THE COMBINED EFFECTS OF TEMPERATURE INCREASE AND PH DECREASE DURING *LEPTUCA THAYERI* LARVAL DEVELOPMENT IN A CLIMATE CHANGE SCENARIO

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The increase of CO₂ emissions produced by burning of fossil fuels is affecting global climate. Oceans are mainly affected by temperature increase and pH decrease. End of 21st century projections point to a pH reduction of 0.3-0.7 units and average water temperature waring ranging between 1 and 4 °C. Our goal was to evaluate how the combined effects of ocean warming and acidification (based on the last IPCC predictions) can affect coastal ecosystems, using as model organism the fiddler crab *Leptuca thayeri*. We evaluated 1) larval survivorship and time to death (survival percentage), 2) behavior (mobility) and 3) physiology (heart rate) of zoea I larvae exposed to different treatments of temperature increase and pH reduction. We hypothesized that temperature increase and pH decrease will negatively affect larvae survival percentage, behavior and physiology. 1008 healthy larvae (active swimmers) from eleven females were divided and exposed to 6 factorial combinations (3x2) of temperature increase [control (25°C), + 2°C (27°C) and + 4°C (29°C)] and pH decrease [control (8.1) and – 0.7 units (7.4)] in microcosms. The control temperature was selected based on 2003 to 2016 average summer sea surface temperatures at the São Paulo shelf (about 1 km offshore, at 10 m depth) according to data from the Group for High Resolution Sea Surface Temperature. Control pH is based on present global ocean mean values. The +2°C treatment is based on 2046-2065 projections coming from GCMs experiments conducted under the IPCC RCP 8.5 scenario and 2081-2100 values for simulations forced by the RCP 4.5 scenario. The +4°C treatment is based 2081-2100 projections from simulations under the RCP 8.5 scenario. Larvae survival was affected by temperature, but not by pH or the interaction between the two parameters. Larvae subjected to the highest temperature (29°C) showed the lowest survival rate among all tested temperature groups. Time to death did not differ between treatments. Behavior and heart rate were affected by temperature and pH. Larvae from the 7.4pH/25°C treatment showed the highest mobility score and differed from the others. The 7.4pH/25°C treatment exhibited the highest heart rates with the lowest values recorded for the 8.1pH/29°C treatment. Our initial hypothesis was partially refuted: the combined effects of warming and acidification are expected to reduce survival rate and generate changes to physiology and behavior of *L. thayeri* zoea larvae

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