

POLISH POLAR RESEARCH	17	3-4	213-220	1996
-----------------------	----	-----	---------	------

Magdalena BŁAŻEWICZ and Krzysztof JAŹDŻEWSKI

Laboratory of Polar Biology and Oceanobiology
Department of Invertebrate Zoology and Hydrobiology
University of Łódź
Banacha 12/16
90-237 Łódź, POLAND

A contribution to the knowledge of Tanaidacea (Crustacea, Malacostraca) of Admiralty Bay, King George Island, Antarctic

ABSTRACT: A collection of 15 283 individuals of tanaidacean crustaceans was gathered by successive Polish Antarctic Expeditions in the years 1977–1993 in Admiralty Bay (King George Island, South Shetland Islands). Twelve species belonging to three families are identified in this study. The material is clearly dominated by *Nototanais antarcticus* (Hodgson, 1902); other common species were *Nototanais dimorphus* (Beddard, 1886) and *Peraeospinosus* sp. A. The highest density of tanaids was over 140 000 specimens m⁻², occurring on a muddy bottom in Herve Cove lagoon.

Key words: Antarctic, South Shetland Islands, Tanaidacea, benthos.

Introduction

Tanaidacea are comparatively small malacostracan crustaceans occurring in marine communities from upper sublittoral to the hadal depths. The total number of hitherto known Tanaidacea is estimated at about 800 species (McLaughlin, 1980). Typically, tanaids live in tubes or tunnels constructed from sand grains, mud and detritus using secretions from the tegumental glands, but they can also occur between coralline algae, in rock-pools, and in the crevices between the plates on the back of turtles (Holdich and Jones, 1983).

The work herein is a presentation of the results from the first stage of a major project on the systematics, biology and ecology of the tanaids of Admiralty Bay. These results are compared to those from other regions in the vicinity of King George Island.

