

Assessing the Impact of Elevated Temperatures on Caribbean King Crab Physiology

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Increasing ocean temperatures have caused a decline in Florida's coral reef health and growth, resulting in reduced coral cover and greater macroalgal cover. The grazing activity of Caribbean king crabs has gained interest by reef managers and made them attractive to coral restoration efforts, yet no studies have determined their tolerance to the same thermal stress that corals are now facing. We determined how thermal stress may impact the physiology of ovigerous king crabs at two temperature treatments: 28°C and 32°C. Hemolymph samples were collected at: 1, 5, and 10 days exposure to determine thermal stress and measured for lactate and protein serum. Crab external stress levels were determined using a righting test which accounts for the durations in seconds it takes for the crabs to right themselves after being flipped over. Closed respirometry was then used to monitor metabolic rates after 7 days of exposure to the experimental treatments. Crabs in 32°C had higher lactate and protein levels consuming 31% more oxygen than at 28°C. Crabs at 32°C also took longer to right themselves. Our results suggest that thermal extremes cause sublethal physiological stress but low mortality indicates the species can tolerate acute anaerobic metabolism which may be beneficial for coral restoration efforts.