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Effects of acute temperature increase on performance and survival of *Caribbean Echinoids*

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An increase of mean sea surface temperatures up to 4.8°C because of climate change is expected by the end of this century. The actual capabilities of marine invertebrates to adapt to these rapid changes have still to be understood. Adult echinoids play a crucial role in the tropical ecosystems where they live. Despite their role, few studies about the effect of temperature increase on their viability have been reported in literature. In this communication, we report a first systematic study on several Caribbean echinoids of the Bocas Del Toro Archipelago in Panama about their tolerance to temperature rise in the context of global warming. The research focalized on the 6 sea urchins *Lytechinus variegatus, L. williamsi, Echinometra lucunter, E. viridis, Tripneustes ventricosus* and *Eucidaris tribuloides*, and the 2 sand dollars *Clypeaster rosaceus* and *C. subdepressus*. Mortality and neuromuscular well-being indicators - such as righting response, covering behavior, adhesion to the substrate, spine and tube feet movements - have been analyzed in the temperature range 28-38°C. The righting time measured in the 6 sea urchin species demonstrated a clearly dependence on the water temperature. The experiments allowed to determine the "thermal safety margin" (TSM) of each species. *Echinometra lucunter* and *E. viridis* has resulted the most tolerant species to high temperatures with a TSM of 5.5°C, while *T. ventricosus* was the most vulnerable with a TSM of only 3°C. The study assessed that all the species already live at temperatures close to their upper thermal limit.

Biography

Francesco Rendina completed with Honors, his Master's degree in Marine Biology at the Alma Mater Studiorum of Bologna (Italy) in March 2016. In 2015, he won a fellowship of the same University to prepare his thesis work abroad and spent 6 months (from June to November 2015) at the Research Station of the Smithsonian Tropical Research Institute (STRI) in Bocas del Toro (Panama) studying the effect of global warming on adult Echinoids. Previously, in July 2013, he had completed "with Honors" the Bachelor's degree in Natural Science at the Federico II University of Naples (Italy).

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