



An obligate generalist coral-feeding butterflyfish: *Chaetodon trifasciatus*

### **Specialisation of fish that feed on coral and their vulnerability to climate change**

Fish display quite a variability of feeding preferences among different species. Some species feed on algae (herbivores), some on other fish (piscivores), and others on invertebrates (invertivores). One feeding group of fish feed on live coral polyps, and these fish are termed 'corallivores'. Within the corallivores, feeding can be further distinguished by the degree of specialisation a species exhibits<sup>1</sup>. Those that feed on live coral, but also feed on algae and invertebrates, may be termed 'facultative corallivores'. Those that feed only on live coral, but eat a broad range of species of coral, may be termed 'obligate generalist corallivores'. Finally, those that feed exclusively on live coral and will eat very few species of coral, are termed 'obligate specialist corallivores'.

During the 2006 Chagos expedition the dietary specialisation of 3 species of coral feeding butterflyfish was recorded at two reefs in the Diego Garcia lagoon. The two reefs represented one dominated by *Acropora* corals with low diversity of other corals, and one dominated by *Pocillopora* corals with high diversity of other corals. Individuals of each species of fish were followed for 3 minute durations on snorkeller and every time they took a feeding bite, the type of coral, or type of other substrate was recorded. In this way the degree of feeding specialisation could be calculated and compared among species and between the two reefs.

*Chaetodon trifascialis* was confirmed to eat very few types of coral (obligate specialist corallivore), only feeding on 4 types and preferentially choosing *Acropora* corals where possible. *Chaetodon trifasciatus* (pictured), also only fed on live coral, but ate a much broader range of corals (obligate generalist corallivore). *Chaetodon auriga* fed on approximately 55% live coral, the remaining bites being on algae and small invertebrates (facultative corallivore). All species fed on a greater number of corals in the *Pocillopora* dominated, diverse reef<sup>2</sup>.

The importance of these findings was tested with data from the inner Seychelles Islands where climate induced coral bleaching caused about 90% coral loss in 1998. Data from Chagos could not be used as the reefs there have recovered a lot faster from the 1998 bleaching event and so changes in fish assemblages are less apparent. Patterns of decline of coral feeding fish in the Seychelles have confirmed the importance of understanding feeding specialisation; the obligate specialist species nearly disappeared (with local extinctions in some species), the obligate generalist species showed considerable decline, whereas the facultative feeders showed negligible change. The study concluded that we need a greater understanding of the species most vulnerable to climate change, their habitat requirements and the roles they play on the reef, to assist biodiversity conservation and management in a changing climate<sup>2</sup>.

<sup>1</sup> Pratchett, M.S. 2005. Dietary overlap among coral-feeding butterflyfishes (Chaetodontidae) at Lizard Island, northern Great Barrier Reef. *Marine Biology* **148**: 373-382.

<sup>2</sup> Graham, N.A.J. 2007. Ecological versatility and the decline of coral feeding fishes following climate driven coral mortality. *Marine Biology* **153**: 119-127.

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