

# Butterfly fish 'may face extinction'

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A beautiful black, white and yellow butterflyfish, much admired by eco-tourists, divers and aquarium keepers alike, may be at risk of extinction, scientists have warned.

The case of the Chevroned Butterflyfish is a stark example of how human pressure on the world's coral reefs is confronting certain species with 'blind alleys' from which they may be unable to escape, says Dr Morgan Pratchett of the ARC Centre of Excellence for Coral Reef Studies Media Release and James Cook University.

In a study published in the journal *Behavioural Ecology and Sociobiology* Dr Pratchett and Dr Michael Berumen of Woods Hole Oceanographic Institution (USA) warn that the highly specialized nature of the feeding habits of this particular butterflyfish – the distinctively patterned *Chaetodon trifascialis* - make it an extinction risk as the world's coral reefs continue to degrade due to human over-exploitation, pollution and climate change.

“The irony is that these butterflyfish are widespread around the world, and you'd have thought their chances of survival were pretty good,” Dr Pratchett said today.

“But they only eat one sort of coral – *Acropora hyacinthus* – and when that runs out, the fish just disappear from the reef.”

The team found it hard to believe a fish would starve rather than eat a mixed diet, so they tested *C. trifascialis* in tank trials on a range of

different corals. The fish grew well when its favourite coral was available – but when this was removed and other sorts of corals offered, it grew thin, failed to thrive and some died.

“We call these kinds of fish obligate specialists. It means they have a very strong dietary preference for one sort of food, and when that is no longer available, they go into decline. We still don’t have a satisfactory scientific explanation for this, as it seems like rather a risky tactic in evolutionary terms – but it must confer some advantage provided enough of its preferred food is available,” Dr Pratchett says.

The *A. hyacinthus* coral, which the butterfly fish feeds on, is itself highly vulnerable – to attacks by plagues of crown-of-thorns starfish (thought to be triggered by humans releasing excess nutrients onto the reef as sediment, fertilizer or sewage), to storms and to the coral bleaching caused by the heating of ocean surface waters to 32 degrees or more, which is thought to be linked to global warming.

“Although extremely widespread, the Chevroned butterflyfish may be at considerable risk of extinction following ongoing degradation of coral reefs around the world, because the coral itself is exceptionally vulnerable, Dr Pratchett explains.

“It is estimated that up to 70 per cent of the world’s coral reefs are now badly degraded, which usually involves the loss of this particular coral – and, when it goes, the *C. trifascialis* also disappear from the reef.

“To make matters worse, butterflyfishes are one of the main families of coral reef fishes being targeted by aquarium collectors. However, the specialized coral-eaters are clearly not suitable for keeping in aquaria - and often die because they cannot obtain their main food source.”

A previous case in which a coral-dependent fish vanished occurred in the

case of *Gobiodon* a specialized coral-dweller known only from one site, Kimbe Bay in Papua New Guinea, which was thought by scientists to have possibly become extinct after its habitat was destroyed.

Researchers consider that such extinctions are likely to occur as part of the global mass extinction of species now taking place, and that marine ecosystems may be particularly vulnerable in that small changes in habitat or water quality can have a big impact on their species.

Dr Pratchett and Dr Berumen say theirs is one of the few studies so far to consider the evolutionary and ecological basis of dietary versatility, and has implications for the fate of specialised feeders throughout the animal kingdom.

Source: ARC Centre of Excellence in Coral Reef Studies

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