



Distribution and population structure of pelagic Ostracoda near the sea-ice edge in the Scotia Sea and off the King George Island (December 1988 – January 1989)

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ABSTRACT: Four Ostracoda species belonging to one family, Halocyprididae, were found in plankton material collected from the Scotia Sea and off the King George Island (the Antarctic) during the austral summer 1988/1989. *Alacia belgicae*, *A. hettacra* and *Metaconchoecia isocheira* were dominant making up to nearly 99% of all Ostracoda. The horizontal distribution was modified by variability of hydrological conditions. The higher concentrations of chlorophyll *a* and phytoplankton, which were found in the mid- and eastern parts of the Scotia Sea, coincided with the highest densities of Ostracoda. The influence of ice pack presence in the Scotia Sea upon the higher abundance of Ostracoda in the period investigated in comparison with the earlier studies was distinctive. A vertical distribution analysis confirmed that the three above-mentioned endemic species were most abundant in the mesopelagial. The population structures of *A. belgicae*, *A. hettacra*, and *M. isocheira* were analysed. The presence of the youngest stage of *A. belgicae* in the Scotia Sea confirmed the beginning of reproduction of this species at that time. The vertical distribution patterns of *A. hettacra* and *M. isocheira* populations were similar, although their age structures in comparison with *A. belgicae* differ significantly. This was consistent with their higher “mean population stage” values.

Key words: Antarctic, pelagic Ostracoda, vertical distribution, horizontal distribution, population structure.

Introduction

Due to their high local abundance, pelagic Ostracoda are an important component of the mesozooplankton in Antarctic waters (Boden 1985, Fukuchi *et al.* 1985, Hopkins 1985a, Boden and Parker 1986, Foster 1987, 1989; Hopkins and

Torres 1988). However, the role of pelagic Ostracoda in the Southern Ocean ecosystem has not yet been recognised. There are a few papers on the geographic range and vertical distribution of Antarctic planktonic Ostracoda (Hillman 1967, Deevey 1978, 1983; Kock 1992, 1993; Gollasch 1997, Błachowiak-Samołyk and Żmijewska 1995, 1997), but knowledge of the topic is still fragmentary. Despite the broad spectrum of the occurrence of pelagic Ostracoda in the Antarctic waters, from the deeper epipelagial to bathypelagial, these animals inhabit mainly mesopelagial (Deevey 1978, 1982; Błachowiak-Samołyk and Żmijewska 1997, Błachowiak-Samołyk 1999). The majority of earlier studies on the Antarctic Ostracoda have been carried out in epipelagial (Kock 1992, 1993), hence little is known about their age structure in deep waters (Błachowiak-Samołyk 2001), and even less about the influence of pack-ice upon this structure.

The aim of this study was to analyse the distribution and age structure of pelagic Ostracoda from the Sea-Ice Zone in the Scotia Sea and the vicinity of the King George Island in the summer season 1988/1989. In addition the intention of authors was to recognise the possible influence of pack ice upon the assemblages of Ostracoda. Furthermore, the data provided a background for further analysis of their life cycles.

Materials and methods

The research material included 67 plankton samples (Table 1) collected from 30 stations situated in two different regions: the Scotia Sea between the Elephant Island and the South Orkney Islands (27 stations) and the vicinity of the King George Island (3 stations) (Fig. 1). Zooplankton samples were taken from the *r/v Profesor Siedlecki* during the austral summer (from December 26, 1988 to January 11, 1989) within the framework of the BIOMASS IV project.

The samples were taken with WP-2 plankton net with a diameter of 50 cm and mesh size of 200 µm from standard layers: 300–100 m, 100–50 m, 50–20 m, 20–0 m. At the first three stations (21, 22 and 23) situated near the Admiralty Bay of King George Island samples were taken from two layers: 300–100 m and 100–0 m. From station 24 the ice-pack programme started and samples were collected from the standard layers mentioned above. The only exception was station 70, where the research material was collected from the deeper layer 600–300 m (Rakusa-Suszczewski 1991).

All samples were preserved immediately on board in sodium borate-buffered formaldehyde. Ostracoda were separated from the rest of the zooplankton in the laboratory and all specimens were subsequently analysed. Determination of Ostracoda species was based on the papers by Müller (1912), Sars (1928), Hillman (1969), Deevey (1978, 1982) and Kock (1992).

