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Some Corals May Adapt to Warmer Seas

by Dennis Normile on 12 March 2012, 12:25 PM | 2 Comments

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ENLARGE IMAGE

Survivor. Healthy *Acropora* (in front) appear to have developed resistance to high sea temperatures while bleached *Porites* did not.

Credit: James Guest

Pictures of ghostly white coral colonies bleached by elevated sea temperatures have become symbols of the effects of global warming. Now there is a glimmer of hope that at least some corals may be more resilient than previously thought. A study suggests that certain kinds of corals subjected to bleaching adapt to endure higher water temperatures.

Corals rely on symbiotic algae, called zooxanthellae, for their color and to produce nutrients through photosynthesis. Above a tipping point, warm seawater typically upsets this delicate symbiotic balance and corals expel the algae, turning white and eventually dying if high temperatures persist. Such bleaching events are becoming more frequent as periodic hot spells exacerbate the sea temperature rise due to global warming. This raises concerns about the long-term survival of coral reefs, which are refuges for marine biodiversity.

Yet corals may be hardier than biologists have thought. During a 2010 bleaching episode, an international team studied three coral reef sites. At one in Indonesia that had not bleached previously, corals responded typically to warmer water. There, fast-growing branching coral species—such as *Acropora*—suffered severe die-offs. But at two sites in Singapore and Malaysia that had bleached in 1998, this pattern was reversed, with normally susceptible *Acropora* colonies appearing healthy while massive slow-growing corals, such as *Porites* were heavily damaged. The group concluded that "the effects of bleaching will not be as uniform as anticipated" and fast-growing corals such as *Acropora* and *Pocillopora* may be able to survive more frequent rises in water temperature. Marine biologist James Guest,

previously at the National University of Singapore and now at University of New South Wales in Sydney, Australia, and colleagues reported their findings online on 9 March at *PLoS One*.

The report "is very interesting and hopeful," says Mikhail Matz, a coral biologist at University of Texas, Austin. Matz says it appears natural selection led to the evolution of higher bleaching resistance in just one coral generation, "which would be awesome news indeed." He would like to see additional evidence to clarify the mechanism involved.

Guest agrees additional work is needed. "We don't know whether the unusual resistance in the branching corals was due to the host coral or the symbionts or both," he says. They are starting additional studies to learn more about the specific type of zooxanthellae inhabiting the coral that adapted and to try to study the phenomenon in the laboratory. He also cautions that higher water temperatures could still affect the composition and health of reefs. Finding evidence of adaptation "does not mean that the global threat to reefs from climate change has lessened," he says.

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