COLD WATER TEMPERATURES DEFINE SOUTHERN BOUNDARIES DISTRIBUTION OF SOUTH AMERICAN FIDDLER CRABS

DE GRANDE, F.R.[1,2,3*]; MAROCHI, M.Z.[1]; ARAKAKI, J.Y.[3] & COSTA, T.M.[1,3]

[1] Universidade Estadual Paulista (UNESP), Campus do Litoral Paulista, Laboratório de Ecologia e Comportamento Animal, Brasil

[2]Universidade Federal de São Paulo, Campus Baixada Santista, Laboratório de Ecologia e Gerenciamento Costeiro

[3] Universidade Estadual Paulista (UNESP), Campus de Botucatu, Instituto de Biociências, Brasil

*Corresponding author: frdegrande@gmail.com

The temperature rise due to climate change has globally shifted the range distribution of several organisms. In intertidal environments, most organisms exhibit an amphibian life cycle and their latitudinal distribution can be delimited by their thermal sensibility during larval pelagic stages or in benthic adulthood. Herein we compare the minimum critical thermal limits (CT_{min}) of larvae and adults of South American fiddler crabs *Leptuca cumulanta, L. leptodactyla, L. thayeri, L. uruguayensis, Minuca burgersi, M. mordax, M. rapax, M. vocator* to evaluate whether environmental temperature delimits their distribution ranges. We found that during the larval stage the cold sensibility of the crabs differed between species (Anova: $F_{7,184}$=157.76, MS=89.53, P<0.0001), corroborating their southern boundaries gradient (the southernmost species were more tolerant to cold water). The most cold-sensitive species was *L. cumulanta,* reaching the CT_{min} at 16.5°C. The most sensitive species to the cold were *M. rapax, L. thayeri, L. leptodactyla, M. burguesi* and *M. vocator,* reaching the CT_{min} at approximately 14.5°C. *Minuca mordax* and *L. uruguayensis* were more tolerant to the cold reaching the CT_{min} at approximately 12.0 and 10.0°C, respectively. For all species, the mean minimum water temperature in the estuary of their boundary distribution was always higher than larvae's CT_{min}. In estuaries further south of species boundaries and focus species are not present, the number of days per year in which water temperature is lower than larvae CT_{min} was higher than in estuary of species limits. The adult's sensibility to cold did not show a clear pattern between species and the mean minimum air temperature in their distribution boundary, frequently decreasing below their CT_{min}. Therefore, the differential thermal sensibility during the larval stage implies consequences to the latitudinal range distribution of the fiddler crabs in South America.

Keywords: global warming, thermal limits, larvae, latitudinal distribution

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