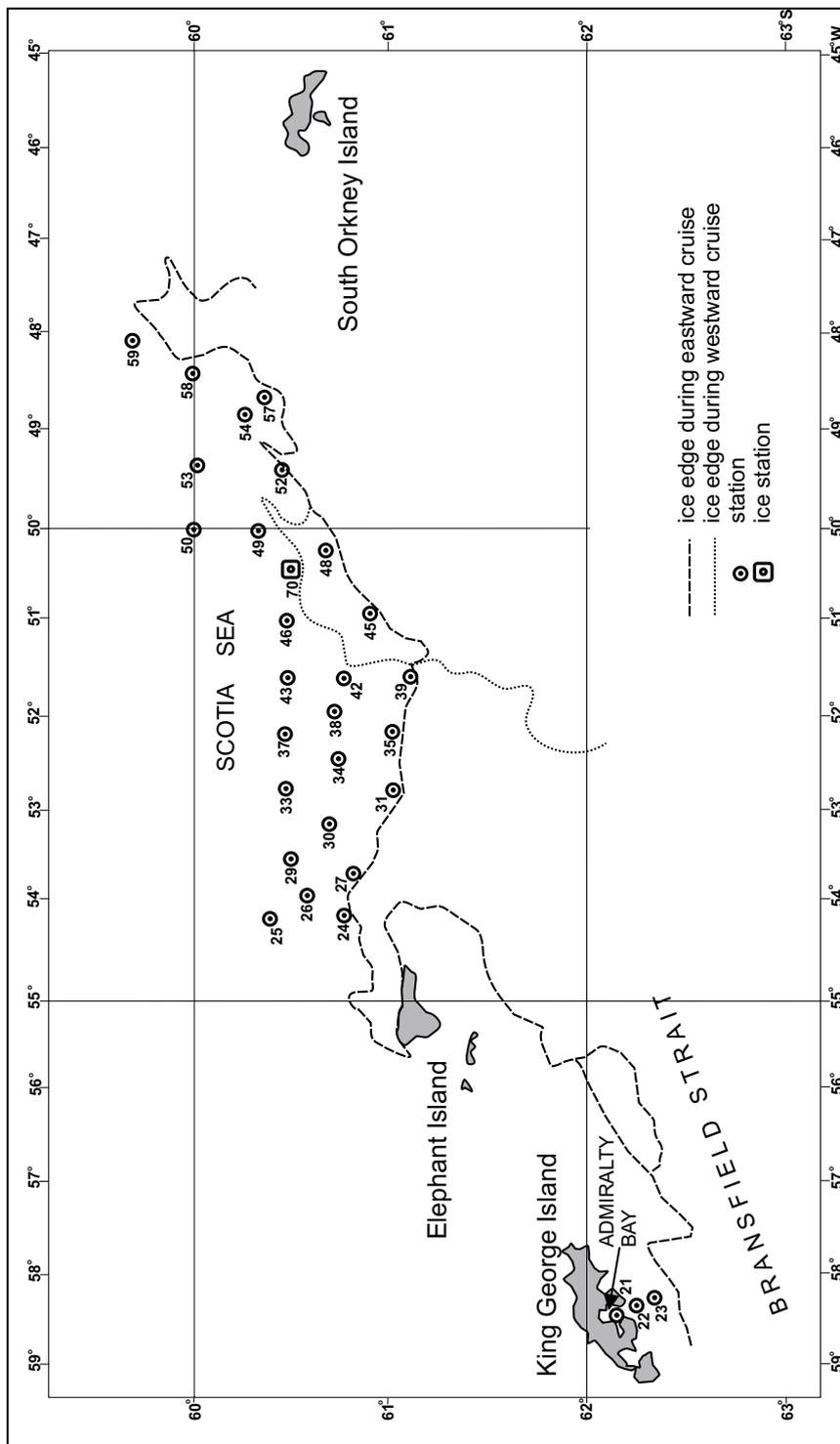


Fig. 1. Sampling stations location in the vicinity of King George Island (Admiralty Bay) between the Elephant Island and the South Orkney Islands (the Scotia Sea) in December 1988 – January 1989.

Division into development stages was done based on the Hartmann (1968) classification. All determined species belonged to the family Halocyprididae, the representatives of which generally have six instars and one adult stage. According to Hartmann (1968) these are designated consecutively A-6, A-5... A-1 and Ad (adult). For the three oldest stages: A-2, A-1 and Ad, sex was also determined. In order to compare the age structure of the three dominant Ostracoda species the “mean population stage”, \bar{S} , was calculated for each layer. The index \bar{S} concerning the number of development stages was previously expressed by Marin (1987) and modified for Ostracoda by Kock (1992) as follows:

$$\bar{S} = \frac{N_{A-6} \times 1 + N_{A-5} \times 3 + N_{A-3} \times 4 + N_{A-2} \times 5 + N_{A-1} \times 6 + N_{Ad} \times 7}{N_{A-6} + N_{A-5} + N_{A-4} + N_{A-3} + N_{A-2} + N_{A-1} + N_{Ad}}$$

where $N_{A-6}, N_{A-5}, \dots, N_{Ad}$ is the mean abundance of the discrete development stage. The index \bar{S} achieves a minimum value of 1 when 100% of the specimens in the population represent the A-6 stage, and a maximum of 7 when a population consists of adult individuals exclusively.

Results

In summer 1988/1989 in the studied samples four Ostracoda species of the Halocyprididae family were determined: *Alacia belgicae* Müller, 1906, *Alacia hettacra* Müller, 1906, *Metaconchoecia isocheira* Müller, 1906 and *Boroecia antipoda* Müller, 1906. The first three, endemic Antarctic species were dominant and constituted 98.8% of all Ostracoda.