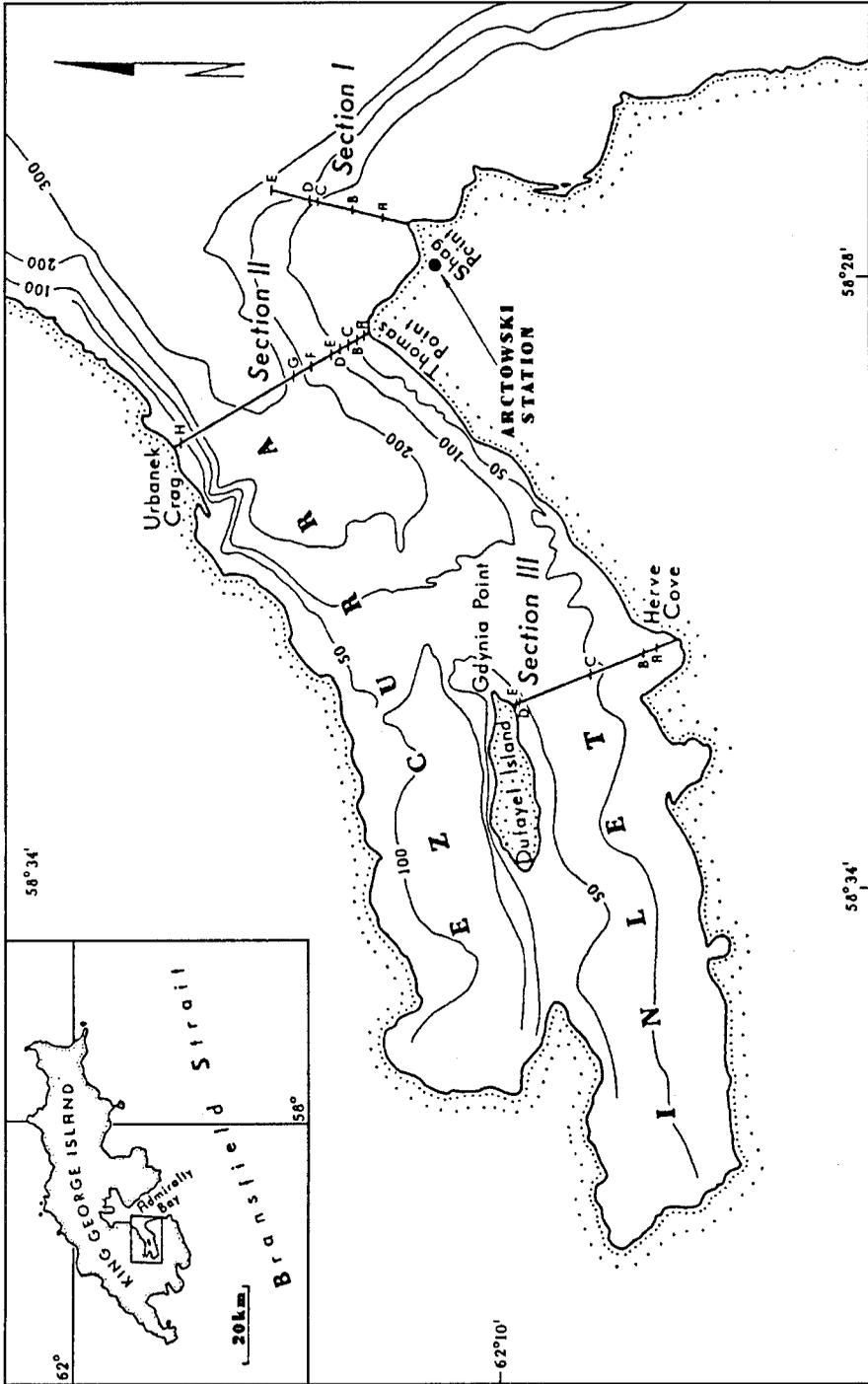


Fig. 1 Study area showing the location of the transects according to Jazdzewski *et al.* 1986

Study area and material

Admiralty Bay is a fjord-like trifurcated embayment of King George Island, the largest of the South Shetlands archipelago (Fig. 1). The depth of the bay reaches over 500 m and the surface area is about 120 km².

Salinity and temperature are relatively stable throughout the whole bay. In austral summer, at the sea floor, they range from 33.8 to 34.3 ‰ and from -0.4 to 0.9°C respectively (Lipski, 1987). Distinct decreases in salinity were occasionally observed in shallow inlets (Szafrński and Lipski, 1982).

There have been no extensive studies on bottom sediments in Admiralty Bay other than a rudimentary determination of sediment type. Coarse sediments mixed with fine mud occur in the main channel down to 50 m depth, whereas in deeper parts and in inlets mud prevails (Pęcherzewski, 1980; Siciński and Tatur, *unpubl.*).

For the present study, materials were collected from the whole of Admiralty Bay. However, the majority of samples were collected from the extensive vicinity of the Polish *H. Arctowski* station and in Ezcurra Inlet.

Tanaidacea were collected during the series of Polish Antarctic Expeditions to *H. Arctowski* Station in the years 1977–1993. These crustaceans were found in 100 out of the total number of 252 qualitative samples (dredges, trawls), and in 158 of the 193 quantitative samples (Van Veen grab; sample area = 0, 09 m²). Most of the quantitative samples were obtained during three series of collections: (i) in 1979/80 taking usually three subsamples at each station in three chosen transects (see Fig. 1) (Jażdżewski *et al.*, 1986), (ii) in 1984/85 in Section I and in Ezcurra Inlet, and (iii) in 1992/93 in shallow inner lagoons: Herve Cove and Suszczewski Cove.

Results and discussion

The material from Admiralty Bay contained 15 283 individuals of Tanaidacea. The following 12 species were determined, representing eight genera and three families:

Family **Tanaidae** Kröyer, 1849

Tanais sp.

Family **Leptognathiidae** Sieg, 1973

Araphura elongata (Shiino, 1970)

Leptognathia gallardoi Shiino, 1970

Leptognathia gracilis (Kröyer, 1842)

Mirandotanais vorax (Kusakin *et* Tzareva, 1974)

Peraeospinosus adipatus (Tzareva, 1982)

Peraeospinosus pushkini (Tzareva, 1982)

Peraeospinosus sp. A

Typhlotanais sp.

