



Feeding and energy budgets of Antarctic krill *Euphausia superba* at the onset of winterII. Juveniles and adults

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Limnol. Oceanogr., 47(4), 2002, 953-966 | DOI: 10.4319/lo.2002.47.4.0953

ABSTRACT: The overwintering success of *Euphausia superba* is a key factor that dictates population size, but there is uncertainty over how they cope with the scarcity of pelagic food. Both nonfeeding strategies (reduced metabolism, lipid use, or shrinkage in size) and switching to other foods (carnivory, ice algae, or detritus) have been suggested. We examined these alternatives in the southwest Lazarev Sea in autumn (April 1999), when sea ice was forming and phytoplankton was at winter concentrations. Both juveniles and adults had a very high lipid content (36% and 44% of dry mass, respectively) of which >40% was phospholipid. However, their low O:N ratios suggested that these reserves were not being used. Results from gut contents analysis and large volume incubations agreed that juveniles fed mainly on phytoplankton and adults fed on small (<3 mm) copepods. This dietary difference was supported possibly by elevated concentrations of 20 : 1 and 22 : 1 fatty acids in the adults. The feeding methods also confirmed that feeding rates were low compared with those in summer. Even when acclimated to high food concentrations, clearance and ingestion rates were <30% of summer rates. Respiration and ammonium excretion rates of freshly caught krill were 60%-80% of those in summer and declined significantly during 18 d of starvation. These findings suggest both switch feeding and energy conservation strategies, with a trend of reduced and more carnivorous feeding with ontogeny. This points to a []compromise[] strategy for postlarvae, but there are alternative explanations. First, the krill may have reduced their feeding in an autumn transition to a nonfeeding mode, and, second, some of the population may have maintained a high feeding effort whereas the remainder was not feeding.

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