

Models show corals more resistant to ocean warming if they swap for more heat-resistant varieties of algae

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A team of researchers from the University of California, the NOAA/OAR Geophysical Fluid Dynamics Laboratory and the

University of British Columbia has found via simulations that corals that replace poorly performing algae with more heat resistant varieties are more resistant to coral bleaching as oceans warm due to global warming. In their paper published in the journal *Nature Climate Change*, the group describes the factors that went into the development of their simulations and what they showed over time.

Prior research has shown that under [climate change](#), the oceans absorb some of the heat, resulting in ocean warming. Prior research has also shown that [carbon dioxide](#) released into the atmosphere is also causing more acidic oceans. Additionally, [global warming](#) is known to cause bleaching of [coral reefs](#). As a response to [warmer water temperatures](#), corals expel the algae that live in their tissues, leaving the corals to die. The algae remove waste products from healthy corals and also supply them with oxygen. Without these services, the coral cannot survive. In this new effort, the researchers noted that some algae are more heat tolerant than others and that corals respond to them by allowing them to remain in their tissue. They created a model to simulate how corals might respond as the oceans warm if they were able to swap out poorly performing algae with strains that were more tolerant of heat.

Their model incorporates data from 1,925 coral reefs from around the globe, along with data regarding strains of algae. They then ran their simulation under four possible scenarios involving different rises in ocean temperatures due to different amounts of greenhouse gas emissions into the atmosphere in the coming years.

The simulations demonstrate that under moderate global warming conditions, many of the coral reefs around the world could survive if they were able to swap out for more heat-resistant algae. Their simulation also showed a limited impact on coral bleaching due to increasing acidification of the worlds' oceans.

More information: Cheryl A. Logan et al. Quantifying global potential for coral evolutionary response to climate change, *Nature Climate Change* (2021). [DOI: 10.1038/s41558-021-01037-2](https://doi.org/10.1038/s41558-021-01037-2)

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