

Meiofauna of the Koster-area, results from a workshop at the Sven Lovén Centre for Marine Sciences (Tjärnö, Sweden)

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Abstract

During a two-week workshop held at the Sven Lovén Centre for Marine Sciences on Tjärnö, an island on the Swedish west-coast, meiofauna was studied in a large variety of habitats using a wide range of sampling techniques. Almost 100 samples coming from littoral beaches, rock pools and different types of sublittoral sand- and mudflats yielded a total of 430 species, a conservative estimate. The main focus was on acoels, proseriate and rhabdocoel flatworms, rotifers, nematodes, gastrotrichs, copepods and some smaller taxa, like nemertodermatids, gnathostomulids, cyclophorans, dorvilleid polychaetes, priapulids, kinorhynchans, tardigrades and some other flatworms. As this is a preliminary report, some species still have to be positively identified and/or described, as 157 species were new for the Swedish fauna and 27 are possibly new to science. Each taxon is discussed separately and accompanied by a detailed species list.

Keywords: biodiversity, species list, biogeography, faunistics

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Introduction

In 2001 the Swedish Species Information Centre (ArtDatabanken) was commissioned to start a project, designed to run for 20 years, to improve our taxonomical expertise on Swedish organisms.

One part of the project aims to increase our knowledge on marine species of the Swedish west coast. To accomplish this a series of marine inventories was carried out. However, these were mainly focusing on macrobenthic fauna, and therefore a workshop for which a number of meiobentologists

Table 1. Locality data. Samples are numbered according to the date (day in September) and given a running number. Coordinates are given for all localities. In case of dredging samples coordinates of both starting and stopping point are given.

No.	Date	Toponym	Coordinates	
			Start	Stop (if applicable)
2.1	02-09-07	Saltö, Hasslebukten	N 58°52'12.30" E 11°08'28.99"	
3.1	03-09-07	Singlefjord	N 59°00'47.58" E 11°07'46.56"	N 59°00'55.50" E 11°07'15.90"
3.2	03-09-07	Singlefjord, Sandviken	N 59°01'08.70" E 11°07'31.74"	N 59°01'13.26" E 11°07'30.06"
3.3	03-09-07	Singlefjord	N 58°59'54.72" E 11°06'22.08"	N 58°59'50.28" E 11°06'15.06"
3.4	03-09-07	?		
3.5	03-09-07	Hällsö	N 58°56'36.48" E 11°05'18.84"	N 58°56'51.30" E 11°04'51.54"
3.6	03-09-07	Kalkgrund	N 58°55'26.46" E 11°02'25.92"	N 58°55'27.42" E 11°02'37.38"
4.1	04-09-07	Inre Vattenholmen	N 58°52'35.58" E 11°06'39.78"	N 58°52'34.62" E 11°06'46.38"
4.2	04-09-07	Brattskär	N 58°51'55.52" E 11°04'33.30"	
4.3	04-09-07	Brattskär	N 58°51'55.52" E 11°04'33.30"	
4.4	04-09-07	Saltö	N 58°52'04.10" E 11°08'32.00"	
4.5	04-09-07	Saltö	N 58°52'04.30" E 11°08'32.00"	
4.6	04-09-07	Saltö	N 58°52'05.86" E 11°08'32.13"	
4.7	04-09-07	Saltö	N 58°52'10.67" E 11°08'27.54"	
4.8	04-09-07	Saltö	N 58°52'16.57" E 11°08'44.47"	
4.9	04-09-07	Saltö	N 58°52'19.14" E 11°08'46.70"	
4.10	04-09-07	Saltö	N 58°52'21.37" E 11°08'47.75"	
5.1	05-09-07	Skåreskär	N 58°50'18.54" E 11°02'49.08"	N 58°50'16.32" E 11°02'41.52"
5.2	05-09-07	Ullvillarna	N 58°49'22.02" E 11°04'24.24"	N 58°49'25.62" E 11°04'28.62"
5.3	05-09-07	Ullvillarna	N 58°49'23.70" E 11°04'04.38"	N 58°49'31.32" E 11°04'08.52"
5.4	05-09-07	Ullvillarna - Segelskären	N 58°48'11.34" E 11°00'09.96"	N 58°48'04.02" E 11°00'05.46"
5.5	05-09-07	E. Segelskären	N 58°47'39.24" E 10°59'32.16"	N 58°47'39.54" E 10°59'14.76"
5.6	05-09-07	Segelskären	N 58°46'55.02" E 10°59'48.66"	N 58°47'00.96" E 10°59'51.66"
5.7	05-09-07	Segelskären	N 58°46'32.88" E 10°59'18.36"	N 58°46'26.34" E 10°59'04.86"
5.8	05-09-07	Segelskären	N 58°54'20.22" E 10°50'07.62"	N 58°54'22.80" E 10°49'53.04"
5.9	05-09-07	Grisbådarna	N 58°54'51.78" E 10°48'55.38"	N 58°54'59.04" E 10°48'51.90"
5.10	05-09-07	Grisbådarna	N 58°55'22.50" E 10°49'49.26"	N 58°55'10.20" E 10°50'01.92"
5.11	05-09-07	Beach by Saltö Rd	N 58°52'41.45" E 11°07'28.57"	
5.12	05-09-07	Beach by Saltö Rd	N 58°52'41.45" E 11°07'28.57"	
5.13	05-09-07	Saltpannebukten	N 58°52'27.43" E 11°08'44.87"	
5.14	05-09-07	Saltpannebukten	N 58°52'27.43" E 11°08'44.87"	
5.15	05-09-07	Saltpannebukten	N 58°52'28.95" E 11°08'39.74"	
5.16	05-09-07	Saltpannebukten	N 58°52'28.95" E 11°08'39.74"	
5.17	05-09-07	Saltpannebukten	N 58°52'28.95" E 11°08'39.74"	
5.18	05-09-07	Saltpannebukten	N 58°52'33.10" E 11°08'44.89"	
5.19	05-09-07	Tjärnö	N 58°52'58.06" E 11°10'07.70"	
5.20	05-09-07	Tjärnö	N 58°52'58.67" E 11°10'07.84"	
5.21	05-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
5.22	05-09-07	Beach by Saltö Rd	N 58°52'41.45" E 11°07'28.57"	
6.1	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.2	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.3	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.4	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.5	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.6	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	

was invited, was organised in September 2007 at the Sven Lovén Centre for Marine Sciences on the island of Tjärnö.