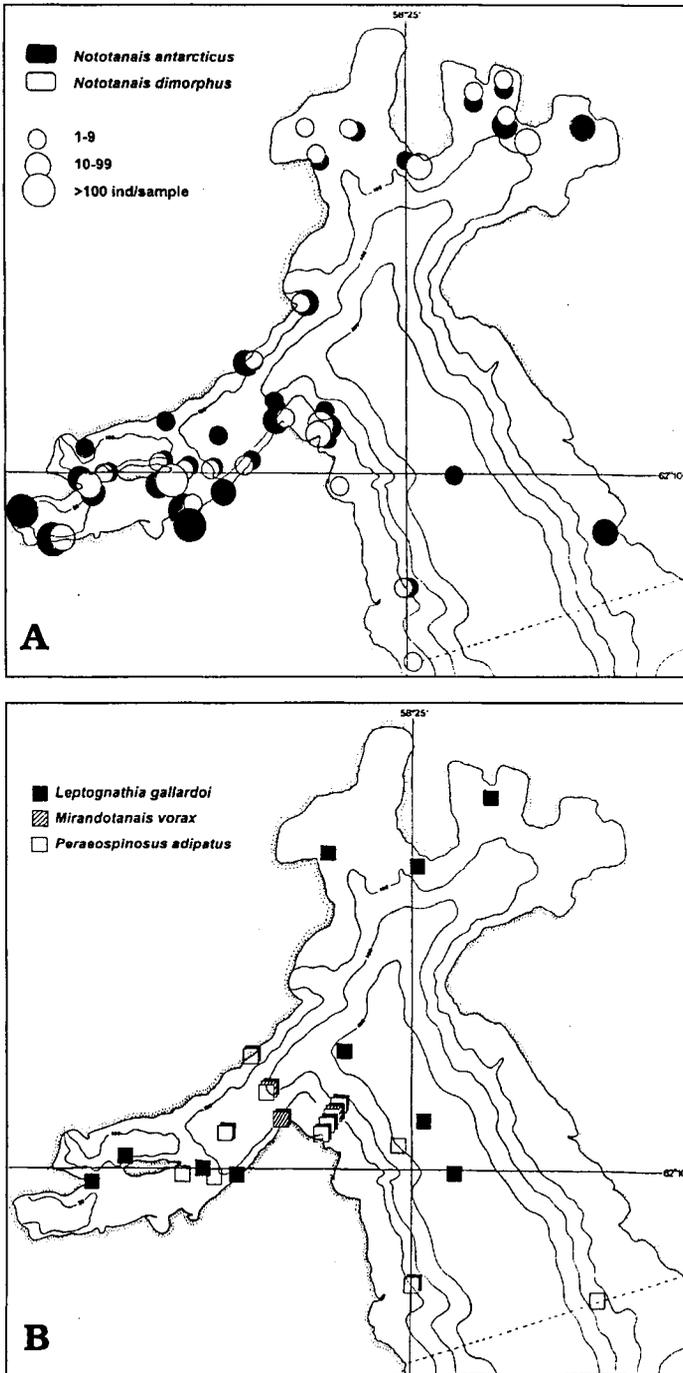


Fig. 2 The distribution of Tanaidacea in Admiralty Bay. (A) Relative abundance of two dominants (individuals per sample); (B) occurrence of particular non dominant taxa.

Family **Nototanaidae** Sieg, 1973*Nototanaïs antarcticus* (Hodgson, 1902)*Nototanaïs dimorphus* (Beddard, 1886)*Protanaïssus longidactylus* (Shiino, 1970)

The material studied was clearly dominated by *Nototanaïs antarcticus*. *Nototanaïs dimorphus*, *Peraeospinosus pushkini* and *Peraeospinosus* sp. A were subdominants (Table 1). The least frequent and numerous species were: *Mirandotanaïs vorax* and the currently undetermined *Tanaïs* sp. and *Typhlotanaïs* sp.

Leptognathia gallardoi, *Mirandotanaïs vorax* and *Peraeospinosus pushkini* were usually found at depths greater than 200 m. Opposite to that *Peraeospinosus* sp. A was recorded mainly in shallow waters (2–80 m) in Ezcurra Inlet (see Fig. 3)

Figures 2A–B and 3 show the distribution of each species in Admiralty Bay. Relative abundance (number of individuals per sample) of the two dominant species for each station was calculated for qualitative and quantitative samples together (Fig. 2A).

