

Mangroves and climate change: Effects of increasing temperature on biology, density and distribution of *Perisesarma guttatum* (A. Milne Edwards, 1869) and *Uca urvillei* (H. Milne-Edwards, 1852) crabs at Gazi Bay, Kenya

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Abstract

Despite the importance of mangrove crabs to the general mangrove ecosystem functioning and viability, little is known on the expected effects of climate change on these animals. Questions then arise on what effects, if any, would temperature, salinity, sea-level rise and low pH value have on those animals resident in mangrove sediment. As part of a wider EU project on “Coastal Research Network on Environmental Changes – CREC”, experiments were carried out at Gazi Bay, Kenya to determine thermal tolerance of adults and eggs of *Perisesarma guttatum* and *Uca urvillei* crabs which were maintained at different temperatures between 17-37°C and respiration measured using a closed chamber system. After 8 and 3 hours acclimation at 27°C for adults and eggs respectively, respiration rates were recorded and used as a proxy for their basal metabolism. Crabs were counted in 1m² quadrats while megalopae were collected using air-filter traps in *Rhizophora mucronata*, *Ceriops tagal* and *Avicennia marina* zones. The results suggest that males of *P. guttatum* and *U. urvillei* had a temperature range of 27-31°C and 27-33°C ($P > 0.05$) respectively in both air and water media and temperature show significance at 35°C ($P < 0.0004$) beyond which the crabs got stressed as indicated by increased metabolism suggesting that the former is more sensitive to temperature variation than the later which has a wide thermal tolerance window. *U. urvillei* and *P. guttatum* recorded highest densities of 66.25/m² and 11.75/m² respectively in the *R. mucronata* zone although *P. guttatum* density in *C. tagal* and *R. mucronata* wasn't significant ($P > 0.05$). *U. urvillei* density was lowest in *C. tagal* and landward *A. marina*. Full moon day and the transition phase between the North East and South East Monsoon revealed significant effect on megalopae density ($P < 0.000$). These results are crucial in understanding and predicting of future physiological responses of mangrove crab populations to climate change affecting mangroves.

Keywords

mangrove crabs, thermal sensitivity, density, megalopae, Gazi Bay