

Fish diet heats up marine biodiversity hotspot

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Planktivorous coral reef fishes feeding in the water column at Lizard Island, Australia. These fishes are far more diverse than others in the Indo-Australian Archipelago. Credit: Victor Huertas.

Scientists have discovered a never-before-seen biodiversity pattern of

coral reef fishes that suggests some fishes might be exceptionally vulnerable to environmental change.

A new study shows plankton-eating coral [reef](#) fishes (planktivores) are far more diverse than others in the Indo-Australian Archipelago, a global marine biodiversity [hotspot](#).

The findings highlight, for the first time, a unique link between the diet and distribution of species across the marine realm.

"The archipelago is one of the most complex and dynamic geological regions in the tropics," said lead author Dr. Ale Siqueira from the ARC Centre of Excellence for Coral Reef Studies at James Cook University (Coral CoE at JCU). "And its fishes underpin its status as a [biodiversity hotspot](#)."

"The exceptional success of planktivores may be a result of the hotspot's unique geological configuration and oceanographic currents, which ensure a constant and abundant source of planktonic food," said co-author Professor David Bellwood, also from Coral CoE at JCU.

"Such stable conditions over the past five million years are likely to have promoted the accumulation of planktivorous [fish](#) species in the hotspot."

While planktivores thrive in the hotspot, they have had a difficult history in more remote areas with the possibility of food shortages and periodic extinctions.

"Planktivore richness drops abruptly away from the marine hotspot—and more so than any of the other dietary categories studied," Dr. Siqueira said.

These findings suggest a vulnerability of planktivorous coral reef fishes

to [environmental change](#), despite their species richness within the hotspot.

"We examined the global diversity patterns for more than 3,600 coral reef fishes," said co-author Dr. Pete Cowman from Coral CoE at JCU and Queensland Museum.

Dr. Cowman said the research identified a link between biodiversity, food and habitat—emphasizing the importance of species interactions with their environment.

"Understanding the ecosystem roles of different species and how they have changed through space and time offers the potential for exciting new insights, as revealed by our planktivores," said Dr. Cowman.

Dr. Siqueira said a deeper understanding of species interactions is needed.

"Future research should focus on the ecosystem roles that different species play," Dr. Siqueira said.

"We need to describe changes in the roles of species through space and time, rather than simply documenting [species](#) and their numbers; the traditional approach in science."

More information: Alexandre C. Siqueira et al, Planktivores as trophic drivers of global coral reef fish diversity patterns, *Proceedings of the National Academy of Sciences* (2021). [DOI: 10.1073/pnas.2019404118](https://doi.org/10.1073/pnas.2019404118)

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