Zoogeographic analysis of the tanaids of Admiralty Bay, using the division proposed by De Broyer and Jażdżewski (1993), showed that six species have a circumantarctic distribution (W+E), three species are known only from West Antarctic (W), and one is hitherto known both from Antarctic and Subantarctic (W+E+S) (Table 1).

According to Jażdżewski *et al.* (1986, Fig. 4) in the inner part of Ezcurra Inlet, Tanaidacea were noted as a conspicuously subdominant group among benthic fauna. Their diversity however appeared to be low (only five species). In contrast, in main channel of Admiralty Bay, tanaids were observed as less important element of the zoobenthos in terms of abundance there (Jażdżewski *et al.* 1986, Figs 2–3), but their diversity was distinctly higher (eleven species).

Data on Tanaidacea from West Antarctic are not abundant. They can be found in the papers by Shiino (1970), Lowry (1975), Gallardo *et al.* (1977), Richardson and Hedgpeth (1977) and Sieg (1986a, b). The most comprehensive list of 25 species found in this region compiled from two recent papers by the last author includes all our taxa, excluding *Peraeospinosus* sp. A, a species probably new for science.

Six out of seven species given by Shiino (1970) for Chile Bay of Greenwich Island were found also in Admiralty Bay (*Nototanaïs antarcticus*, *N. dimorphus*, *Protanaïssus longidactylus*, *Leptognathia gracilis*, *L. gallardoi* and *Araphura elongata*); the seventh was *Typhlotanaïs greenwichensis*, the species recorded as common in Chile Bay, at the depth exceeding 100 m (*Maldane* assemblage) by Gallardo *et al.* (1977). It is to be mentioned however, that in our materials there was also one not yet determined specimen of *Typhlotanaïs*. Similarly, out of the list of seven species reported by Sieg (1986b) in the waters off Danco Coast, four were in common with Admiralty Bay (*Nototanaïs antarcticus*, *N. dimor-*

