Corals 'can fight acidifying oceans'

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In a world-first, scientists from the ARC Centre of Excellence for Coral Reef Studies (CoECRS) have shown that tropical corals have the ability to fight back against acidifying oceans caused by human emissions of carbon dioxide.

While the threat of coral bleaching from higher sea-surface temperatures and direct human impacts still present serious risks to the long-term prospects for coral reefs, the research findings suggest that many corals have the ability to largely offset the effects of increasingly acidic oceans.

Lead researcher, Prof. Malcolm McCulloch, will discuss his team's findings at the 'Coral Reefs in the 21st Century' symposium in Townsville on Friday 11th October.

"Using a new boron isotope technique we were able to calculate the effects of the acidification process on coral growth rate," says Prof. McCulloch of the University of Western Australia and Deputy Director of CoECRS.

"We've looked at many species of corals, including deep sea corals, and found that almost all of them are able to reduce the acidity – or pH – of the seawater they take in, adapting the chemistry of this seawater and hence enabling them to more efficiently extract this important material needed for building their coral skeletons."

This process of 'buffering' seawater – raising its pH – only takes up a relatively small amount of energy and provides significant benefits to the

coral. However Prof. McCulloch cautions that corals still face serious risks from climate change.

"In terms of ocean acidification, our research model showed predictable but generally small effects on the future ability of tropical corals to build skeletons, something that is not only critical for their individual growth and survival but for the health of coral reefs in general.

"But the rapid and often abrupt increases in ocean temperatures that are expected over the next 100 – 200 years are also likely to cause serious episodes of coral bleaching and when this happens the bleached corals are unable to function properly," he says.

"Corals in this state will probably not be able to modify the chemistry of seawater they take in – an important part of the skeleton-building process – meaning that the effect of ocean acidification would be felt at exactly the time when it is most unwanted."

According to Prof. McCulloch, other skeleton-building marine species, including some sponges and giant clams are unable to modify the acidity of the seawater they use to extract building material and these species may be even more vulnerable to the effects of climate change.

The research team is continuing to examine a wide range of marine species that build skeletons in order to better understand the capacity of these organisms to modify their internal seawater chemistry. In doing so they hope to be better able to predict the relative impact that climate change may have on different marine species.

'Life at the edge: the role of pH upregulation in marginal environments' will be presented by Prof. McCulloch at the Coral Reefs in the 21st Century symposium.

The symposium will feature talks by more than 30 eminent coral reef and fish scientists on the future of these vital marine ecosystems and the industries and communities which depend on them.

The symposium and public forumare being held at the Rydges Southbank, Townsville on Thursday October 10 and Friday October 11. Symposium Program details are available online.

The paper relating to this talk "Coral resilience to ocean acidification and global warming through pH up-regulation" by Malcolm McCulloch, Jim Falter, Julie Trotter and Paolo Montagna appears in the journal *Nature Climate Change*.

Provided by ARC Centre of Excellence in Coral Reef Studies