Distribution of Ostracoda

The most frequent species noted at 28 stations was *A. belgicae* – 40.8% (Fig. 2). The highest density occurred in the mid- and east parts of the Scotia Sea at stations: 70 (255 ind. m⁻²), 54 (173 ind. m⁻²) and 53 (122 ind. m⁻²). Specimens of *A. belgicae* were also present at all stations situated in the vicinity of the King George Island. Among them the maximum density was observed at station 21 in the Admiralty Bay (56 ind. m⁻²) (Fig. 2). *Alacia hettacra* accounted for almost 30% of the ostracods collected. Specimens of *A. hettacra* were observed at 23 stations, with the highest abundance at station 70 (403 ind. m⁻²). Densities at the remaining stations did not exceed 100 ind. m⁻². *Metaconchoecia isocheira* were only slightly less frequent than *A. hettacra* (29%). An extremely high concentration of this species was noted at st. 70 (785 ind. m⁻²). It was significant that the densities of *M. isocheira* at remaining stations were below 50 ind. m⁻². The last species – *B. antipoda* was found in very low abundance with a maximum (20 ind. m⁻²) at station 25 (Fig. 2).

Distribution of pelagic Ostracoda in water columns revealed some common features throughout the studied area. Generally they were found to avoid the sur-

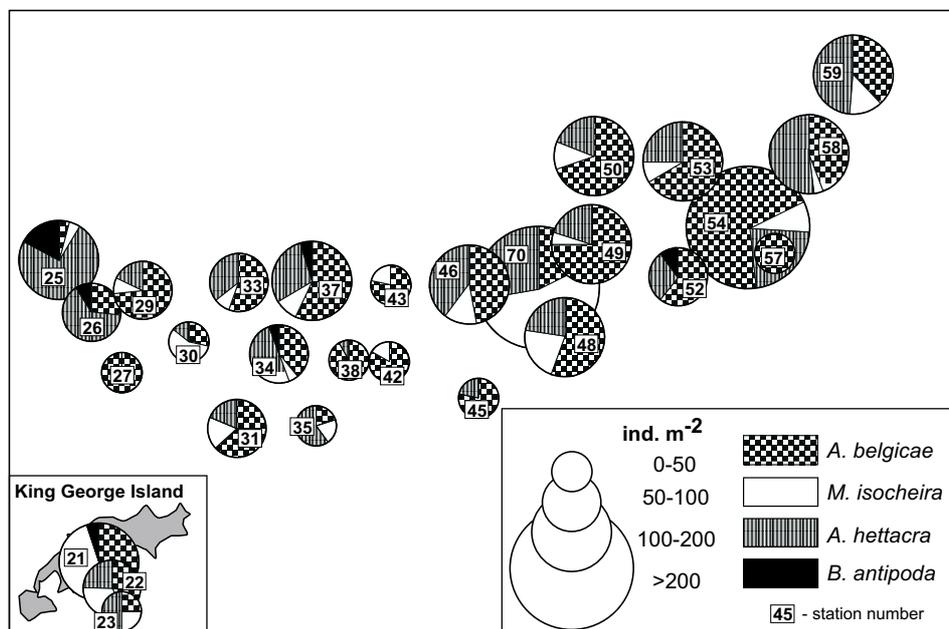


Fig. 2. The Ostracoda distribution (ind. m⁻²) in the vicinity of King George Island and between Elephant Island and the South Orkney Islands (the Scotia Sea) (see Fig. 1).

face water layer (100–0 m) (Table 1). The highest abundance attained *M. isocheira* (2616 ind. 1000 m⁻³), *A. hettacra* (1342 ind. 1000 m⁻³) and *A. belgicae* (849 ind. 1000 m⁻³) was in the layer 600–300 m in the central part of the Scotia Sea at station 70, the only one, where samples were taken from the layer below 300 m.

In the remaining stations *A. belgicae* dominated. The highest concentrations of this species were noted at depths of 300–100 m at stations: 54, situated in the Scotia Sea (815 ind. 1000 m⁻³), and 21 in the Admiralty Bay (280 ind. 1000 m⁻³). And at station 46, high density of *A. belgicae* (713 ind. 1000 m⁻³) in the shallow water layer (100–50 m) was observed. *Alacia hettacra* attained the highest abundance at the depth of 300–100 m at stations: 25 (433 ind. 1000 m⁻³) and 59 (357 ind. 1000 m⁻³). The highest numbers of *M. isocheira* did not exceed 200 ind. 1000 m⁻³ throughout the studied area (with the exception of station 70 mentioned above). The highest abundance of the deep-sea species – *B. antipoda* – was reported at the depth of 300–100 m at station 25 (102 ind. 1000 m⁻³) (Table 1).

Population structure of Ostracoda

The age structures of the three dominant species – *A. belgicae*, *A. hettacra* and *M. isocheira* – were studied. In the case of the first one all development stages were found. The other species were represented by all instars except the

Table 1
 Quantitative vertical distribution of Ostracoda in the water column in the vicinity of King George Island and in the Scotia Sea (ind. 1000 m⁻³) in December 1988 – January 1989.

Station	Depth (m)	<i>A. belgicae</i>	<i>M. isocheira</i>	<i>A. hettacra</i>	<i>B. antipoda</i>
1	2	3	4	5	6
21	100–0 300–100	280	204		26
22	300–100	127	102	76	
23	100–0 300–100	26	26	51	
24	50–20 100–50 300–100				
25	100–0 300–100	26	26	433	102
26	20–0 50–20 100–50 300–100	76		178	26
27	20–0 50–20 100–50 300–100	26			
29	300–100	204	26	51	
30	300–100	51	102	26	
31	300–100	255	76	76	
33	300–100	153	26	102	
34	300–100	178	26	229	26
35	100–50 300–100	26	26	76	
37	20–0 50–20 300–0	204	34	102	17
38	300–100	280		26	
39	20–0 50–20 100–50				
42	100–0 300–100	127	26		
43	20–0 300–100	178	51		
45	50–20 300–100	178		51	
46	100–50 300–100	713 178		306 229	
48	100–0 300–100		102 178	204 153	
49	50–20 100–50 300–100	102 357		102 76	
50	100–50 300–100	102 433		102 102	

Table 1 – continued.