In this contribution an overview is given of the results of this two-week meiofauna-workshop, which was combined with an intensive course for PhD-students, in order to train future taxonomists. A detailed species list for the selected taxa is given, together with a short discussion for each taxon separately.

Habitat

sand and dead *Fucus*
 silt-mud, 80-87 m, NE of *Lophelia* reef
 silt-sand, 21-28 m, E *Lophelia* reef
 silt-mud, 65-74 m, ridge S of *Lophelia* reef

mud, 63-76 m, Warén dredge
 silty calcareous sand, 15-19 m
Amphioxus sand with shells, 7-25 m
Zostera and silt, 3 m
Zostera and silt, 5 m
 littoral, floating algae and periphyton
 littoral, sand
 detritus on shore
 littoral, algae on rock
 littoral, algae on rock
 rock pool
 littoral, sand
 silt-sand, 12-16 m
 coarse clean sand, 10-18 m
 pebbles
 stones and pebbles, 30-31 m
 large shell fragments, 30-38 m
 stones and pebbles, 11-20 m
 stones and pebbles, 27-40m
 stones and pebbles, 40-43 m
 medium fine sand and shell fragments, 37-40 m, Warén dredge
 medium fine sand and shell fragments, 34-38 m, Warén dredge
 muddy sand, 0.5 m
 coarse sand at waterline
 muddy sand, 0.5-1 m, channel between Tjärnö & Saltö
 muddy sand with *Zostera*, 0.5 m, channel between Tjärnö & Saltö
 muddy sand, 0.5-1 m
 muddy sand, 0.5-1 m
 muddy sand, 0.5-1 m
 muddy sand, 0.5-1 m, by TMBL boathouse
 plankton
 littoral, benthic periphyton
 medium sand, 0-0.3 m
 muddy sand, 1 m, with many cockles
 fine sand between *Zostera*, 1 m
 muddy sand with filamentous algae
 clean fine sand with ripple marks, 0.2-0.4 m
 muddy sand, 1 m
 fine sand, 0.5 m
 fine sand with detritus, 0.5 m

Material and methods

In September 2007 a meiofauna workshop was organised by the Swedish Species Information Centre (ArtDatabanken) at The Sven Lovén Centre for Marine Sciences on the island of Tjärnö – the former Tjärnö Marine Biological Laboratory or TMBL – on the Swedish west coast.

Since work space was rather limited not all taxa belonging to the meiofauna were covered. During the workshop the main focus was on acoels, proseriate and rhabdocoel flatworms, rotifers, nematodes, gastrotrichs, copepods and some smaller taxa, like nemertodermatids, gnathostomulids, cyclophorans, dorvilleid polychaetes, priapulids, kinorhynchans, tardigrades and some other flatworms.

During a two-week period (2-14 September 2007) the meiofauna was sampled in a variety of habitats ranging from littoral beaches and rock pools to sublittoral mudflats. Detailed information on all sampling localities is given in Tab. 1. The sample localities can be divided into two categories. Littoral samples were mostly taken by hand or a plankton-net in the immediate surroundings of the Tjärnö lab, whereas sublittoral samples were taken by boat using a dredge or Warén sledge in the Koster area. For the latter samples coordinates for both locations, the starting and stopping point of dredging, are given in Tab. 1. One locality (9.1 Bohus-Malmön) is not situated in the Koster area, but approximately 70 km south of the Tjärnö lab. Two more localities are not mentioned in Tab. 1. A number of individuals of *Nephrops norvegicus* (Linnaeus, 1758) that had been caught commercially in the Koster area, has been examined on the presence of symbionts. No details on the exact location and dates of the catch of the lobsters is available. A second sampling site, not mentioned in Tab. 1, is the bacterial film present on samples taken from a Minke whale (*Balaenoptera acutorostrata* Lacépède, 1804) carcass and kept in petridishes in cool conditions (see Dahlgren et al. 2006 for details).

Sediment, collected either by hand or by dredging, was kept in large plastic boxes and stored at a constant temperature ($\pm 15^\circ\text{C}$). Animals were extracted, mainly using two different methods: MgCl_2 -decantation or by siphoning off the water just above the sediment. Algae samples were rinsed with MgCl_2 . Live material was studied using dissecting and light-microscopes. Material for identification and/or descriptive purposes

was preserved using methods appropriate for the respective taxon.

Collected material will be deposited in the collections of the Swedish Natural History Museum in Stockholm.

Results and remarks

All results are given and discussed in detail per taxon. Tab. 2 gives a complete overview of the results, with the number of species new to science being a conservative estimate.

Table 1. Locality data (continued).