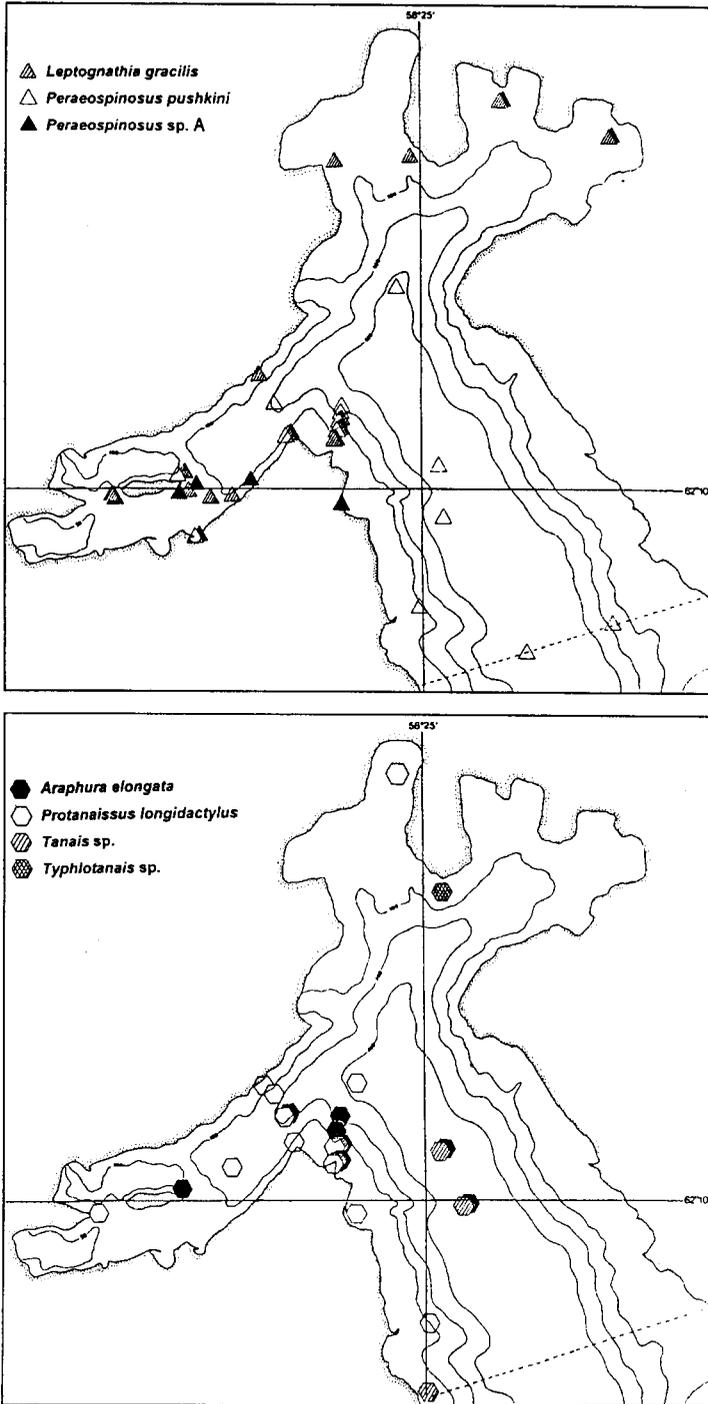


Fig. 3 The distribution of Tanaidacea in Admiralty Bay.

Table 1

Dominance in the material (D%), frequency in samples (F%), depth and zoogeographical status of species of Tanaidacea found in Admiralty Bay.

Species	D%	F%	Depth [m]	Zoogeographical status
<i>Nototanais antarcticus</i>	72.76	81.6	2-500	W+E
<i>Peraeospinosus</i> sp. A	15.06	18.3	2-80	W
<i>Nototanais dimorphus</i>	5.59	43.0	20-210	W+E+S
<i>Peraeospinosus pushkini</i>	4.02	29.1	33-500	W
<i>Leptognathia gracilis</i>	0.75	19.6	26-290	W+E
<i>Leptognathia gallardoi</i>	0.61	26.6	30-500	W
<i>Protanaisissus longidactylus</i>	0.42	18.3	48-500	W+E
<i>Peraeospinosus adipatus</i>	0.33	12.0	31-496	W+E
<i>Araphura elongata</i>	0.18	8.2	129-500	W+E
<i>Mirandotanais vorax</i>	0.08	2.5	69-263	W+E
<i>Tanais</i> sp.	0.03	2.5	15-600	?
<i>Typhlotanais</i> sp.	0.01	0.6	70	?

phus, *Leptognathia gracilis*, *Peraeospinosus adipatus*) and the fifth could be also *Typhlotanais greenwichensis*.

Much lower similarity can be observed between our materials and the Weddell Sea tanaid fauna (Sieg, 1986a). Only two species (*Mirandotanais vorax* and *Nototanais antarcticus*) from the list of 21 were found in Admiralty Bay.

In an inner lagoon of Herve Cove (Ezcurra Inlet), an exceptionally dense population of tanaids was found, amounting to 140 000 specimens m⁻². It is worth mentioning that the highest densities hitherto reported for Tanaidacea by Dayton and Oliver (1977) in the samples taken from Mc Murdo Sound (Ross Sea) was about 53 000 specimens m⁻² on a soft bottom and about 70 000 specimens m⁻² on a sponge mat.

Acknowledgements. — Thanks are due to our colleagues: Dr W. Kittel, Prof. R. Ligowski, Dr P. Presler, Dr J. Siciński and Mr J. Żychliński for collecting material for this paper during several Polish Antarctic Expeditions to the *H. Arctowski* Station supervised by Professor dr Stanisław Rakusa-Suszczewski. We are extending also our thanks to Dr A. R. Parker (Australian Museum) for revising English manuscript and his kind comments. This paper is an effect of co-operation with Department of Antarctic Biology and was supported by KBN grant no PB208/PO4/96/11.

References

- DAYTON P.K. and OLIVER J.S. 1977. Antarctic soft bottom benthos in oligotrophic and eutrophic environments. — *Science*, 197: 55–58.
- DE BROYER C. and JAZDŻEWSKI K. 1993. Contribution to the marine biodiversity inventory. A checklist of the Amphipoda (Crustacea) of the Southern Ocean. — *Doc. Trav. I.R.Sc.N.B.*, Bruxelles, 73: 1–154.