1	2	3	4	5	6
52	20–0 100–50 300–100	52 1529	52	52 76	
53	20–0 50–20 100–50 300–100	306 535	76	229	
54	100–50 300–100	204 815	102	102 255	
57	20–0 50–20 100–50 300–100	26			
58	20–0 50–20 100–50 300–100	280	170	331	
59	50–20 300–100	280	102	357	
70	600–300	849	2616	1342	

Table 2

The “mean population stage” (\bar{S}) for *A. belgicae*, *M. isocheira* and *A. hettacra* in particular water layers in the vicinity of King George Island and in the Scotia Sea.

Investigated area	Layer (m)	\bar{S}		
		<i>A. belgicae</i>	<i>M. isocheira</i>	<i>A. hettacra</i>
The vicinity of King George Island	300–100	5.5	5.7	6.2
Scotia Sea	100–50	3.9	7.0	5.5
	300–100	4.2	7.0	5.3
	600–300	3.3	5.4	4.2

youngest, A-6. The term “younger part of the population” was used in reference to instars from A-6 to A-3, and “older part of the population” referred to stages from A-2 to Ad.

In the vicinity of the Admiralty Bay (at the depth 300–100 m) populations of *A. belgicae*, *M. isocheira* and *A. hettacra* were clearly dominated by older stages (Fig. 3).

The share of younger stages of *A. belgicae* increased in relation to depth in the Scotia Sea. The youngest instars (A-6) of this species were observed there only in the deepest water layer (600–300 m) (Fig. 4). In the same area a different pattern was observed in the *A. hettacra* population. The older part of *A. hettacra* population dominated in epipelagic zone (100–50 m) constituting about 88% (A-2 to Ad),

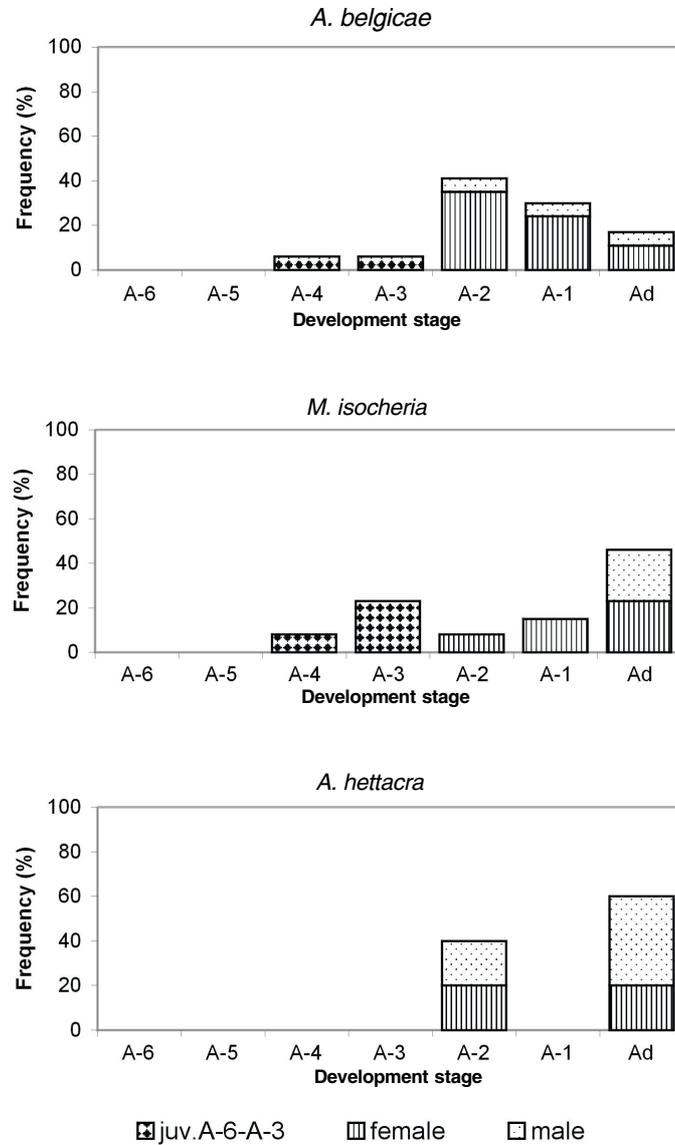


Fig. 3. Age structure of *A. belgicae*, *M. isocheira* and *A. hettacra* (%) in the vicinity of King George Island (the Admiralty Bay) at the depth of 300–100 m.

while younger individuals (A-5 to A-3), amounting to 62%, were observed in the layer 600–300 m (Fig. 5). The age structure of *M. isocheira* in the Scotia Sea was similar to that described for *A. hettacra*. There were exclusively adults at the depth of 300–100 m and 100–50 m, whereas juveniles occurred only in the deepest investigated water layer (600–300 m) composing 30% of the *M. isocheira* population there (Fig. 6).

