

Response of corals to temperature stress

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The composition and health of coral reefs has changed in the past 20 years, and continues to change. Some of the documented changes include species distribution, overall coral cover, species dominance and diversity of associated organisms, both microscopic and macroscopic. Most researchers attribute these changes to increased sea surface temperatures as the primary driving factor. Corals have specific temperature limits beyond which normal function is impaired. Bleaching is among the most obvious signs of temperature stress. Bleaching not only affects the coral zooxanthallae symbiosis, but also associated microorganisms, thus, disrupting the coral holobiont. This situation often leads to disease. Increased seawater temperatures can affect the establishment of coral pathogens by increasing their growth rate or inducing virulence factors. Normal antibiotic production by the surface mucopolysaccharide layer microbial community is also affected by increased temperature. Sea surface temperatures are now increasing at a rate greater than those experienced in the past 420,000 years. This is reflected by existing coral reefs changing by decreasing coral cover and shifts in dominant species.

Biography

Garriet W. Smith is a Microbial Ecologist at USCA where he studies microbial interactions with marine organisms. He is on the Graduate faculty in the Dept. of Marine Medicine and Environmental Studies at MUSC and the College of the Environment at USC-Columbia. He maintains a laboratory at the Center for Hydrogen Research where he screens nitrogen-fixing bacteria for their potential to produce hydrogen in fuel cells. Smith also studies diseases of corals throughout the world and is the co-chair of the Coral Disease Working Group in the World Bank's Targeted Coral Research Program. Smith has identified pathogens associated with diseases of scleractinian corals, gorgonians, echinoderms and sponges. His research, while concentrating in the Caribbean, includes studies in the Indian Ocean, the Red Sea and throughout the Pacific. He has published over 100 scientific papers in peer reviewed journals.

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