No.	Date	Toponym	Coordinates	
			Start	Stop (if applicable)
6.7	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.8	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.9	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.10	06-09-07	Saltö, Hasslebukten	N 58°52'08.40" E 11°08'27.84"	
6.11	06-09-07	Sillebukten	N 58°52'45.04" E 11°07'22.91"	
6.12	06-09-07	Saltö Island, Sillebukten	N 58°52'39.72" E 11°07'31.77"	
6.13	06-09-07	Saltö Island, Sillebukten	N 58°52'45.04" E 11°07'22.91"	
6.14	06-09-07	Saltö Island, Sillebukten	N 58°52'45.04" E 11°07'22.78"	
6.15	06-09-07	TMBL	N 58°52'32.89" E 11°08'44.45"	
6.16	06-09-07	TMBL	N 58°52'32.99" E 11°08'44.45"	
7.1	07-09-07	Inre Vattenholmen	N 58°52'34.02" E 11°06'40.56"	N 58°52'33.96" E 11°06'45.06"
7.2	07-09-07	Hättorna	N 58°50'57.96" E 11°07'29.70"	N 58°50'52.62" E 11°07'31.68"
7.3	07-09-07	Gofferholmarna	N 58°50'13.02" E 11°08'00.42"	N 58°50'16.08" E 11°08'08.58"
7.4	07-09-07	Arsklävet	N 58°49'45.12" E 11°08'16.74"	N 58°49'48.00" E 11°08'16.20"
7.5	07-09-07		N 58°49'53.40" E 11°08'11.94"	N 58°50'00.48" E 11°08'09.06"
7.6	07-09-07	Tegelskär	N 58°52'05.76" E 11°05'14.70"	N 58°51'53.76" E 11°05'06.06"
7.7	07-09-07	N. Tegelskär	N 58°52'05.04" E 11°04'57.96"	N 58°52'13.08" E 11°04'42.36"
7.8	07-09-07	SO Yttre Vattenholmen	N 58°52'13.20" E 11°06'34.98"	N 58°52'29.58" E 11°06'36.72"
7.9	07-09-07	Inre Vattenholmen	N 58°52'36.00" E 11°06'53.40"	
7.10	07-09-07	Strömstad	N 58°55'36.21" E 11°11'47.78"	
7.11	07-09-07	Strömstad	N 58°55'35.47" E 11°11'43.02"	
7.12	07-09-07	Strömstad	N 58°55'36.21" E 11°11'46.59"	
8.1	08-09-07	Saltö, Hasslebukten	N 58°52'41.45" E 11°07'28.57"	
8.2	08-09-07	Saltö Island, Katholmen	N 58°51'59.14" E 11°08'25.96"	
9.1	09-09-07	Bohus-Malmön, Klävbergs Holme	N 58°20'21.65" E 11°20'28.29"	
9.2	09-09-07	Saltö	N 58°52'36.90" E 11°08'20.94"	
9.3	09-09-07	Beach by Saltö Rd	N 58°52'41.45" E 11°07'28.57"	
9.4	09-09-07	Beach by Saltö Rd	N 58°52'41.45" E 11°07'28.57"	
9.5	09-09-07	Tjärnö, Lindholmen	N 58°53'21.67" E 11°08'15.39"	
9.6	09-09-07	Tjärnö, Lindholmen	N 58°53'22.39" E 11°08'21.91"	
9.7	09-09-07	Saltö, Kattholmen	N 58°52'05.38" E 11°08'31.97"	
10.1	10-09-07	Lilleskärsslätten	N 58°52'58.02" E 11°06'33.00"	N 58°53'13.44" E 11°06'12.96"
10.2	10-09-07	Inre Vattenholmen	N 58°52'35.58" E 11°06'39.78"	N 58°52'34.62" E 11°06'46.38"
10.3	10-09-07	Saltö, Hasslebukten	N 58°52'41.45" E 11°07'28.57"	
11.1	11-09-07	Kalkgrund	N 58°55'25.14" E 11°02'21.72"	N 58°55'25.50" E 11°02'26.04"
11.2	11-09-07	Kalkgrund	N 58°55'27.00" E 11°02'24.78"	N 58°55'26.34" E 11°02'33.48"
11.3	11-09-07	Kalkgrund	N 58°55'24.96" E 11°02'24.72"	N 58°55'29.40" E 11°02'30.24"
11.4	11-09-07	Kalkgrund	N 58°55'23.70" E 11°02'29.82"	N 58°55'25.86" E 11°02'37.56"
11.5	11-09-07	Kostergrund	N 58°52'16.32" E 11°04'59.10"	N 58°52'20.04" E 11°04'59.94"
11.6	11-09-07	TMBL	N 58°52'32.96" E 11°08'44.45"	
11.7	11-09-07	TMBL	N 58°52'32.96" E 11°08'44.45"	
12.1-2	12-09-07	Lilleskärsslätten	N 58°52'58.02" E 11°06'33.00"	N 58°53'13.44" E 11°06'12.96"
12.3	12-09-07	Inre Vattenholmen	N 58°52'35.58" E 11°06'39.78"	N 58°52'34.62" E 11°06'46.38"
12.4	12-09-07	Tjärnö, Galteryggen Bay	N 58°53'28.25" E 11°08'58.17"	
13.1	13-09-07	Bofors camping beach	N 58°52'51.35" E 11°08'30.23"	
13.2	13-09-07	Saltö	N 58°52'20.16" E 11°08'20.22"	
13.3	13-09-07	Saltö	N 58°52'22.86" E 11°08'36.00"	

Acoela and Nemertodermatida (Tab. 3)

These two taxa, formerly classified within Platyhelminthes, but currently regarded as separate basal bilaterian clades (Jondelius et al. 2002, Wallberg et al. 2007), have a long history of taxonomic study in Swedish waters. In a series of papers Westblad (1940, 1942, 1945, 1946, 1948) described a large number of acoel species and higher taxa

Habitat

fine sand with detritus, 0.5 m
 medium fine sand
 shell fragments and sand, 0.3 m
 coarse sand, 0.2 m
Enteromorpha
 among reeds
 filamentous algae on rock
 floating macroscopic algae
 floating algae
 floating algae
Amphioxus sand, 7-24 m
 sand, 23-28 m
 sand, 11-16 m
 sand, 14-19 m
 7-11 m
 50-60 m
 45-53 m, Warén dredge
 30-53 m, Warén dredge
 4-5 m, freediving hand samples
 shallow lagoon, plankton among reeds
 shallow lagoon, plankton
 littoral, periphyton

medium to medium-fine clean sand, 0-1.5 m
 sandy beach on tombolo, 0.1-0.2 m
 barnacles, 0.2 m
 fine muddy sand, 1 m
 coarse sand in between large pebbles, 0.5 m
 algal feltrum
 littoral, floating algae
 rock pool
 muddy sand, 41-31 m, Warén dredge
Amphioxus sand with shells, 7-25 m
Fucus and green algae with sand
 sandy mud, 23-38 m
 shell gravel, 15-18 m
 sandy shell gravel, 17-23 m
 shells and silty sand, 17-20 m
 mud with sand, 29-36 m, Warén dredge
 plankton
 algae on rock
 mud with sand, 41-31 m, Warén dredge
Amphioxus sand with shells, 7-25 m
 sediment and algae in rock pool
 sandy beach
 sand
 mussels and barnacles, 0.5 m

from Swedish and Norwegian waters with a bias toward the Gullmar fjord area. Westblads' studies are unique since he sampled extensively in the sublittoral: a large number of species inhabiting deeper waters are therefore known from Sweden. Taxonomic studies of Acoela relevant to the study area were later carried out by Dörjes (1968), who described a number of species from the littoral of Sylt in the North Sea. After the work of Dörjes, little taxonomic work has been done on Acoela and Nemertodermatida in the study area. Nemertodermatida were treated by Sterrer (1998a) on a global scale reporting records from Swedish waters. New species of Acoela were later described by Tekle (2004) and Tekle et al. (2006).

All in all about 55 species of Acoela and 4 species of Nemertodermatida were known from Sweden prior to the workshop. The twenty species of Acoela found during the workshop includes a minimum of five species new to science and three species not previously recorded from Swedish waters. Four undescribed species belong to the problematic group Mecynostomidae. The taxonomy of Nemertodermatida is problematic with broadly defined nominal species (Sterrer 1998a). Five species of Nemertodermatida were collected including two that cannot be identified as any described species.

