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Benthic Harpacticoida (Crustacea, Copepoda) from the Svalbard archipelago

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ABSTRACT: This article presents an inventory of the marine benthic harpacticoids (Crustacea, Copepoda) from the area of Svalbard (including Bear Island). Information concetning the occurrence of 90 taxa in the shallow littoral zone of Svalbard is presented based on own samples as well as published and unpublished sources. Two species and 7 genera are reported for the first time from the investigated area.

Key words: Harpacticoida, Svalbard.

Introduction

In spite of the increasing interest in the role of biodiversity in the functioning of marine ecosystems, taxonomic studies of fauna are still unsatisfactory. Information regarding the species composition of Svalbard littoral meiofauna in general, and of Harpacticoida in particular, is very limited.

The order Harpacticoida of the class Copepoda order contains over 3000 species – most of which are free-living benthic organisms (Hick and Coull 1983). In marine sediments they are usually the second most abundant meiofaunal taxon after nematodes, but they are often the dominant taxon in marine algae. They are found in all salinity regimes, from the supralittoral to the abyssal zone, and in all temperatures from polar to tropical zones. Harpacticoids are known as organisms which are not tolerant to anaerobic conditions. In the sea they are associated with sessile epibenthic macrofauna and macrophytes, where they can make up a large part of the phytal meiofauna (Moore 1973).

Svalbard marine meiobentos have been investigated, but most of the published papers yield information only about the abundance and biomass of higher taxa (Szymelfenig *et al*. 1995, Węsławski *et al*. 1997, 1999; Węsławski and Szymelfenig 1999, Soltwedel *et al*. 2000). Meiobenthos from single localities have been

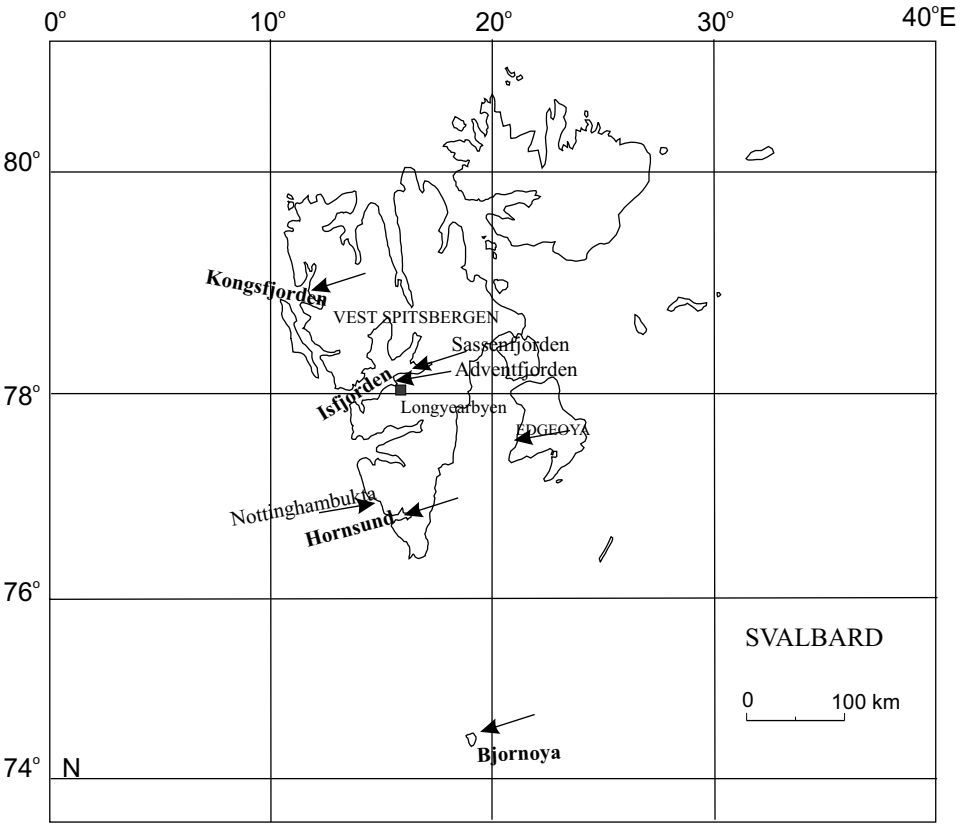

Fig. 1. Location of sampling sites.

described in detail, *e.g.* by Radziejewska and Stankowska-Radziun (1979) and Kendall *et al.* (1997). The first observations on the harpacticoids from the Arctic seas were published by Scott and Scott (1901), and Lang (1936). An important descriptions of the benthic littoral harpacticoids from Svalbard was published by Mielke (1974). There are only a few papers giving detailed information on the species' level (Gee and Huys 1994, Gulliksen *et al.* 1999).