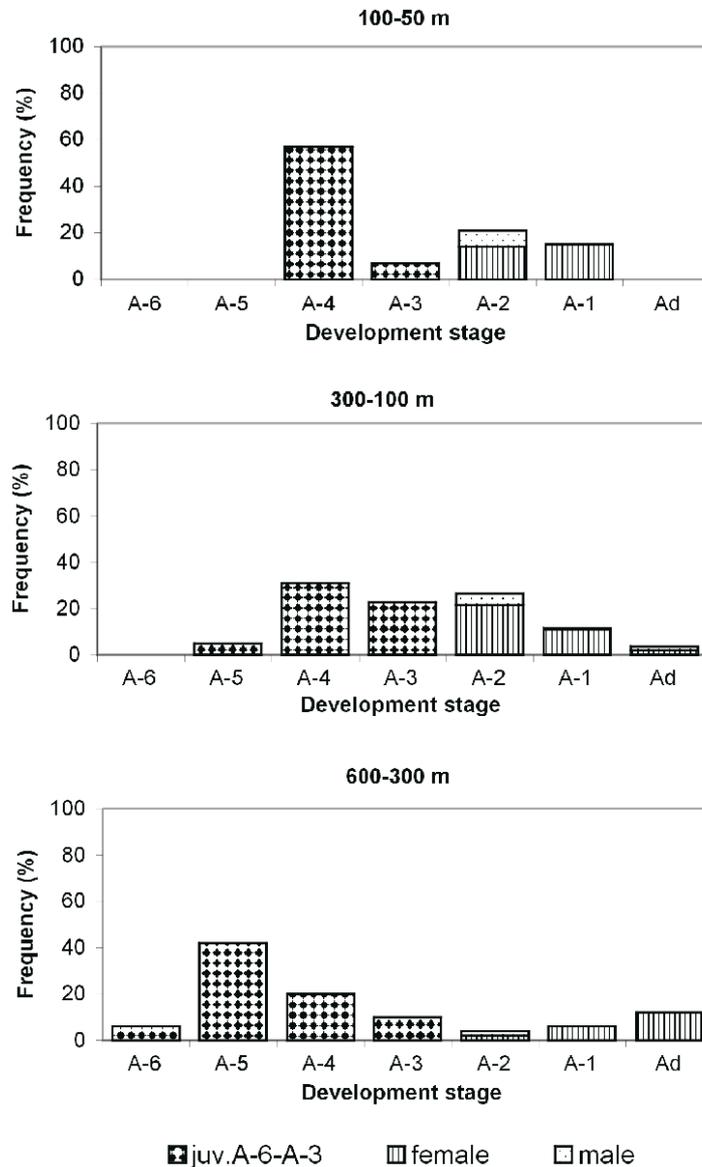


Fig. 4. Population structure of *A. belgicae* (%) in water column in the Scotia Sea in summer 1988/1989.

The “mean population stage” for *A. belgicae*, *M. isocheira* and *A. hettacra* did not differ significantly in the vicinity of the Admiralty Bay (Table 2), while the values for the same species in the whole investigated water columns in the Scotia Sea were 4.0, 5.7 and 4.9, respectively. The index \bar{S} in water column for the three species generally decreased in relation to depth (Table 2).

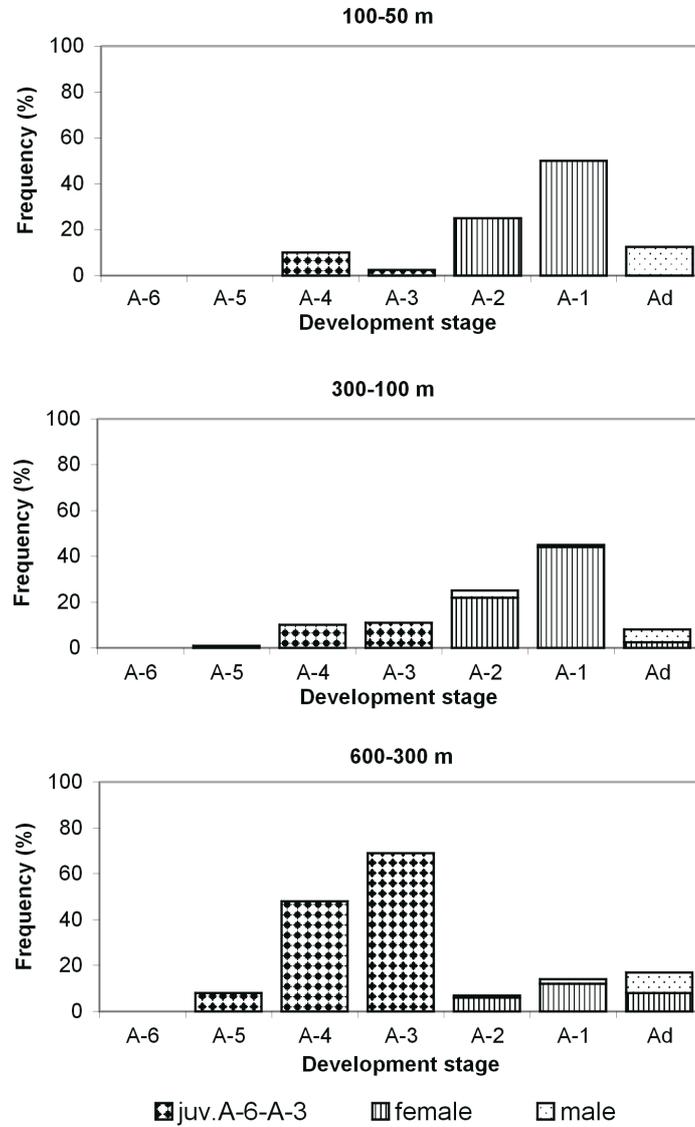


Fig. 5. Population structure of *A. hettacra* (%) in water column in the Scotia Sea in summer 1988/1989.