Clearly the Swedish acoel and nemertodermatid fauna is still incompletely known; a relatively limited two-week effort yielded a 15 % increase in number of recorded species. The offshore sampling site at Grisbådarna yielded four new

Table 2. Overview of results.

	Total	New for Sweden	New to science
Acoela	20	8	5
Nemertodermatida	6	3	2
Proseriata	21	15	3
Rhabdoceola	35	11	3
Platyhelminthes-others	9	3	0
Gnathostomulida	3	0	0
Rotifera-Monogononta	23	9	0
Cycliophora	1	0	0
Polychaeta-Dorvilleidae	6	0	0
Nematoda	95	16	?
Priapulida	2	1	1
Kinorhyncha	6	1	0
Gastrotricha	32	20	?
Tardigrada	6	2	0
Copepoda	165	68	13
	430	157	27

species indicating that future collecting efforts should be directed at sublittoral shell gravel sediments, which seem to be repositories of marine meiofauna diversity.

Platyhelminthes – Proseriata (Tab. 4)

The composition of Proseriata in Swedish waters has so far received very limited attention. The low number of species known (10 according to Karling 1974) is therefore deemed as unrepresentative, for the sheer size of the country and the diversity of

Table 3. Acoela and Nemertodermatida. Taxonomy at family level is traditional (see Tyler et al., 2005) Distributional data based on Westblad 1940, 1942, 1945, 1946 and 1948; Dörjes 1968; Dörjes and Karling 1975 and own observations.

	Localities	New for Swedish fauna	Known distribution
Acoela			
?			
Acoel with hard structures in parenchyma	09.01	×	
Actinoposthiidae			
<i>Philactinoposthia saliens</i> (Graff, 1882)	10.2		NE Atlantic, Baltic, Adriatic
<i>Philactinoposthia</i> n. sp.	10.2	×	
Anaperidae			
<i>Anaperus rubellus</i> Westblad, 1945	5.9		NE Atlantic, Adriatic
Childiidae			
<i>Childia macroposthium</i> (Steinböck, 1931)	12.01		NE Atlantic, Adriatic
<i>Childia submaculatum</i> (Westblad, 1942)	10.1, 12.1, 3.5		NE Atlantic, Adriatic
<i>Childia triangulifera</i> (Westblad 1942)	12.1		N Atlantic, Adriatic
Diopisthoporidae			
<i>Diopisthoporus longitubus</i> Westblad, 1940	12.1		Swedish and Norwegian west coasts, Adriatic
Haploposthiidae			
<i>Haplogonaria viridis</i> Dörjes, 1968	4.2	×	Helgoland
<i>Haploposthia lactomaculata</i> Tekle, 2004	12.1		Swedish west coast
<i>Haploposthia rubropunctata</i> Westblad, 1945	3.5		NE Atlantic, Adriatic
Isodiametridae			
<i>Archaphanostoma macrospiriferum</i> (Westblad, 1946)	8.1		Swedish west coast, Helgoland
Mecynostomidae			
<i>Mecynostomum</i> n. sp. 1	5.9	×	
<i>Mecynostomum</i> n. sp. 2	3.6	×	
<i>Paedomecynostomum</i> n. sp.	5.9	×	
<i>Paramecynostomum diversicolor</i> (Ørsted, 1845)	7.1, 5.15		North Atlantic, Mediterranean, Japanese coast
<i>Pseudmecynostomum bruneum</i> Dörjes, 1968	7.1		Helgoland, Sylt
<i>Pseudmecynostomum</i> n. sp.	Whale bone bacterial film	×	
Otocelididae			
<i>Notocelis gullmarensis</i> (Westblad, 1946)	5.15		North Atlantic
Solenofilomorphidae			
<i>Endocincta punctata</i> Crezee, 1975	5.9	×	Western Atlantic (North Carolina)
Nemertodermatida			
Ascopariidae			
<i>Ascoparia neglecta</i> Sterrer, 1998	6.6	×	Western Atlantic (Florida)
<i>Flagellophora apelti</i> Faubel & Dorjes, 1978	11.3, 5.9, 7.3, 11.4		North Atlantic, Adriatic, New Guinea
Nemertodermatidae			
<i>Nemertoderma</i> n. sp. 1	5.9, 5.10, 11.4	×	
<i>Nemertoderma</i> n. sp. 2	5.9	×	
<i>Nemertoderma westbladi</i> (Westblad, 1937)	3.5, 10.1, 12.1		N Atlantic, Mediterranean
<i>Sterreria psammicola</i> (Sterrer, 1970)	11.5		North Atlantic, Adriatic, Zanzibar, New Guinea, Australia

habitats present, and in comparison with about 80 species known for the North East Atlantic as a whole (Curini-Galletti 2001). As expected, research focussed on the taxon in the Tjärnö-area during the meiofauna-workshop resulted in a substantial increase in the number of species known for the Swedish coasts: out of a total of 20 proseriate species found, 15 are in fact reported for the first time for Sweden (Tab. 4). At present, 25 species of Proseriata are known for Sweden. Among the species reported by Karling (1974), *Paramonotus hamatus* (Jensen, 1878), *Minona baltica* Karling & Kinnander, 1953 and *Coelogympora schulzii* Meixner, 1938 were not found during the survey; furthermore, *Bothriomolus balticus* Meixner, 1938, collected in the spring on Saltö beach in previous years (Jonelius pers. com.), was not found, at least in the mature stage, in September 2007. One more species reported for Sweden, *Otomesostoma auditivum* (Du Plessis, 1874), is restricted to fresh water. One may question, however, how representative of the Swedish fauna is the number of species found during the survey. The mixed sediments prevalent in the Tjärnö-area are in fact not optimal for Proseriata,

many species of which are partial to well sorted, medium to coarse sediments (Reise, 1988). The lack of suitable habitats may thus have prevented the finding in the area of most representatives of the extremely rich and diversified coelogymporan fauna of the North East Atlantic, many species of which are known for the Baltic coasts of Germany (Karling 1974), and likely to occur elsewhere in Sweden. Furthermore, most of the few specimens of Proseriata found in the deeper water samples were immature, and only rarely and tentatively attributable to known genera or species, suggesting that research performed in different seasons (as further documented by the case of *B. balticus* cited above) may yield additional species.