The aim of this article is to present a synopsis of the occurrence of Harpacticoida in the littoral of Svalbard. The data is based on the author's own unpublished results, supplemented with existing information: from both published and unpublished sources.

Study area

The shallow littoral zone of the Svalbard archipelago between 74° – 81° N and 10° – 30° E (Fig. 1) was studied. The littoral zone of Svalbard is harsh but by no

means barren (Węsławski *et al*. 1993, 1997; Szymelfenig *et al*. 1995). Sea ice covers almost the whole coast during winter time and disappears only on the west coast in the summer due to the influence of warm Atlantic water (Coachman and Aagaard 1974). Most shores are influenced by melt water and sediment from glaciers. Bjornoa is an island, isolated from the rest of archipelago, situated at 74°N and 17°E. It's a rocky pear-shaped island some 20 km in diameter, surrounded by extensive shallows below 100 m depth.

The samples of Mielke (1974) were collected from the littoral zone of the Longyearbyen (Isfjorden) and Ny Alesund (Kongsfjorden) regions. In July 1990 an ecological study of latitudinal gradients in the structure of sub-littoral meiobenthos was conducted in Sassenfjord by Gee and Huys (1994). In the period 1999–2001 meiofauna samples were collected by the author in Kongsfjorden, Hornsund, and Bjornoya.

Sampling

Meiofauna was sampled on a sandy beach, in the intertidal and shallow littoral – between 2 and 30 meters depth – by means of a steel tube of 2 cm diameter, inserted into the sediment down to a depth of 10 cm and preserved in a 4% buffered formaldehyde and seawater solution. The extraction of the meiofauna from the sediment was done according to the standard method of decantation (Pfanekuche and Thiel 1988). Organisms were washed on 0.038 mm sieves and stained with Bengal Rose.

The taxonomy of harpacticoid copepods is still unresolved. Until now the monograph by Lang (1948) remains the most important identification key. Other useful works are the monographs of Sars (1911, 1921), Smirnov (1946), Lang (1965), Huys *et al*. (1996), and a catalogue of the new marine harpacticoid copepods by Bodin (1997).

Results and discussion

Until the present time 34 species and 51 genera of Harpacticoida have been recorded from the Svalbard archipelago (Table 1). A comparison of the species list from Mielke (1974), Gee and Huys (1994 and unpublished data), Gulliksen *et al*. (1999) and the author's own samples reveals considerable differences. The highest number of taxa (49) was recorded by Gee and Huys (1994 and unpublished data) in the Sassenfjord region. In Kongsfjorden and Isfjorden Mielke (1974) identified 26 species of Harpacticoida. In the entire area of study Gulliksen *et al*. (1999) reported only 3 species of Harpacticoida. The author's material yielded a total of 21 taxa, including 2 species and 7 genera reported from the region for the first time.

Table 1

List of harpacticoid taxa from Svalbard archipelago, expected number of species in brackets. Data from: A – Mielke (1974), B – Gee and Huys (1994) and unpublished data, C – Gulliksen *et al.* (1999), D – own data.