Discussion

Distribution of Ostracoda

The first attempts to describe the zooplankton community under coastal fast ice were undertaken by Hicks (1974), Fukuchi and Tanimura (1981), Fukuchi *et al.* (1985), Tanimura *et al.* (1986) and Foster (1987, 1989) in the Indian Ocean sector

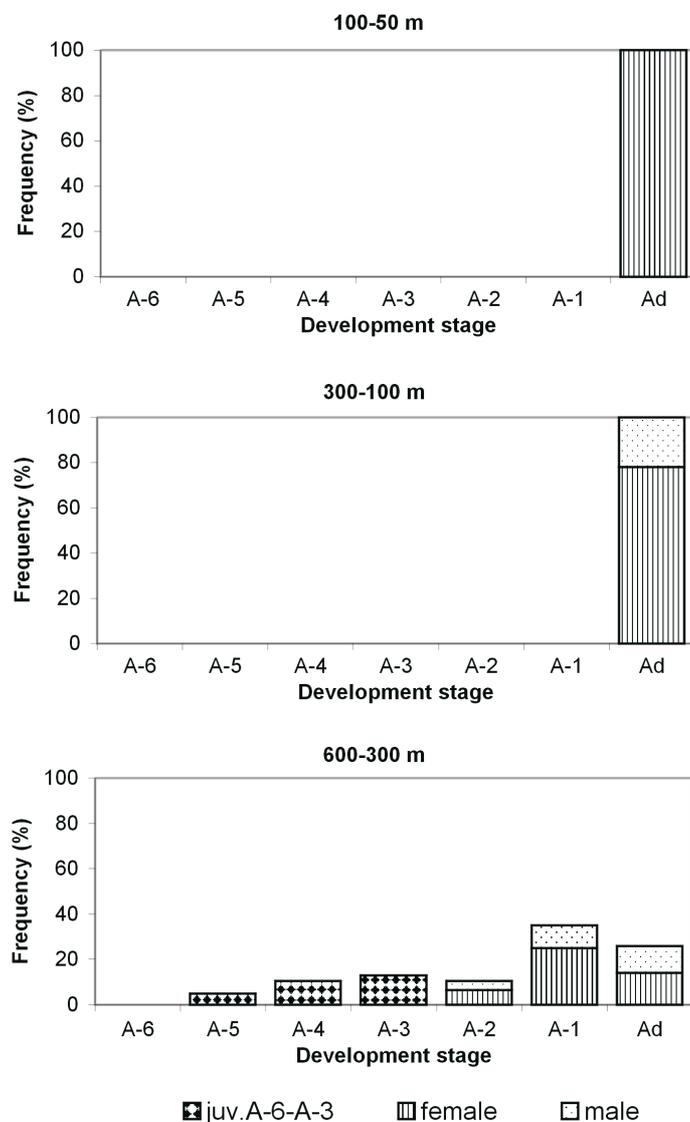


Fig. 6. Population structure of *M. isocheira* (%) in water column in the Scotia Sea in summer 1988/1989.

and the southern Ross Sea. Brinton (1985), Hopkins and Torres (1988) and Siegel *et al.* (1992) reported on their observations concerning the composition, abundance and biomass of the oceanic community near pack-ice zone.

Ostracoda are an important constituent of the zooplankton in the pelagial of the Southern Ocean, owing to their potentially large abundance (Hopkins 1985a). Because of their relatively large body size (adults can attain 1–3 mm length) (Hopkins 1987) their share in Antarctic zooplankton is also important in terms of biomass.

The Ostracoda share in the total biomass of the zooplankton under the sea-ice of the northern Weddell Sea reached almost 5% (Hopkins and Torres 1988), and only Copepoda were more abundant.

There is an evident asymmetry in the species diversity among the pelagic Ostracoda in Antarctic waters. In Pacific sector 23 species were recorded whereas in the Atlantic only 7 species (Kock 1992). Among the seven pelagic Ostracoda species occurring in the Antarctic waters of the Atlantic origin – *A. belgicae*, *A. hettacra*, *M. isocheira*, *B. antipoda*, *M. skogsbergi*, *Discoconchoecia aff. elegans* and *Conchoecissa symmetrica* – only the first four were found in the material analysed in the present work. The low diversity of the Ostracoda species in the summer 1988/1989 might have been caused by the limited geographical range of the analysed area (59°44'S – 62°18'S; 47°59'W – 58°24'W).