Among the species found, a few are new to science, and await formal description. The most striking finding is a monocelidid n. gen. n. sp. found on the maxillipeds of the lobster *Nephrops norvegicus* (Linnaeus, 1758), where it feeds on the ectosymbiont fauna present, and most notably on the cycliophoran *Symbion pandora* Funch & Kristensen, 1995. *Coelogympora* n. sp., unusually for the genus, occurs in subtidal, low-energy

Table 4. Platyhelminthes – Proseriata. Taxonomy follows Tyler et al. (2005).

	Localities	New for Swedish fauna	Known distribution
Monocelididae			
<i>Archiloa westbladi</i> Ax, 1954	8.2	×	NE-Atlantic
<i>Archilopsis unipunctata</i> (Fabricius, 1826)	5.21, 8.2, 13.1		NE-Atlantic, Iceland, E Canada
<i>Archilopsis spinosa</i> (Jensen, 1878)	8.2	×	NE-Atlantic, the Channel
<i>Boreocelis</i> juv. cf. <i>filicauda</i> Westblad, 1952	5.9	×	NE-Atlantic
<i>Duplominona septentrionalis</i> Martens, 1983	5.9, 10.2	×	NE-Atlantic
<i>Monocelis fusca</i> Orsted, 1843	8.2, 13.1	×	NE-Atlantic, Iceland, E Canada
<i>Monocelis</i> n. sp. (<i>M. fusca</i> complex)	12.4	×	
<i>Monocelis lineata</i> (O.F. Muller, 1774) "pigmented"	5.21		see text
<i>Monocelis lineata</i> (O.F. Muller, 1774) "unpigmented"	5.12		see text
<i>Monocelopsis otoplanoides</i> Ax, 1951	8.2	×	NE-Atlantic
<i>Monotoplana diorchis</i> Meixner, 1938	5.9, 5.10	×	see text
Monocelididae n. gen. n. sp.	on lobsters	×	
<i>Promonotus schultzei</i> Meixner, 1943	8.2, 13.1, 5.14		NE-Atlantic
Coelogymporidae			
<i>Coelogympora biarmata</i> Steinbock, 1924	8.2, 5.21		NE-Atlantic, Black Sea
<i>Coelogympora gynocotyla</i> Steinbock, 1924	8.2, 5.21	×	NE-Atlantic
<i>Coelogympora</i> n. sp.	10.2	×	
Otoplanidae			
<i>Itaspiella helgolandica</i> (Meixner, 1938)	5.12, 8.2, 5.21	×	NE-Atlantic
<i>Monostichoplana</i> juv. cf. <i>filum filum</i> (Meixner, 1938)	5.9, 12.3	×	NE-Atlantic
<i>Philosyrtis fennica</i> Ax, 1954	4.1	×	NE-Atlantic
<i>Pseudorthoplana foliacea</i> (Meixner, 1938)	4.1, 5.2	×	see text
<i>Pseudosyrtis subterranea</i> (Ax, 1951)	4.1		NE-Atlantic

muddy habitats. A further new species belongs to the *Monocelis fusca* Ørsted, 1843 complex, and is distinguishable from the nominal species, present in the Tjärnö-area as well, by karyotype, size of the accessory stylet, and habitat choice. The *Monocelis lineata* (O. F. Muller, 1774) complex is present with two “forms”, with and without pigmented eye spot, occurring in different sediments. Studies aimed to assess the taxonomic status of North East Atlantic populations of the complex are presently in progress, and the two “forms” are provisionally listed separately in table 4.

From a biogeographical point of view, most species found, appear to have distributions limited to the Scandinavian and North Sea area (including, in a few cases, the Channel). The only species with wider ranges either belong to

species-complexes, still in course of study, such as *M. lineata*, or, as in the cases of *Pseudorthoplana foliacea* (Meixner, 1938) and *Monotoplana diorchis* Meixner, 1938, the specimens found differed from the Mediterranean populations attributed to the species in chromosome number. A thorough taxonomic revision is certainly needed before any decision of the status of these populations can be attained. In the case of *Coelogyropora biarmata* Steinböck, 1924, known for the north East Atlantic and the Black Sea (Ax 1959; pers.obs.), an accidental introduction of the species (as well as of many others, cf. Zolotarev 1996) in the latter area has been suggested (Curini-Galletti & Casu 2003).

Overall, data confirm the high level of endemicity of proseriate faunas. Given that in most

Table 5. Platyhelminthes – Rhabdocoela. Taxonomy at family level is traditional (see Tyler et al. 2005 for an overview), whereas higher-level taxonomy follows Willems et al. (2006). Distributional data based on Graff 1913; Karling 1953, 1956a,b, 1963, 1967, 1974, 1982, 1983a,b, 1985; Brunet 1966; Ehlers 1972, 1974; Karling & Schockaert 1975, 1977; Ax & Armonies 1987; Willems et al. 2004, 2007; Artois 2008; Krzrnaric et al. in press.

	Localities	New for Swedish fauna	Known distribution
Cicerinidae			
<i>Cicerina brevicirrus</i> Meixner, 1928	6.1-10		NE-Atlantic, Baltic Sea
<i>Ethmorhynchus anophthalmus</i> Meixner, 1938	10.1		NE-Atlantic and adjacent waters, Baltic Sea
<i>Zonorhynchus seminascatus</i> Karling, 1956	6.1-10		North and Baltic Sea, Skagerrak
Cytocystidae			
<i>Cytocystis clittelatus</i> Karling, 1953	3.6		Skagerrak
Gnathorhynchidae			
<i>Odontorhynchus aculeatus</i> Karling, 1956	7.2		Skagerrak
<i>Paragnathorhynchus subterraneus</i> Meixner, 1938	9.1	×	Baltic Sea
Polycystididae			
<i>Acrorhynchides caledonicus</i> (Claparède, 1861)	10.3		NE-Atlantic
<i>Brunetorhynchus microstylis</i> Krzrnaric et al., in press	3.6	×	Mediterranean Sea
<i>Gynatrix hermaphroditus</i> Ehrenberg, 1831 species complex	4.1		cosmopolitan (incl. limnic habitats)
<i>Mesorhynchus terminostylus</i> Karling, 1956	10.1		NE-Atlantic and adjacent waters, Baltic Sea
<i>Paulodora contorta</i> (Schockaert & Karling, 1975)	5.10, 7.2	×	NE-Atlantic, W-Mediterranean Sea
<i>Phonorhynchus helgolandicus</i> (Mecznikow, 1865)	10.3		N-Atlantic and adjacent waters, Alaska, Bering Strait
Polycystididae n. sp.			
<i>Rogneda anglica</i> Karling, 1953	12.1-2		NE-Atlantic and adjacent waters
<i>Scanorhynchus forcipatus</i> Karling, 1955	6.1-10		NE-Atlantic and adjacent waters, California, Seas of Japan and Okhotsk
Psammorhynchidae			
<i>Psammorhynchus tubulipenis</i> Meixner, 1938	6.1-10		North and Baltic Sea, Skagerrak
Karkinorhynchidae			
<i>Cheliplana rubescens</i> Brunet, 1966	7.2		W-Mediterranean Sea
<i>Cheliplanilla caudata</i> Meixner, 1938	6.1-10		North, Baltic and Mediterranean Sea, Skagerrak

