the surface it was on, while the gold coloured fish could not.

"These results suggest that differences in the ability to match backgrounds could play a potentially important role in maintaining colour frequencies in the wild," Sowersby said.

The research team, including Associate Professor Bob Wong, School of Biological Sciences, and Dr Topi Lehtonen, University of Turku, hope to do more work in this area.

"Given the complexities of colour variants in species, more work is needed to understand how differences in colouration might influence the susceptibility of dark and gold individuals to different predators and under different environmental conditions," Sowersby said.

More information: "Background matching ability and the maintenance of a colour polymorphism in the red devil cichlid" *Journal of Evolutionary Biology* DOI: 10.1111/jeb.12572

Provided by Monash University