

Influence of food quality on carbon budget and digestive enzyme activities and patterns of *Calanus glacialis* (Copepoda)

H. Tonkes, F.J. Sartoris, B. Niehoff

Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Am Handelshafen 12, 27570 Bremerhaven, Germany

Calanus glacialis is a key zooplankton species on the Arctic shelf. These copepods are pivotal in structuring the pelagic food web, as they convert low-energy carbohydrates and proteins from ice algae and phytoplankton into high-energy lipids, mainly consisting of wax esters. Ocean acidification and warming might change algal stoichiometry and shift the phytoplankton community composition from diatoms to smaller flagellates and dinoflagellates. To study the response to a change in food quality, we incubated *C. glacialis* CV from a high Arctic fjord for 25 days with food of different quality: (1) the diatom *Thalassiosira weissflogii* (C:N ratio 4.5), (2) *T. weissflogii* grown under nitrogen-limited conditions (C:N ratio 11.5), and (3) the heterotrophic dinoflagellate *Oxyrrhis marina* (C:N ratio 4.4). A fourth group of copepods was not fed. Ingestion, respiration, and egestion were measured regularly to establish the carbon budget for each treatment. In addition, samples were taken to determine digestive enzyme activities and patterns as revealed by substrate SDS-PAGE. Our data show that carbon ingestion and respiration was usually similar among algal treatments. Also, the assimilation efficiency was similar. Additionally, copepods feeding on *O. marina*, produced significantly less and smaller faecal pellets. However, these faecal pellets were carbon rich and, thus, faecal pellet production in terms of carbon was not lower than in the other algal treatments. Our data suggest that *C. glacialis* is flexible in using food of different quality and if dinoflagellates become a major food source, the species still thrives.

Keywords: Copepods, grazing, diatoms, dinoflagellates, carbon budget, proteinase, lipase-esterase, SDS-page

H. Tonkes, Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Am Handelshafen 12, 27570 Bremerhaven, Germany. Henrieke.Tonkes@awi.de