areas of the world research on the taxon is scanty or nil, current estimates of about 400 species of Proseriata worldwide (cf Curini-Galletti 2001) are thus far from being representative of the actual contribution of the taxon to marine biodiversity.

Platyhelminthes – Rhabdocoela (Tab. 5)

This species-rich taxon of flatworms is studied rather well in marine habitats throughout Sweden (e.g. Karling 1956a,b, 1963, 1974; Luther 1962, 1963; Willems et al. 2007). Out of a current estimate of 1600 species of Rhabdocoela worldwide, slightly more than 10 % is reported from Sweden, ca. 190 species in total, with ca. 140 of them confined to marine and brackish habitats.

Most of what is known of strictly marine rhabdocoels in Sweden is due to extensive research in the Kristineberg-area (Gullmaren), which is situated on the Swedish west coast only 80 km south of the present study area. However, the

Tjärnö-area has a wider diversity in habitats and therefore it is not surprising that during the meiofauna-workshop a total of 35 species of Rhabdocoela were collected, including three species new for science and eight species reported from Sweden for the first time (see Tab. 5). Interestingly, one of the new species, *Brunetorhynchus microstylis* Krznicaric et al. (in press) is already known to occur in the Mediterranean (Schockaert, pers. comm.), but was only formally described (Krznicaric et al., in press), coinciding with the workshop. Therefore the Swedish record is included in Krznicaric et al. (in press). Of the remaining two new species (a polycystidid or koinocystidid and a promesostomid), unfortunately no material could be retrieved, making a description impossible. Furthermore, one species of Solenopharyngidae Graff, 1882 could not be positively identified, but since it was distinctly different from the two other solenopharyngid species, it is included in Tab. 5 for the sake of completeness.

Table 5. Platyhelminthes – Rhabdocoela (continued).

	Localities	New for Swedish fauna	Known distribution
Schizorhynchidae			
<i>Carcharodorhynchus subterraneus</i> Meixner, 1938	3.6, 5.10, 7.2		NE-Atlantic and adjacent waters
<i>Proschizorhynchus gullmarensis</i> Karling, 1950	2.1		NE-Atlantic and adjacent waters, Baltic, Mediterranean and Black Sea
Byrsophlebeidae			
<i>Byrsophlebs dubia</i> (Ax, 1956) Karling, 1985	5.9	×	North, Baltic and Mediterranean Sea
Promesostomidae			
<i>Promesostoma marmoratum</i> (Schultze, 1851)	10.3		N-Atlantic, Mediterranean Sea
<i>Promesostoma neglectum</i> Karling, 1967	5.10, 13.1		NE-Atlantic, Skagerrak
<i>Promesostoma rostratum</i> Ax, 1951	5.15, 6.1-10, 8.1	×	N-Atlantic, North and Baltic Sea
Promesostomidae n. sp.	7.2	×	
Solenopharyngidae			
<i>Doliopharynx geminocirro</i> Ehlers, 1972	3.6	×	North Sea
<i>Lenopharynx bathos</i> Willems, Sandberg & Jondelius, 2007	7.3		Skagerrak
Solenopharyngidae sp.	3.6	?	
Trigonostomidae			
<i>Mariplanella frisia</i> Ax & Heller, 1970	5.10	×	North and Baltic Sea
<i>Proxenetes quinquespinosus</i> Ax, 1971	6.1-10	×	North and Baltic Sea
<i>Proxenetes trigonus</i> Ax, 1960	5.10	×	North and Baltic Sea
<i>Trigonostomum armatum</i> (Jensen, 1878)	4.1, 10.3		NE-Atlantic and adjacent waters, Curaçao, S-Georgia, E-Australia
<i>Trigonostomum venenosum</i> (Uljanin, 1870)	5.9		NE-Atlantic and adjacent waters, Mediterranean and Black Sea, Kerguelen
Provorticidae			
<i>Provortex karlingi</i> Ax, 1951	4.1, 10.3		NE-Atlantic, North and Baltic Sea, Skagerrak
<i>Provortex tubiferus</i> Luther, 1948	6.1-10		NE-Atlantic, North and Baltic Sea, Skagerrak

From a biogeographical point of view, only a few records really stand out. Most species collected around Tjörnö have a northern Atlantic (including adjacent waters as the North and Baltic Sea) or an even wider distribution pattern. A few species (*Cytocystis littellatus* Karling, 1953, *Odontorhynchus aculeatus* Karling, 1956 and *Lenopharynx bathos* Willems et al. 2007) seem to be restricted to Skagerrak (Karling 1953, 1956b; Willems et al. 2007). Apart from *B. microstylis*, yet another species, *Cheliplana rubescens* Brunet, 1966, is currently only known from the Mediterranean Sea (Brunet 1966).

Platyhelminthes – remaining taxa (Tab. 6)

Although the remaining platyhelminth taxa were not studied in great detail, an overview of identified species is given in Tab. 6.

A few specimens of the rare marine catenulids were found and tentatively identified as belonging to the taxon *Retronectes* Sterrer & Rieger, 1974. Two

species and several unidentified taxa are known from the Kristineberg-area (Sterrer & Rieger 1974). Seven species of Prolecithophora were collected, two of them new for the Swedish fauna. Furthermore *Haplopharynx rostratus* Meixner, 1938, formerly classified within Macrostromida, is new for Sweden.

No attention was given to representatives of the taxa Macrostromidae and Polycladida, due to lack of expertise for both taxa and the fact that the latter taxon does not form part of the meiofauna.

