World Academy of Science, Engineering and Technology
International Journal of Marine and Environmental Sciences
Vol:17, No:07, 2023

Influence of Chemical Pollution on Thermal Habitats of the Ciliate Tetrahymena thermophila

Authors : Doufoungognon C. Kone

Abstract : Global change, in particular pollution and global warming, threatens ecosystems and the biodiversity they harbor. Due to pollutants exposure, organisms might modify their thermal niches in order to track the thermal conditions limiting the negative impacts of chemical stressors depending on their mode of action. This study tests the influence of different pollutants, copper, salt, and chloramphenicol, on the thermal preferences of the ciliate Tetrahymena thermophila. Six genotypes were exposed to a gradient of concentrations ranging from 0 to 500mg/L for copper, 0 to 300 mg/l for chloramphenicol, and 0 to 12g/l for salt in synthetic media at eight temperatures ranging from 11 to 39° C. The measured fitness proxies are the maximum growth rate and the 50% growth inhibitory concentration (IC50). The results show that the majority of genotypes are more resistant to chloramphenicol in temperatures below their thermal optimum without pollutants, while they better tolerate other salt and copper in temperatures above their thermal optimum. In addition, generalists reduce their niche width while specialists widen it in chloramphenicol. Overall, results suggest that global warming would have a particularly deleterious effect in the case of chemical pollution. This pollution would induce the full disruption of the thermal habitats.

Keywords : ciliate, thermal niche, growth rate, toxicity, multiple stressors
Conference Title : ICAEB 2023 : International Conference on Aquatic Environment and Biodiversity
Conference Location : Berlin, Germany
Conference Dates : July 17-18, 2023