



Feeding and energy budgets of Antarctic krill *Euphausia superba* at the onset of winter I. Furcilia III larvae

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ABSTRACT: Physiological condition and feeding behavior of furcilia larvae were investigated in autumn (April 1999) in the southwestern Lazarev Sea prior to the critical overwintering period. Furcilia stage III (FIII) larvae were most abundant, so only these were used for all analyses (dry mass [DW], elemental and biochemical composition, gut content) and experiments (metabolic and ingestion rates, selective feeding behavior). Chlorophyll a (Chl a) concentrations in the mixed layer were $<0.1 \mu\text{g L}^{-1}$. Respiration rates of freshly caught FIII larvae were between 0.4 and 1.2 $\mu\text{l O}_2 \text{ mg}^{-1} \text{ DW h}^{-1}$, similar to larvae fed for 7 d on high food concentrations ($4 \mu\text{g Chl a L}^{-1}$). Excretion rates ranged between 0.01 and 0.02 $\mu\text{g NH}_4 \text{ mg}^{-1} \text{ DW h}^{-1}$. Their atomic O:N ratio of 72 indicated that lipids were the main metabolic substrate of FIII larvae in the field. The daily C ration ranged from 0.4% at the lowest food concentration of $3 \mu\text{g C L}^{-1}$ to 28% at the highest enriched food concentration of $216 \mu\text{g C L}^{-1}$, whereas clearance rates decreased with increasing food concentrations. In natural seawater, $115 \text{ ml mg}^{-1} \text{ C h}^{-1}$, and in natural seawater enriched with ice biota, $24 \text{ ml mg}^{-1} \text{ C h}^{-1}$, the clearance rates on specific phytoplankton taxa revealed no significant difference across a food size range of 12-220 μm . The study suggests that during periods of low food supply in the water column, larvae have to exploit ice biota to cover their metabolic demands.

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