

Caribbean coral reef inhabitants critical in determining future of reefs

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Diadema are rare on Caribbean reefs now but used to be very important bioeroders. Their decline, due to disease, has been one major reason why erosion rates are now much lower. Credit: University of Exeter

New research led by the University of Exeter has found that species that live in and erode coral reefs will play a major role in determining the future of reefs.

The research, which is published in the journal *Proceedings of the Royal Society B*, highlights the delicate balance that exists between bioerosion and carbonate production on coral reefs.

Coral eroders, termed bioeroders, include species of sea urchins, sponges, parrotfish and microorganisms, known as microendoliths. Erosion occurs as a result of feeding and during the creation of living spaces and is a natural process on all coral reefs.

Professor Chris Perry from Geography at the University of Exeter said: "Our study shows that the future health and growth potential of coral reefs is of course in part dependent on rates of coral carbonate production, but that it is equally dependent, on the species that live in and on them, and which act to erode carbonate.

"If bioeroding species increase in number, and erosion rates increase relative to carbonate production, then this could spell trouble for many Caribbean coral reefs."

On 'healthy' coral reefs, bioerosion rates can be high, but more carbonate is typically produced than is lost to biological erosion. However, rates of carbonate production have slowed on many Caribbean coral reefs and coral cover has declined dramatically since the early 1980s. Despite this, marked shifts to states of net coral reef erosion have not widely occurred.

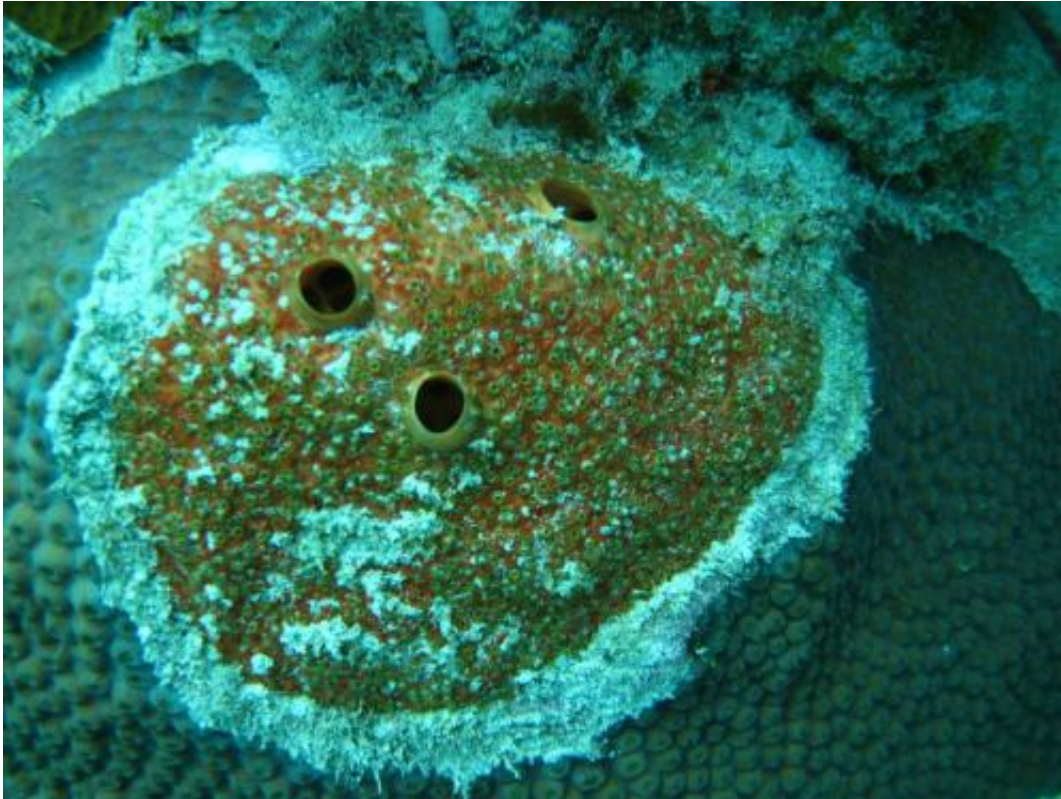
This new research shows that this is because bioerosion rates have also been reduced in recent years due to disease and overfishing and that this has acted to partially offset the lower rates of coral carbonate production. Were historical levels of bioerosion to be applied to today's reefs there would be widespread destruction, threatening many of the benefits that reefs provide to society.

Major management efforts are directed at protecting at least one major group of bioeroders, the parrotfish. This will benefit reefs because although parrotfish erode reef substrate, the advantages they offer through the removal of fleshy macroalgal cover and promoting coral recruitment outweigh the negative effects of substrate erosion.

"In essence, we need to work towards restoring the natural balance of ecological and geomorphic processes on [coral reefs](#). From a bioerosion perspective this may seem counter-intuitive, but these species also play a critical role in maintaining reef health." said Professor Perry.



Parrotfish used to be very important bioeroders but are now less abundant due to overfishing. Credit: University of Exeter



Endolithic sponges are important substrate eroders. This image shows a massive coral infested by an endolithic sponge which is denuding the colony and destroying the living tissue. Credit: University of Exeter

Provided by University of Exeter

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