- GALLARDO V.A., CASTILLO J.G. RETAMAL M.A. and YANEZ A. 1977. Quantitative studies on the soft-bottom macrobenthic animal communities of shallow Antarctic bays. — *In*: Llano G.A (ed.), *Adaptation within Antarctic Ecosystems*. Proc. 3rd SCAR Symp. Antarct. Biol., Smithsonian Institution, Washington: 361–387.
- HOLDICH D.M. and JONES J.A. 1983. *Tanaids*. Cambridge University Press. Cambridge, London, New York, New Rochelle, Melbourne, Sydney: 98pp.
- JAZDZEWSKI K., JURASZ W., KITTEL W., PRESLER E., PRESLER P. and SICIŃSKI J. 1986. Abundance and biomass estimates of the benthic fauna in Admiralty Bay, King George Island, South Shetland Islands. — *Polar Biol.*, 6: 5–11.
- LIPSKI M. 1987. Variations of physical conditions and chlorophyll *a* contents in Admiralty Bay (King George Island, South Shetland Islands, 1979). — *Pol. Polar Res.*, 8: 307–332.
- LOWRY J.K. 1975. Soft bottom macrobenthic community of Arthur Harbor, Antarctica. *Antarct. Res. Ser.*, 23(1): 1–19.
- MCLAUGHLIN P.A. 1980. *Comparative morphology of recent Crustacea*. W.H. Freeman and Company. San Francisco: 1–177.
- PECHERZEWSKI K. 1980. Distribution and quantity of suspended matter in Admiralty Bay (King George Island, South Shetland Islands, 1979). — *Pol. Polar Res.*, 1: 75–82.
- RICHARDSON M. and D., HEDGPETH J.W. 1977. Antarctic soft-bottom, macrobenthic community adaptations to a cold, stable, highly productive, glacially affected environment. — *In*: Llano G. A. (ed). *Adaptations within Antarctic Ecosystems*. Proc. 3rd SCAR Symp. Antarct. Biol. Smithsonian Institution, Wash.: 181–196.
- SHIHO S.M. 1970. Paratanaidae collected in Chile Bay, Greenwich Island by the XXII Chilean Antarctic Expedition, with an *Apseudes* from Pouvenir Point, Tierra del Fuego Island. — *I.N.A.C.H.*, 1: 77–122.
- SIEG J. 1986a. Tanaidacea (Crustacea) von der Antarktis und Subantarktis. — *Mitt. Zool. Mus.Univ. Kiel*, 2(4): 1–80.
- SIEG J. 1986b. Crustacea Tanaidacea of Antarctic and Subantarctic. On material collected at Tierra del Fuego, Isla de Estados, and the West Coast of the Antarctic Peninsula. — *Ant. Res. Ser.*, 45(18): 1–180.
- SZAFRAŃSKI Z. and LIPSKI M. 1982. Characteristics of water temperature and salinity at Admiralty Bay (King George Island, South Shetland Islands, Antarctica) during austral summer 1978/1979. — *Pol. Polar Res.*, 3: 7–24.

Received September 1, 1996

Accepted November 14, 1996

Streszczenie

Artykuł prezentuje wstępne informacje o skorupiakach z rzędu Tanaidacea występujących w Zatoce Admiralicji (Wyspa Króla Jerzego, Sztetlandy Południowe). Materiał był zbierany w czasie kolejnych Polskich Wypraw Antarktycznych PAN w latach 1977–1993. Wśród 15 283 osobników Tanaidacea stwierdzono 12 taksonów należących do trzech rodzin. Materiał był wyraźnie zdominowany przez *Nototanais antracticus* (Hodgson, 1902); innymi pospolitymi gatunkami były *Nototanais dimorphus* (Beddard, 1886) i *Peraeospinosus* sp. A — gatunek prawdopodobnie nowy dla nauki. W najbardziej wewnętrznych częściach Fiordu Ezcurra Tanaidacea należały do subdominantów w zoobentosie, choć ich różnorodność gatunkowa była niska (tylko pięć gatunków). Najwyższe zagęszczenie Tanaidacea wynoszące ponad 140 000 osobn./m² na mulistym dnie laguny Herve Cove. Znacznie wyższe bogactwo gatunkowe tej grupy skorupiaków obserwowano w basenie centralnym Zatoki Admiralicji. Rozmieszczenie poszczególnych taksonów w Zatoce przedstawiono na rys. 2 i 3.