The *A. belgicae* preference for the neritic zone suggested by Kock (1993) did not correspond with the high frequency of the species observed in the Scotia Sea in the summer 1988/1989. The maximum abundance of *A. belgicae* (over 250 ind. m⁻²) during the period studied was noted in the mid- and eastern parts of the basin, due to specific hydrological conditions. The region east of 53.5°W was influenced by winter Weddell Sea water, while summer modification water was found between 49°W and the South Orkneys in the upper 45-m layer (Tokarczyk *et al.* 1991). This probably explains the high share of *A. belgicae* in that part of the Scotia Sea in the summer 1988/1989 which was about two times higher than that found 5 years earlier (Błachowiak-Samołyk and Żmijewska 1995). A high frequency of *A. belgicae* was also found in the vicinity of the Admiralty Bay, which was confirmed by Kittel *et al.* 2001.

Alacia hettacra is also widespread in the Southern Ocean (Hillman 1969). Domination of the species in the northern part of the Weddell Sea in the spring 1988 (Siegel *et al.* 1992) and in the Drake Passage in the summer 1983/1984 (Błachowiak-Samołyk and Żmijewska 1995) confirms its distinct preferences for open waters. The frequency of *A. hettacra* in the Scotia Sea in the summer 1988/1989 was lower than that of *A. belgicae*. This might be a result of the fact that sampling took place almost exclusively in the upper layer (300–0 m). It was significant that the abundance of *A. hettacra* at the only station sampled deeper than 300 m (station 70) was twice as high as that of *A. belgicae* (Table 1).

The share of the third endemic Antarctic species, *M. isocheira* in the pack-ice zone in the summer 1983/1984 (Błachowiak-Samołyk and Żmijewska 1995) was higher (ca. 50%) than during the analysed period (ca. 30%), although *M. isocheira* attained the higher abundance of all Ostracoda (about 800 ind. m⁻²) in the Scotia Sea in the summer 1988/1989. A horizontal distribution analysis of *M. isocheira* did not reveal any preference of this species for particular water masses (Deevey 1982, Kock 1993, Błachowiak-Samołyk 1999).

Since mainly the upper 300-m water layer was sampled during the summer 1988/1989, deep-sea Antarctic species, *B. antipoda*, was found in low density and

did not exceed 20 ind. m⁻². According to Deevey (1982) the *B. antipoda* distribution is confined to the Southern Hemisphere (in the Atlantic waters between 1°S–65°S).

The extensive studies of Hopkins in the Croker Passage (1985b) and in the Ross Sea (1987) showed that Ostracoda are mostly omnivorous and detritus feeding animals. Such a wide food spectrum explains the considerable independence of that group from any single food source. In the summer 1983/1984 the highest abundance of Ostracoda were found (Błachowiak-Samołyk and Żmijewska 1995) in the south-eastern part of the Bransfield Strait and the area influenced by the Weddell Sea waters in sites of maximum concentrations of phytoplankton (Kopczyńska and Ligowski 1985). However the earlier studies (Witek *et al.* 1982) did not show any clear correlation between the maximum abundance of net phytoplankton and herbivorous zooplankton in the Antarctic Peninsula area. The higher abundance of Ostracoda in the mid- and eastern parts of the Scotia Sea in the summer 1988/1989 coincided with the maximum chlorophyll *a* concentrations (1.56 mg m⁻³) (Lipski 1991).

In summary, the influence of ice pack presence in the Scotia Sea upon the higher abundance of Ostracoda (1450 ind. m⁻²) in the summer 1988/1989 in comparison with the same season of 1983/1984 (700 ind. m⁻²) (Błachowiak-Samołyk and Żmijewska 1995) was distinctive. The result was probably caused also by a great concentration of organic matter accumulated in this region (Rakusa-Suszczewski 1991). The higher concentrations of chlorophyll *a* and phytoplankton, which were found in the eastern part of the Scotia Sea (Rakusa-Suszczewski 1991), coincided with the highest densities of Ostracoda in the period investigated.

A common feature of the vertical Ostracoda distribution in the research area was their absence in the surface water layer (50–0 m). These tendencies were also noted by Angel and Fasham (1975) and by Mognilevsky and Angel (1975) in the North Atlantic. The lack of Ostracoda in the 100–0 m layer in the Sea of Norway (Wiborg 1954) and in the Northern Pacific (Marlow and Miller 1975) seems to support this assumption. When studying the layers of 100–0 m and 300–0 m in the Antarctic (McMurdo Sound), Foster (1989) observed differences in Ostracoda densities: at the turn of October in the surface layer he noted 1.52 ind. 100 m⁻³, whereas in the deeper one he noted 11.1 ind. 100 m⁻³. A similar vertical distribution pattern of *A. belgicae* was observed in the Weddell Sea by Foster (1987), with four times higher densities in 300–0 m layer than in the 100–0 m one. Clear differences in mean values of Ostracoda quantities (487 ind. 1000 m⁻³ and 64 ind. 1000 m⁻³ respectively) were observed between the two summer periods February–March 1981 and December 1983 – January 1984 in the area of the Antarctic Peninsula (Jazdzewski *et al.* 1982, Witek *et al.* 1985). The great differences must have resulted from both the catching device (plankton net with different size mesh) and a wider range of depths in the first case (300–0 m) than in the second (200–0 m). In

studies of material from water layer 300–0 m Kock (1992) found that Ostracoda were likely to inhabit the lower epi- and upper mesopelagic zone. On the basis of materials sampled from the Bransfield Strait (Błachowiak-Samołyk 1999) and the Croker Passage (Błachowiak-Samołyk and Żmijewska 1997) it was discovered that three studied endemic species – *A. belgicae*, *A. hettacra* and *M. isocheira* – preferred mesopelagial (down to about 700 m) in the water column.