Gnathostomulida (Tab. 7)

One of the more recently described phyla (Ax 1956, Riedl 1969), Gnathostomulida was known with two genera and four species until Sterrer (1966a,b, 1969) described three more genera, with 12 new species, from Kristineberg (Gullmaren). Nearly 100 species in 26 genera are now known from around the world (Sterrer 2001, 2006), in-

Table 6. Platyhelminthes – Others. Taxonomy according to Tyler et al. (2005).

	Localities	New for Swedish fauna	Known distribution
Catenulida			
Retronectidae			
<i>Retronectes</i> sp.	6.6, 8.1		
Haplopharyngida			
Haplopharyngidae			
<i>Haplopharynx rostratus</i> Meixner, 1938	9.1	×	Sylt, Helgoland, Scilly Islands
Prolecithophora			
Cylindrostomidae			
<i>Euxinia baltica</i> Meixner, 1938	5.9		NE Atlantic
<i>Monoophorum tubiferum</i> (Westblad, 1955)	3.6	×	Norwegian W coast, Isles of Scilly
Plagiostomidae			
<i>Plagiostomum album</i> Hyman, 1938	3.6		North Atlantic, Adriatic
<i>Plagiostomum cuticulata</i> Brandtner, 1934	3.5		NE Atlantic
<i>Plagiostomum ochroleucum</i> Graff, 1882	3.5		NE Atlantic
<i>Plagiostomum striatum</i> Westblad, 1956	10.1		NE Atlantic
Scleraulophoridae			
<i>Scleraulophorus cephalatus</i> Karling, 1940	5.9	×	Norway, British Isles

Table 7. Gnathostomulida. Taxonomy follows Sterrer (1972) and Sørensen et al. (2006). Distributional data based on Sterrer (1969) and Sterrer (1998b).

		Localities	New for Swedish fauna	Known distribution
Haplognathiidae	<i>Haplognathia filum</i> (Sterrer, 1966)	5.10bis, 6.6		Skagerrak
Pterognathiidae	<i>Pterognathia swedmarki</i> Sterrer, 1966	6.6, 6.8		N-Atlantic
Gnathostomulidae	<i>Gnathostomula paradoxa</i> Ax, 1956	5.10bis, 6.6, 6.8, 9.1bis		North Sea

cluding a large number with circumtropical or cosmopolitan distribution. Of the three species encountered at Tjärnö, only one (*Pterognathia swedmarki* Sterrer, 1966) has also been reported from outside the NE-Atlantic (Sterrer 1998b).

Rotifera (Tab. 8)

Rotifers are microscopic aquatic animals that comprise about 2000 species. Most rotifer species live in freshwater and limno-terrestrial habitats, and only about 400 species have been found in saline waters (Fontaneto et al. 2006, 2007; Segers 2008). Surprisingly, very few faunistic and taxonomic studies dealt with marine rotifers, and most of the present knowledge on rotifer distribution is limited to the freshwater habitat.

The geographical distribution of the brack-

ish and marine rotifers largely reflects the distribution of rotifer investigators, therefore, no biogeographical comparison can be performed. Nevertheless, the Baltic and North Sea have been among the first areas to be studied (Remane 1929), and the best known areas up to now. No specific investigation has ever been performed in Sweden for marine rotifers, but some data are available for Norway, Finland and Denmark (Fontaneto et al. 2006).

The Tjärnö-area has a wide diversity of littoral habitats and about 2000 individuals were collected during the meiofauna-workshop, mostly sampling littoral sand, rock pools, algae (both floating ashore and on rocks), and plankton, while samples from deeper waters yielded very few individuals. Overall, 23 species of rotifers were identified. The richest species assemblages were

Table 8. Rotifera – Monogononta. Distributional data based on Fontaneto et al. (2006).

	Localities	New for Swedish fauna	Known distribution
Ploima			
Dicranophoridae			
<i>Aspelta clydona</i> Harring & Myers, 1928	5.19, 6.15, 6.16, 7.10, 7.11, 7.12, 9.6, 11.7		Arctic, North and Baltic Sea, British Channel
Notommatidae			
<i>Cephalodella</i> sp.	7.11, 7.12	?	
Lepadellidae			
<i>Colurella adriatica</i> Ehrenberg, 1831	4.1, 4.4, 4.6, 4.7, 4.8, 4.9, 4.10, 5.19, 5.20, 6.15, 6.16, 7.10, 7.11, 7.12, 9.5, 9.6, 9.7, 11.7		North and Baltic Sea, Black Sea, British Channel, Indian Ocean, Japanese Sea, Mediterranean, NE-Atlantic, SE-Atlantic, SW-Atlantic
<i>Colurella colurus</i> (Ehrenberg, 1830)	4.1, 4.4, 4.5, 4.6, 4.7, 4.8, 4.10, 6.12, 6.13, 6.14, 6.15, 6.16, 7.10, 7.11, 9.6, 12.4		Antarctica, Arctic, North and Baltic Sea, Black Sea, British Channel, Indian Ocean, Mediterranean, NE Atlantic, NW Atlantic, SE Atlantic
<i>Colurella dicentra</i> (Gosse, 1887)	4.5, 4.7, 6.12	×	North and Baltic Sea, Black Sea, Mediterranean, NW Atlantic
Dicranophoridae			
<i>Encentrum algente</i> Harring, 1921	4.4, 4.6, 4.7, 4.8, 5.20, 6.15, 6.16, 11.7	×	Antarctica, Arctic, North and Baltic Sea
<i>Encentrum bidentatum</i> (Lie-Pettersen, 1906)	9.7	×	North and Baltic Sea
<i>Encentrum limicola</i> Otto, 1936	11.7	×	Arctic, North and Baltic Sea
<i>Encentrum marinum</i> (Dujardin, 1841)	4.1, 4.4, 4.6, 4.8, 4.9, 4.10, 5.19, 5.20, 6.14, 6.15, 6.16, 7.11, 7.12, 9.6, 11.7, 12.4		Antarctica, Arctic, North and Baltic Sea, Black Sea, British Channel, Indian Ocean, Mediterranean, NE Atlantic, New Zealand, NW Atlantic
<i>Encentrum</i> sp.	9.7	?	
Lindiidae			
<i>Lindia gravitata</i> (Lie-Pettersen, 1906)	4.10, 6.6, 6.8, 7.11	×	North and Baltic Sea
<i>Lindia tecusa</i> Harring & Myers, 1922	4.1, 6.6, 6.8, 7.10, 7.11		North and Baltic Sea, Black Sea, NE-Atlantic

those of two plankton samples among floating algae in brackish lagoons, with 10 and 13 species. The sample with the highest abundance of rotifers was a 250 ml sample from a rock pool, with hundreds of individuals of 6 different species. Two species could be identified to genus level only, due to insufficient material.

