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The influence of temperature on the oxygen consumption of the Northern krill (*Meganyctiphanes norvegica*) and Arctic krill (*Thysanoessa raschii*) in the St. Lawrence Estuary, Canada

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There are two dominant krill species, Meganyctiphanes norvegica and Thysanoessa raschii, in the St. Lawrence estuary. These macrozooplankton species play a key role as an important trophic link between phytoplankton and higher trophic levels (e.g. fish, seabirds and marine mammals). In the context of increasing global warming, we are interested in defining the impact of temperature on physiological processes of both krill species, in particular their metabolic and swimming rates. The optimal temperature range of each species is expected to be different, as both species differ in their spatial and thermal habitat distribution, M. norvegica being a temperate species and T. raschii an Arctic one. Oxygen consumption ($\dot{M}O_2$) was used to measure metabolic rate. Newly designed respirometers were used to quantify $\dot{M}O_2$ simultaneously with the swimming activity of individual krill over a time period of 24h, using intermittent-flow respirometry. Significant positive regressions were obtained between $\dot{M}O_2$ and swimming speed for each species, allowing for the estimation of the standard and maximal metabolic rates. Preliminary results indicate that the SMR and MMR of M. norvegica increased from 3 °C to 15 °C. However, swimming speed had a small impact on $\dot{M}O_2$, suggesting that respiration is well adapted to continuous swimming activity throughout 24h. Our findings will help in assessing the probable responses of both krill species to climate change. These data will also be used to estimate the aerobic scope at different temperatures for each species, and to model the mean energetic costs as a function of temperature.

St. Lawrence Estuary, zooplancton, temperature, metabolism, oxygen consumption, respirometry

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