

of the different *Marseniopsis* species. Most of the larvae were right at the end of their pelagic stage and began to metamorphose in the aquaria. They settled with the foot on the aquarium wall, the four velar lobes were reduced and the mantle built up the typical adult shape, overgrowing the whole shell.

A new type of continuous water exchange in the aquarium system on 'Polarstern' allows the maintenance of very sensitive animals, for example the actinian *Isosycionis alba*, covering the shell of *Harpovoluta charcoti*. This relationship seems to be obligatory, only very young gastropods of about 10 mm shell size were found without actinia. One individual of *H. charcoti* was found with two actinians. Initial observations on feeding behaviour were made during the cruise. *I. alba* may well be a mollusc predator because several specimens were found with gastropod shells in their gut.

For *Pontiothauma ergata*, two large individuals of this turrid species with special harpoon-like radula teeth were occasionally observed feeding on nemertean worms.

Studies of the gastropod feeding behaviour will be continued at the AWI by analysing the stomach content of preserved material and also by studying faecal pellets taken from single freshly caught specimens.

First experiments using different types of substrate in the aquaria show that some bivalves (*Propeleda longicaudata*, *Malletia sabrina*, *Cyclocardia astartoides*) are shallow burrowers in soft sediments. Gastropods of the family Naticidae dig into the sediment, producing typical v-shaped tracks. Further investigations of this type could be helpful for identification of tracks observed with underwater camera systems and will reveal more information about the ecology of several molluscan taxa.

3.11 Studies on amphipod biology C. de Broyer, M. Klages

Objectives

The final objective of this program is to evaluate the role of the gammaridean amphipods in the Eastern Weddell Sea benthic communities. Taxonomy and faunistics, bathymetrical and zoogeographical distribution as well as habitat and microhabitat identification form the first topics to be investigated.

A qualitative and quantitative assessment of the role of the gammaridean amphipods in the trophic web proceeds by studying the feeding eco-ethology of amphipods and their importance as prey for other invertebrates and for demersal fish.

Estimation of the abundance and biomass of endobenthic amphipods will be obtained from the multibox corer samples.

The life history of selected species, representatives of the most important families and exhibiting different feeding types, was investigated in long term experiments on living material in aquaria on board and will be continued later at the AWI in Bremerhaven. This study concentrates on the reproduction

parameters, the growth parameters (embryonic development, moults, growth rate and longevity) as well as on the metabolism. The living material also allows observations to be made on some aspects of the behaviour relevant to the characterization of the mode of life, the identification of the microhabitat and the feeding habits.

Although the amphipods form a conspicuous group among Antarctic benthos the knowledge of their biology and ecology is limited to only six species (3 Lysianassidae and 3 Pontogeneiidae) among 550 species occurring in the Southern Ocean.

Work at sea

Gammaridean amphipods were collected from 46 (40 in the Eastern Weddell Sea) trawl catches (GSN, AGT, BPN), some RMT hauls, two baited traps and from the corer samples (MG and MUC). The early loss of the autonomous trap system prevented systematic trap sampling. Samples of potential predators of amphipods were taken for stomach content analysis.

Sorting living specimens from the catches and rearing them in aquaria (30 l) received first priority. In addition to swimming, burrowing, feeding and hatching behaviour observations, twelve feeding experiments were conducted mainly on scavenging species. Colour photographs of living specimens were taken systematically to record the natural colours and behavioural traits.

Preliminary results

About 5000 specimens of 88 species (provisional number) have been sorted from the Weddell Sea samples. Four species belonging to 4 different families are considered new to science and one of them will probably form the Type of a new podoceric genus. The lysianassoid component of the fauna is dominant in terms of number of species and is followed by the acanthonotozomatids and the paramphithoids. This observation conforms to the family composition of the East Antarctic fauna previously described by KNOX & LOWRY (1977) except for the paramphithoid component which seems proportionally more diverse in the eastern Weddell Sea. A first overview of the samples suggests a higher species diversity in the samples from the Kapp Norvegia transect than from the Halley Bay transect.

The comparison of catches using different equipment (GSN, AGT, BPN, REU, RMT) at some stations provided reliable data to clarify the habitat of some species. For instance, the RMT hauls yielded 4 species occurring on or close to the bottom (*Abyssorchemene plebs*, *A. rossi*, *Epimeriella macronyx*, *Eusirus microps*) indicating their benthic-pelagic habitat.

The traps collected *A. plebs* (about 3500 specimens) and *Waldeckia obesa* in one case and in the other case 6 different species; *Tryphosella sp.1* and *sp.2*, *Abyssorchemene nodimanus*, *W. obesa*, *Kerguelenia sp.* and *Pseudorchemene coatsi*. *Kerguelenia sp.* and *Tryphosella sp. 1* were apparently caught in traps for the first time.

The feeding experiments provided first data on the feeding rate of the most common scavengers. They indicated a relatively low consumption of meat by *Uristes gigas* and *Tryphosella sp.1* but showed the voracity of *A. plebs*, *A. rossi* and *Waldeckia obesa*. *A. plebs*, for instance, is able to eat more than its own weight of fish, beef or octopus meat during a 24h period. It has been calculated that 1000 *A. plebs* can eat a 1 kg fish in less than 5 days. These first results suggest a significant role for the scavengers in the food web.

About 2500 specimens of some 25 species are kept alive in temperature controlled laboratory containers. Among these 9 key species have been identified and selected for long-term studies of their autecology, life history, behaviour and some aspects of their physiology at the AWI in Bremerhaven. These species include *Epimeria excisipes*, *E. macrodonta* and *E. robusta* (Fam. Paramphithoidae), the burrower and presumed predator deposit feeder *Paraceradocus gibber* (Fam. Gammaridae), the predator *Eusirus perdentatus* (Fam. Eusiridae), the tube builder and deposit feeder *Ampelisca richardsoni* (Fam. Ampeliscidae) characteristic of the Eastern Shelf Community (VOSS 1988), the Acanthonotozomatid *Gnathiphimedia mandibularis*, presumably a bryozoan and hydrozoan feeder, and three Lysianassoid scavengers *Abyssorhomene plebs*, *Waldeckia obesa* and *Uristes gigas*.

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- 3.12 Distribution and reproductive biology of shrimps in the inner Weddell Sea
A. Clarke, W. Arntz, D. Gore

Distribution and general biology

Objectives

The general distribution of shrimps (Decapoda; Caridea) in the inner Weddell Sea is well known from previous cruises of 'Polarstern'. The aim of this part of the study was to further document the distribution, particularly in relation to bathymetry and hydrography, and with special reference to age-class structure and reproduction.