Family	Taxon	A	B	C	D
Longipediidae	*Longipedia* sp.		+		
Ectinosomatidae	*Ectinosoma melaniceps* Boeck, 1865	+			
	Ectinosoma sp. (1)				+
	Halectinosoma sp. (5)		+		+
	Bradya sp. (3)		+		+
	Parabradya sp. (2)		+		
	Microsetella sp.			+	
	Sigmatidium parvulum Mielke, 1974	+			
	Pseudobradya sp. (2)		+		
Tachididae	*Tachidius discipes* Giesbrecht, 1881	+			+
	Tachidius incisipes Klie, 1913	+			
	Tachidius sp.				+
Harpacticidae	*Harpacticus chelifer* (O.F. Müller, 1776)			+	
	Harpacticus sp.				+
Tisbidae	*Tisbe furcata* (Baird, 1837)	+			
	Scutellidium hippolytes (Kroyer, 1863)	+			
	Scutellidium sp. (1)		+		+
	Zosime sp. (1)		+		
	Tachidiella sp. (1)				+
	Idyanthedilatata Sars, 1905	+			
	Idellopsis sp. (1)		+		
Tegasidae	*Tegastes* sp.	+			
Thalestridae	*Parathalestris* sp. (1)				+
	Dactylopodia vulgaris Sars, 1905	+			
	Dactylopedia longyearbyensis (Mielke, 1974)	+			
	Idomene sp. (1)				+
	Dactylopodella sp. (1)				+
Parastenheliidae	*Parastenhelia spinosa* (Fisher, 1860)	+			
Diosaccidae	*Stenhelia* (St.) sp. (1)		+		+
	Stenhelia (D) sp. (1)		+		+
	Amphiascus minutus (Claus, 1863)	+			
	Amphiascus tenuiremis (Brady et Robertson, 1875)	+			
	Amonardia arctica (T. Scott, 1898)	+			
	Paramphiascopsis sp. (1)		+		
	Typhlamphiascus lammelifer (Sars) *capensis* (f) Kunz, 1975				+
	Typhlamphiascus sp. (2)		+		
	Amphiascoides nanus (Sars, 1906)	+			
	Amphiascoides sp. (1)		+		
	Paramphiascella sp. (1)		+		
	Haloschizopera sp. (1)		+		
	Schizopera ornata Noodt et Parasjoki, 1953	+			
	Schizopera meridionalis Petkowski, 1954	+			

Table 1 – continued.

Family	Taxon	A	B	C	D
Ameridae	*Amerira longipes* Boeck, 1864	+			
	Ameira parvula (Claus, 1866)	+			
	Ameira sp.		+		+
	Pseudoameira sp.		+		
Paramesochridae	*Paramesochra* sp.				+
Canthocamptidae	*Mesochra schmidti* Mielke, 1974	+			
	Mesochra sp.	+			+
	Heteropsyllus sp.		+		
	Mesopsyllus sp.		+		
	Bathycamptus sp.		+		
Cletodidae	*Cletodes longicaudatus* (Boeck, 1872)				+
	Cletodes sp. (3)		+		+
	Monocletodes sp. (1)		+		
	Stylicletodes sp. (1)		+		
Paranannopidae	*Pseudomesochra* sp. (2)		+		
	Danielssenia quadriseta Gee, 1988		+		
	Danielssenia spitsbergensis Gee et Huys, 1994		+		
	Psammis kliei Smirnov, 1946		+		
	Paradanielssenia kathleenae Gee et Huys, 1994		+		
	Paradanielssenia christineae Gee et Huys, 1994		+		
	Mucrosenia kendalli Gee et Huys, 1994		+		
Huntemanniidae	*Nannopus palustris* Brady, 1880	+			
Rhizothricidae	*Rhizothrix* sp.		+		
Argestidae	*Eurycletodes similis* (T. Scott, 1895)	+			
	Eurycletodes (E) sp. (1)		+		
	Eurycletodes (O) sp. (1)		+		
	Eurycletodes sp.				+
Laophontidae	*Laophonte thoracica* Boeck, 1864	+			+
	Heterolaophonte stroemi (Baird, 1834)			+	+
	Paralaophonte hyperborea (Sars, 1909)	+			
	Paralaophonte spitsbergensis Mielke, 1974	+			
Total number of taxa		26	49	3	21

In the temperate zone, the meiofauna community of intertidal sediments typically comprised about 30 harpacticoid species, with the majority of individuals belonging to three or five dominant species (Huys *et al*. 1996). The composition of harpacticoid fauna of the Svalbard archipelago is very similar to that of the temperate zone. Also the distribution of Harpacticoida of other Arctic localities does not differ significantly from the results presented in this article (Sars 1911, Por 1965). In conclusion it can be said that the harpacticoid fauna of the Svalbard archipelago is not "impoverished" when compared to other localities. The abundance of harpacticoids decreases in relation to depth but the number of species increases,

typically 60–70 species inhabit the continental shelf seas and the individuals are spread more evenly among the species (Huys *et al*. 1996).

We may expect a much higher number of taxa to be discovered after closer examination and more extensive sampling.

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