



# CAN-145- Coral age hints at recovery

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## New estimate on coral age hints at recovery hope

Coral and algae have been combining forces to build reefs for much longer than thought. Andrew Masterson reports.

Mushroom coral, found off Indonesia, is the result of a symbiosis that began in the Jurassic period.

ETHAN DANIELS / GETTY IMAGES

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The symbiotic relationship between corals and micro-algae is much older and more robust than previously thought – a finding that implies the world’s reefs might be more resilient to global warming than predicted.

Coral cells rely on long-term mutually beneficial relationships with algae known as zooxanthellae. These live inside the cells and facilitate the capture and exploitation of sunlight that powers the creation of reefs. It is the death of these plant-like micro-organisms in response to warming temperatures that [catalyses coral bleaching](#).

Research into the evolutionary history of the symbiosis, however, raises at least a faint hope that over longer time periods resilience and recovery may be possible.

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Originally held to be a single species, classified in its own genus, *Symbiodium*, by the turn of the century [researchers were noting](#) considerable diversity among the zooxanthellae, and classifying lineages accordingly. However, available sequencing techniques provided only relatively crude results for the age and divergence dates of the newly identified species, together with a rough estimate suggesting the symbiosis with coral began around 60 million years ago.

Now, a team led by Todd LaJeunesse of Pennsylvania

State University in the US has used state-of-the art DNA sequencing to underpin phylogenetic analyses and genome comparisons of the members of what is now regarded as a family of micro-algae – the Symbiodiniaceae – and come up with some startling results.

“Past estimates placed the initiation of these symbiotic relationships at 50 to 65 million years ago,” says LaJeunesse. “Our research indicates that modern corals and their algal partners have been entwined with each other for much longer – since the time of the dinosaurs, approximately 160 million years ago.”

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The relationship between the algae and the coral, thus, began during the Jurassic period – a finding with potentially optimistic implications.

***“During their long existence, they have faced severe episodes of environmental change, but have managed to bounce back after each one,” explains LaJeunesse.***

The researchers say their results indicate that the Symbiodiniaceae should be subdivided into at least 15 genera, between them containing possibly thousands of species. This is significant, because it plausibly extends the range of zooxanthellae resilience to stress induced by global warming.

“This is especially true for studies attempting to understand how the partnership between reef corals and their micro-algae, which are needed for survival and growth, may adapt to climate change,” says co-author John Parkinson.

“For example, when many corals are exposed to high temperatures they lose their symbiotic algae and die. Others are far more tolerant of heat, and some of this resilience is based on the species of algae they have.”

The conclusions LaJeunesse and colleagues draw are, of course, primarily taxonomic, but the findings are likely to be of considerable practical use to reef scientists.

“Until now, studies on the physiology and ecology of these algae attempted to compare apples to apples,” explains Parkinson.

“Considering how different some of them are, we now recognize that often we were comparing apples to oranges. These changes will help researchers to think more accurately about the comparisons they are making in experiments.”

[The research](#) is published in the journal *Current Biology*.

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