

GLOBAL WARMING: QUANTIFYING THE RESPONSE OF MONTASTRAEA CAVERNOSA TO HEAT STRESS

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Climate change is a natural process and part of earth's history, however, the rate and magnitude of current change is troubling. Scleractinian corals, responsible for the foundation of most tropical reefs worldwide, are facing a significant threat of extermination due to heat stress warming the upper water layers. Less known is the effect of heat stress on deeper mesophotic corals (30-150 m), with some researchers suggesting that through connectivity, these coral may serve as a refuge and repopulate shallow depleted reefs. In this study, we compare and contrast the effect of acute (72 hr) and chronic (480 hr) heat stress on the mesophotic coral *Montastraea cavernosa* (Linnaeus 1767) at temperatures varying from 27 to 33°C for six hours vs. increases from 27°C at 1.5°C increments every 72 hours until 33°C was reached. Quantitative real-time polymerase chain reaction (qRT-PCR) resulted in two distinct gene expression profiles (rapid transcript upregulation and variable transcript expression). Acute exposure resulted in the activation and upregulation of an oxidative protective enzyme, molecular chaperone, and anti-apoptotic protein. Chronic heat exposure only elicited a physiological response at the higher temperatures (i.e. 30°C). Here, we propose 30°C as a heat-stress threshold for mesophotic *M. cavernosa*. In conclusion, mesophotic coral appear equally susceptible to increased ocean temperature and should be regarded as a sensitive ecosystem.

Biography

Kevin B Strychar is a tenured Full Professor at the Annis Water Resources Institute - Grand Valley State University. He is a Research Academic studying climate change focussing on the biological implications of climate change, such as the effects of warming temperatures on the spread of pathogens associated with invasive species disease ecology in aquatic habitats. His studies also focus on the effects of climate (heat stress) on reef corals (shallow and deep-water), sponges, dinoflagellates, and other "microbes" in marine habitats.

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