Climate change, fertility and hermaphrodites: Unraveling the Role of Temperature and Salinity

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Résumé

In the coming years, climate change will induce more severe and frequent heatwaves, highlighting the importance of understanding species' potential for adaptation. First evaluated through the lens of survival, numerous studies have underscored the importance of considering another essential criterion for species resilience: reproduction. The impact of temperature on fertility (i.e., capacity to generate viable offspring) has been investigated across a wide range of taxa and at different stages of reproduction. Fertility limits have even emerged as better predictors of global species distribution and extinction risks than survival limits. However, outstanding questions still remain: is one sex more vulnerable than the other; what is the potential for recovery; and what is the combined effect of temperature with other stressors on fertility? To address these questions, we chose the free-living marine flatworm *Macrostomum lignano*, a simultaneously hermaphroditic laboratory model that allows us to test for impacts on both male and female reproductive functions in the same individuals and thereby circumvents potential confounding effects present when studying fertility in separate-sexed organisms. We here report experiments designed to clarify the effect of combinations of stressors (i.e., temperature and salinity) on fertility, whether these effects are sex-function specific and on what timescales fertility can recover.

Mots-Clés: Fertility, Heatwave, Salinity, Sex specificity, Phenotypic plasticity

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