A new bacterium may be associated with reef bleaching

A colony of the Mediterranean coral *Oculina patagonica* showing bleached and healthy polyps.

The coral-eating fireworm acts as a vector for the bacterium that causes bleaching in *Oculina patagonica*.

Israel researchers who discovered that a bacterium is implicated in bleaching of at least one coral species overseas have recently worked with James Cook University scientists to help identify a possible new Australian strain. While further research is now underway to determine whether or not the find may provide important information about why the Great Barrier Reef’s corals bleach, the bacterium’s interaction with corals around the world has been illuminating in itself for marine science.

The researchers have discovered from other international work that behind the bacterium’s bleaching effect, there is a complex interaction involving the coral, its resident algae, the toxic temperature-sensitive bacterium and a coral-grazing marine worm.

Coral bleaching occurs when sea temperatures rise by more than a degree or so above the normal maximum, a stress causing the loss of the colourful symbiotic algae (zooxanthellae) that live in the tissues of corals. Severe coral bleaching events occurred on the Great Barrier Reef and elsewhere around the world in 1998 and 2000 and, with global warming, scientists expect they won’t be the last.

Back in the 1990s, Professor Eugene Rosenberg and his colleagues at the Tel Aviv University, Israel, made the important discovery that bleaching in the hard coral *Oculina patagonica*, a relatively new resident of the Mediterranean Sea, is caused by a pathogenic bacterium, *Vibrio shiloi*. There the coral tends to bleach in the summer, but usually recovers each winter.

The scientists established that the bacterium infects the coral polyps by sticking to receptors in the normally protective coral mucus. The bacteria then invade the coral tissues and multiply.

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Bleaching occurs because the bacteria produce toxins that inhibit photosynthesis by the zooxanthellae living within the coral. The scientists’ aquarium experiments showed that at 29°C, the corals did not bleach unless the bacterium was added. On the other hand, the coral did not bleach at a wintry 16°C even if bacteria were added. Nonetheless, says Rosenberg, ‘we really don’t yet know what role infection plays in periodic mass coral bleaching events around the world.’

‘However, from a practical viewpoint, if and where we find that these phenomena are caused by an infection, we will be able to apply our vast experience of dealing with infectious diseases in other animals, plants and humans to the worrying problem of coral whitening.’

• Steve Davidson

More information: