

Rare corals breed their way out of trouble

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Rare corals may be smarter than we thought. Faced with a dire shortage of mates of their own kind, new research suggests they may be able to cross-breed with certain other coral species to breed themselves out of a one-way trip to extinction.

This finding, released by scientists at the ARC Centre of Excellence for Coral Reef Studies, has raised hopes for the ability of the world's corals to withstand the rigors of changing climates and human impacts, says lead author Zoe Richards.

"Coral reefs worldwide face a variety of marine and land-based threats and hundreds of corals are now on the red list of threatened species. It is often assumed that rare coral species face higher risks of extinction than common species because they have very small effective population sizes, which implies that they may have limited genetic diversity and high levels of inbreeding and therefore be unable to adapt to changing conditions," Zoe says.

"When we studied some particularly rare species of *Acropora* (staghorn corals), which you might expect to be highly vulnerable to extinction, we found some of them were actually hybrids – in other words they had cross-bred with other *Acropora* species. This breaks all the traditional rules about what a species is." By hybridising with other species, these rare corals draw on genetic variation in other species, increasing their own potential to adapt to changing conditions.

"At this stage how it came about and who the breeding partners are isn't

entirely clear, but what is evident is that rare corals previously thought vulnerable to extinction may have more ability to adapt than initially expected" she explains.

Acropora are the main reef-builders throughout the Indian and Pacific Oceans, and so of critical importance to the ability of reefs to cope with changing conditions. However, till now, very few clear cut examples of hybridisation were known, and some people did not even accept that corals can cross-breed, Zoe says.

The common Acropora corals occur mainly on reef crests, flats and slopes, whereas several of the rare species occupy more marginal habitats, such as the deeper or extremely shallow water zones where the common species do not grow.

"When we looked at the genetic history of rare corals, we found that they exhibited unexpected patterns of genetic diversity. This suggests that, rather than being the dying remnants of once-common species, they may actually be coral pioneers pushing into new environments and developing new traits by virtue of the interbreeding that has enabled them to survive there.

"This is good news, to the extent that it suggests that corals may have evolved genetic strategies for survival in unusual niches – and may prove tougher to exterminate than many people feared. With such tricks up their sleeve, it is even possible that the rare corals of today could become the common corals of the future."

Corresponding author Professor David Miller of CoECSR and James Cook University says the discovery is a refreshing piece of good news amid the frequently gloomy reportage about corals nowadays. "One would expect that rare corals would be especially at risk, but we've found that some appear to have developed mechanisms for coping with rarity,"

he says.

"Hybridising with another species actually makes a lot of genetic sense if you are rare and the next colony of your species may be hundreds of kilometres away. It suggests these creatures are far more resilient than we thought, based on what we know from the behavior of land animals."

Source: ARC Centre of Excellence in Coral Reef Studies

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