

according to species. A "reverse" diel vertical migration was observed between *Calanus propinquus* and *Parathemisto gaudichaudii* in the surface water. None of fishes were collected in the present sampling.

Biomass of krill in background water, outside of patches, was estimated to  $1.59 \times 10^{-3}$  wet wt g/m<sup>3</sup> in the present sampling. It was very small to compare previous estimate of the standing stock in the Antarctic Ocean. (p. 155–166)

## FILTERING AND INGESTION RATES OF THE ANTARCTIC KRILL, *Euphausia superba* DANA

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The filtering and ingestion rates of the Antarctic krill, *Euphausia superba* DANA, were experimentally estimated using samples of a variety of body size. The filtering rate in ml/individual/hr, measured in natural seawater, increased with increase in body dry weight. The relationship between the filtering rate ( $y$ ) in ml/ind./hr and body dry weight ( $x$ ) in mg is given as  $y=16.4+0.205x$  ( $r=0.654$ ). The filtering rate in ml/mg dry weight/hr decreased with increase in body dry weight, and became level in large krill over 100 mg in body dry weight. In mass experiment, the filtering rates obtained in seawater with high concentrations of phytoplankton were much higher than those in seawater with low concentrations. Ingestion rates obtained in seawater with low concentrations of phytoplankton were 14.4–55.9  $\mu\text{gC}/\text{ind.}/\text{day}$  in large krill (102.1–127.3 mg in dry wt) and 6.0–38.8  $\mu\text{gC}/\text{ind.}/\text{day}$  in small krill (8.3–26.8 mg in dry wt). In seawater with high concentrations of phytoplankton, the ingestion rates were 1468–1915  $\mu\text{gC}/\text{ind.}/\text{day}$  in large krill (240.7–247.9 mg in dry wt) and 183–211  $\mu\text{gC}/\text{ind.}/\text{day}$  in small krill (10.1–13.4 mg in dry wt). Considering losses by respiration and moulting, the krill ingest actively by filter feeding when phytoplankton is plentiful, but if phytoplankton is sparse the filter feeding becomes inactive, and the krill would depend on other food by predation. (p. 167–175)

## RESPIRATION AND AMMONIA EXCRETION RATES OF THE ANTARCTIC KRILL, *Euphausia superba* DANA

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Respiration and ammonia excretion rates of the krill *Euphausia superba* in the Antarctic Ocean were measured using the Winkler titration method and an auto-analyzer (Technicon CMS-6 Water Analyzer System), respectively. The live krill used in this experiments were collected in the BIOMASS/FIBEX Cruise of the T/S UMITAKA MARU III, from December 1980 to January 1981. The experiments were carried out twice during the cruise in Antarctic Sea. The samples ranged from 6.1 to 385.4 mg in dry weight. The respiration rate was measured of 3.31–139.97  $\mu\text{l O}_2/\text{individual}/\text{h}$  (or 0.193–1.228  $\mu\text{l O}_2/\text{mg dry weight}/\text{h}$ ), and the ammonia excretion rate 0.006–0.705  $\mu\text{g atom N}/\text{ind.}/\text{h}$  (or  $0.57\text{--}5.88 \cdot 10^{-3} \mu\text{g atom N}/\text{mg dry wt.}/\text{h}$ ) at 0°C. The respiration and ammonia excretion rates per individual increased in proportion with body weight. The regression of respiration rate ( $R$ ,  $\mu\text{l O}_2/\text{ind.}/\text{h}$ ) and ammonia excretion rate ( $E$ ,  $\mu\text{g atom N}/\text{ind.}/\text{h}$ ) in relation to body dry weight ( $W$ , mg) in whole individuals of the first and second legs were shown as:  $\log R=0.0259+0.8331 \log W$  and  $\log E=-3.0100+1.2107 \log W$ , respectively. The ratio of respiration rate and ammonia excretion rate (O/N ratio by atom) varied from 8.26 to 95.42 and the mean and S.D. were  $28.29 \pm 18.84$ . The ratio was generally higher than 24 in the average and it suggested that the major metabolite of the krill was lipid rather than protein. (p. 177–187)