The analysed vertical samples from the Scotia Sea showed that Ostracoda preferred to inhabit the deepest sampled layer (600–300 m) (Table 1). This was also shown in earlier studies (summer 1983/1984) when the highest abundance was found at the depth of 500–300 m (Błachowiak-Samołyk and Żmijewska 1995).

Population structure of Ostracoda

Life cycles of the pelagic Ostracoda in the Antarctic waters have been poorly investigated. Angel (1979, 1983) studied the population structure of North-Atlantic Ostracoda. Ikeda and Imamura (1992) and Ikeda (1990, 1992) investigated the life cycle of a mesopelagic species *Conchoecia pseudodiscophora* that occurs in the southern part of the Sea of Japan. Hartmann (1968), Hillman (1969), Kock (1992) and Błachowiak-Samołyk (1999) provided information on the population structure of Ostracoda in the Antarctic waters. Basing on the data on the earlier studied migrations during the life cycle of other Antarctic zooplankton species belonging to Euphausiacea, Chaetognatha or Copepoda Kock (1992) developed a hypothetical model of the life cycle of two dominant endemic Antarctic ostracod species – *A. belgicae* and *A. hettacra*. The material collected by Kock, mainly from the surface water layer 200–0 m, did not include any specimens of the youngest instars of Ostracoda (A-6, A-5), which may have been a result of a too large mesh size of the plankton net (0.32 mm). Kock (1992) made many valuable observations concerning the Ostracoda life strategy. Because of a high frequency of mature stages, of females in particular, in the deeper Antarctic waters Kock (1992) considered the possibility of Ostracoda ontogenetic migrations. Their model of life cycle would be strictly dependent on the Antarctic water circulation. The oldest instars of *A. belgicae* and *A. hettacra* are brought up to the surface in spring and directed north off the Antarctic continent along with the Antarctic Surface Waters. The process is reversed in autumn. With deteriorating weather conditions the animals migrate into the deep water to pass the winter in a more stable environment. In deep-sea water the juvenile instars of *A. belgicae* gradually migrate to the south. The occurrence of the younger instars of *A. belgicae* and *M. isocheira* almost entirely in the deepest layers of the Croker Passage in autumn finally confirmed the ontogenetic migrations of these species (Błachowiak-Samołyk 2001).

In summer 1988/1989 the age structures of the three dominant species – *A. belgicae*, *A. hettacra* and *M. isocheira* – were studied. In the case of the Admi-

rally Bay area, the dominance of the older part of their populations was significant, probably owing to the lack of samples from deeper water layers. A similar age structure pattern of *A. belgicae* and *A. hettacra* was observed by Kock (1993) near the Antarctic Peninsula in the summer 1989/1990. The “mean population stage” for the last two species mentioned above were almost the same in these two summer seasons 1989/1990 (Kock 1993) and 1988/1989 (present observations).

The vertical distribution of development stages of *A. belgicae* in the Scotia Sea showed a clear dominance of younger individuals in the whole penetrated water columns 600–50 m. Such an age pattern is in accordance with Kock’s hypothesis (1992, 1993) that the specimens of *A. belgicae* do not take part in the spring ontogenetic migration due to their preference for shelf zones. This corresponds with the results by Błachowiak-Samołyk (2001) from the 1200 m deep waters of the Croker Passage. The “mean population stage” for *A. belgicae* in summer 1985/1986 (4.7) did not differ significantly from the data obtained in present studies (4.0). The difference might have resulted from the wider range of depths in the first case (1200–0 m) than in the second (600–0 m). In spring 1986 in upper layers (above 1000 m) in the Bransfield Strait the younger part of *A. belgicae* population also dominated, whereas the shares of older and younger ones in deeper layers was similar (Błachowiak-Samołyk 1999). The presence of the youngest (A-6) stage of *A. belgicae* in the summer 1988/1989 in the Scotia Sea confirmed the beginning of reproduction of this species at that time. This was also in accordance with the earlier seasonal studies of age structure of this species in the Croker Passage (Błachowiak-Samołyk 2001)

The age distribution patterns of *A. hettacra* and *M. isocheira* in the summer 1988/1989 in the Scotia Sea were similar. The dominance of younger parts of their populations in the upper 300 m of the Scotia Sea in the summer 1988/1989 was evident, whereas in the deeper waters (below 300 m) oldest stages dominated. The different vertical distribution pattern of *A. hettacra* and *M. isocheira* populations in the investigated area as compared to *A. belgicae*, may suggest a shift in reproduction of these two species. Asynchronous reproduction, which is typical for herbivorous Antarctic Copepoda, is of significant biological importance since food competition within the groups, which have similar trophic needs, is limited (Żmijewska 1993). According to Hopkins (1985b, 1987), the diet of the three discussed endemic Ostracoda species is very similar. Therefore the various reproductive strategies of *A. hettacra* and *M. isocheira*, in comparison with *A. belgicae*, are an advantage. This was also indicated by their higher “mean population stage” values in comparison with *A. belgicae* in the present investigations. However, in order to confirm this hypothesis an analysis of zooplankton material from the same area over all seasons is required.

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