Grazing, egg production, and biochemical evidence of differences in the life strategies of Calanus finmarchicus, C. glacialis and C. hyperboreus in Disko Bay, western Greenland

This is the first high temporal-resolution study in Disko Bay covering population dynamics, grazing, reproduction, and biochemical composition of 3 dominating copepod species (Calanus finmarchicus, C. glacialis and C. hyperboreus) from late winter to midsummer in 2008. C. finmarchicus and C. glacialis ascended to the surface layer at the onset of the spring phytoplankton bloom, followed by C. hyperboreus 2 wk later. C. finmarchicus spawning occurred during the bloom and post-bloom period, partially fueled by wax esters. C. glacialis commenced spawning before the bloom, yet it was greatly stimulated when food became available. However, feeding and reproduction was terminated after the main bloom despite the presence of food. In terms of feeding, this was also the strategy for C. hyperboreus. Between pre-bloom and post-bloom, C. finmarchicus showed an increase in carbon, nitrogen, and phospholipid content but a decrease in total lipid content. This was likely the result of protein synthesis, oocyte maturation, and spawning fueled by wax esters and by feeding. C. glacialis showed a similar pattern, although with an increasing total lipid content from pre-bloom to post-bloom, and an increasing wax ester and decreasing phospholipid content after reproduction was terminated. C. hyperboreus showed greatly increased content of carbon, nitrogen, and all lipid classes between the pre- and post-bloom periods. Hence, C. finmarchicus commenced feeding and spawning at the onset of the bloom and continued throughout the remaining study period. Both C. glacialis and C. hyperboreus females refueled their storage lipids (wax esters) during the bloom and post-bloom period, suggesting that they may spawn in an additional year.

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