DIFFERENCES IN THERMAL TOLERANCE BETWEEN MALES AND FEMALES OF THE BLUE CRAB *Callinectes sapidus* RATHBUN, 1869 (CRUSTACEA: BRACHYURA)

Giovanna Zanetti[1]; Miriane Avelino da Silva[1]; Julia dos Santos Braulino[1]; Pedro Henrique Aguirre[1]; Ana Maria de Lauro Castrucci[1,2]

[1]University of São Paulo, Laboratory of Comparative Physiology of Pigmentation, Department of Physiology, Institute of Biosciences, Brazil.

[2]University of Virginia, Department of Biology Charlottesville, United States.

giovannazanetti@usp.br

One of the major impacts of climate change is the significant alteration in the biogeographic distribution of various marine species. The blue crab *Callinectes sapidus* Rathbun, 1869, native to the Atlantic coast of the Americas - from northern Canada to southern Argentina - has been reported for over a decade in non-native environments such as the Mediterranean Sea, the Black Sea, and the Sea of Azov. Its success can be attributed to its phenotypic plasticity and adaptive capacity in response to varying environmental conditions. Additionally, elevated ocean temperatures may cause significant physiological impacts on this species, potentially altering the neuroendocrine axis and affecting its reproductive cycle, molting process, and even survival. The aim of this study was to evaluate sex differences in thermal tolerance and the potential effects of elevated temperatures on the neuroendocrine axis of *C. sapidus* in tropical waters. Adult males and females of *C. sapidus* were collected in Monte Cabrão (São Paulo, Brazil, 23.9191° S, 46.2863° W) between 2024 and 2025. In the laboratory, individuals were housed in closed recirculating systems with a salinity of 25‰, a 12:12 light-dark photoperiod, and were fed shrimp fragments. After a 7 days acclimation period at 26 °C, the water temperature was gradually increased by 3°C intervals until the animals lost the ability to right themselves, in order to determine the critical thermal maximum - CTmax. For tissue collection for qPCR analysis, animals were divided into two groups: 1) Control – maintained for an additional 7 days at 26°C; 2) Heat-treated: exposed to 32°C for 7 days. At the end of the exposure period, hemolymph was collected, followed by euthanasia and dissection of XO/SG, Y-organ, hepatopancreas, ovary, and androgenic gland tissues (to be analyzed by qPCR). Thermal tolerance tests showed that *C. sapidus* females exhibited a CTmax of 38°C, whereas males tolerated significantly higher temperatures, with a CTmax of 41°C. These differences indicate sexual dimorphism in the species thermal resistance, possibly related to physiological and hormonal factors, what may be highly indicative of ecological implications, especially in scenarios of rising ocean temperatures due to climate change, indicating that females may be more vulnerable to thermal stress compared to males.

Keywords: Gender difference; Temperature; Climate change.