

# Coral reef experts deliver urgent recommendations for future research

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There is substantial variability in temperature tolerance among and within coral species. Typically, boulder-like corals survive higher temperatures, while branching corals perish under moderate heat stress. Scientists are striving to understand and harness the molecular mechanisms that underpin this variability. Central GBR, March 2017. Credit: G. Torda

A group of international scientists, including scientists from Australia, have issued advice that more research is urgently required to determine whether corals can acclimatise and adapt to the rapid pace of climate change.

The team of [coral](#) experts, led by Dr. Gergely Torda from the ARC Centre of Excellence for Coral Reef Studies (Coral CoE) at James Cook University and the Australian Institute of Marine Science (AIMS), have delivered recommendations for future research.

As the Great Barrier Reef faces unprecedented coral mortality from back-to-back mass bleaching in 2016 & 2017, rising carbon dioxide and other natural and human-induced pressures, scientists advise more research is urgently needed into the poorly-understood mechanisms that corals might use to survive in a rapidly warming world.

"There is still a lot to understand about corals," says Dr. Torda. "While our only real chance for their survival is to reverse [climate change](#), a nugget of hope exists - that the corals may be able to adapt to their changing environment," he says.

"However, there are major knowledge gaps around how fast corals can adapt or acclimatise to changes in their environment, and by what mechanisms they might use to achieve this," adds co-author Professor Philip Munday of Coral CoE.

"For example," explains Dr Jenni Donelson, co-author at Coral CoE, "recent studies show that fish can acclimatise to higher water temperatures when several generations are exposed to the same increased temperature, but whether corals can do the same, and how they might achieve this, is largely unknown."

Eight research recommendations are published today in the prestigious

journal *Nature Climate Change* and arise from a workshop with a team of experts composed of 22 biologists from 11 institutions in five different countries.

The team agrees that further research identifying how corals respond to climate change is critical, as the Earth undergoes an unprecedented rate of environmental change.

AIMS Climate Change Scientist, Dr. Line Bay says, "There is sufficient inertia in the climate system that we will not be able to prevent further climate-related disturbances affecting the reef in the immediate future."

"Solutions are required to help corals adapt and acclimate to near-term future climate pressures while we figure out how to reduce emissions and halt and reverse longer-term climate change."



Corals live close to their temperature maxima, and even just a degree of heating over the summer months can cause a stress response called 'coral bleaching.' Why some coral species tolerate heat anomalies better than others is subject of intense research. Central GBR, March 2017. Credit: G. Torda

Co-authors Prof. Timothy Ravasi and Dr. Manuel Aranda from King Abdullah University of Science and Technology (KAUST) warn that the clock is ticking. "The Great Barrier Reef has suffered substantial losses of coral over the past two years. Understanding the mechanisms that could enable corals to cope with ocean warming is becoming increasingly important if we want to help these ecosystems," they say.

The paper is focused on stony, reef-building corals, which are the 'ecosystem engineers' of tropical coral reefs. These corals build the frameworks that provide shelter, food and habitat for an entire ecosystem. When corals are lost, the diversity and abundance of other [reef](#) organisms declines, until ultimately the ecosystem collapses.

"Predicting the fate of coral reefs under climate change is subject to our understanding of the ability of corals to mount adaptive responses to environmental change," says Dr. Torda. "Our paper sets out key research objectives and approaches to address this goal."

"The time to act is now, as the window of opportunity to save [coral reefs](#) is rapidly closing," he concludes.

The paper titled "Rapid adaptive responses to [climate](#) change in corals" is published today in *Nature Climate Change*.

**More information:** Gergely Torda et al, Rapid adaptive responses to climate change in corals, *Nature Climate Change* (2017). [DOI: 10.1038/nclimate3374](#)

Provided by ARC Centre of Excellence in Coral Reef Studies

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