Interesting records were *Proales syltensis* Tzschaschel, 1978, first record after its description from the North Sea (De Smet 1996), and *Testudinella obscura* Althaus, 1957, new for the Baltic Sea. Other interesting species were *Lindia gravitata* (Lie-Pettersen, 1906) and *L. tecusa* Harring & Myers, 1922, often co-occurring in the same sample. The taxonomic validity of the former species has been confirmed only recently, and its distribution seems to be limited to the North and Baltic Sea (De Smet 2005).

Only monogonont rotifers were found, and no bdelloids, confirming that they are not common in marine habitats.

Cycliophora (Tab. 9)

The exclusively marine phylum Cycliophora was described by Funch & Kristensen (1995) and currently comprises only two species. *Symbion pandora* Funch & Kristensen, 1995 is described from the mouth limbs of the Norwegian lobster, *Nephrops norvegicus*, where the microscopical animals live attached as commensals (Funch & Kristensen 1995, Kristensen 2002) or as free-living stages (Funch 1996, Obst & Funch 2003). Recently, a new species, *Symbion americanus* Obst, Funch & Kristensen, 2006, was described from the mouth parts of the American lobster, *Homarus americanus* (Obst et al. 2006). However, molecular data show that the cycliophorans on the American lobster consist of three cryptic species (Obst et al. 2005). Furthermore, the European lobster, *Homarus gammarus* has both *Symbion pandora* and a large undescribed species.

The phylogenetic position of Cycliophora has been much debated since their discovery

Table 8. Rotifera – Monogononta. (continued).

	Localities	New for Swedish fauna	Known distribution
Brachionidae			
<i>Notholca bipalium</i> /liepetterseni	7.10, 7.11, 7.12		Arctic, North and Baltic Sea, Mediterranean, NW-Atlantic
Proalidae			
<i>Proales halophila</i> Remane, 1929	4.4, 4.7, 4.8, 4.10, 6.12, 6.13, 6.15, 6.16, 9.7, 11.7	×	Antarctica, Arctic, North and Baltic Sea, Black Sea, British Channel
<i>Proales reinhardti</i> (Ehrenberg, 1834)	4.4, 4.6, 4.8, 4.10, 5.20, 6.12, 6.13, 6.14, 6.15, 6.16, 7.10, 7.11, 9.6		Antarctica, Arctic, North and Baltic Sea, Black Sea, British Channel, Mediterranean, NE-Atlantic
<i>Proales syltensis</i> Tzschaschel, 1978	4.1	×	North and Baltic Sea
Synchaetidae			
<i>Synchaeta baltica</i> Ehrenberg, 1834	7.11		North and Baltic Sea, Black Sea, Mediterranean, NE Atlantic, New Zealand, NW Atlantic
<i>Synchaeta cecilia</i> Rousselet, 1902	5.19, 11.6		Arctic, North and Baltic Sea, Mediterranean, NE Atlantic, New Zealand, NW Atlantic, SW Atlantic
<i>Synchaeta gyrina</i> Hood, 1887	5.19, 5.20, 7.10, 7.11, 9.7		North and Baltic Sea, Black Sea
<i>Synchaeta vorax</i> Rousselet, 1902	7.10		North and Baltic Sea, Black Sea, British Channel, Caspian Sea, Japanese Sea, Mediterranean, NE Atlantic, SW Atlantic
Flosculariacea			
Testudinellidae			
<i>Testudinella clypeata</i> (Müller, 1786)	9.7, 12.4		North and Baltic Sea, Black Sea, British Channel, Mediterranean, NE Atlantic
<i>Testudinella elliptica</i> (Ehrenberg, 1834)	7.10, 7.11	×	North and Baltic Sea
<i>Testudinella obscura</i> Althaus, 1957	5.19, 5.20, 6.15, 6.16, 7.10, 7.11, 7.12	×	Arctic, Black Sea, NE-Atlantic, NW-Atlantic

(Kristensen 2002). The general opinion of zoomorphologists is that cycliophorans are a sister group to the clade Entoprocta/Ectoprocta (Funch & Kristensen 1995). However, the first molecular analysis showed a sister relationship with Rotifera (Winnepenninckx et al. 1998).

Only one species of cycliophorans has been recorded from the Tjärnö area. In 1997 *Symbion pandora* was collected from the Norwegian lobster in Kosterfjord by R. M. Kristensen for molecular analysis (Winnepenninckx et al. 1998). During the meiofauna-workshop many specimens, including nearly all free living stages were found. Unfortunately, we were not able to get the European lobster at the workshop. However, we expect that this lobster from the Tjärnö area also hosts the undescribed species of *Symbion*.

Very interesting is that the American lobster has recently been artificially introduced to Scandinavian waters. These lobsters are presently still hosting *S. americanus* and not the European species of *Cycliophora*.

Polychaeta (Tab. 10)

The class polychaeta is the most diverse and species-abundant within the phylum Annelida and contains more than 9000 species worldwide (Rouse & Pleijel 2001). Roughly 700 species are found in Swedish waters throughout most marine habitats.

Macrofaunal polychaete taxa are often abundant in benthic samples, and have been well studied for centuries. Meiofaunal species on the other hand are generally more difficult to obtain due to patchiness and more laborious extraction methods. Many areas around Tjärnö have however been well studied with regards to meiofaunal polychaetes. During the meiofauna workshop six species belonging to three different genera were found, some species in great numbers. Juvenile specimens of macrofaunal species abounded in many samples, but were not treated further.

The taxon Dorvilleidae, which contains many meiofauna species, accounted for many of the

Table 9. Cycliophora. Class, order, and family level taxonomy follow Funch and Kristensen (1995).

	Localities	New for Swedish fauna	Known distribution
Eucycliophora			
Symbiida			
Symbiidae			
<i>Symbion pandora</i> Funch and Kristensen, 1995	lobster		North Atlantic, Mediterranean Sea

Table 10. Polychaeta. Order, suborder and family level taxonomy follows Eiby-Jacobsen & Kristensen (1994) and Rouse and Fauchald (1997). Distributional data based on Hansson (1998).

	Localities	New for Swedish fauna	Known distribution
Dorvilleidae			
<i>Trilobodrilus axi</i> Westheide, 1967	5.4, 7.3, 7.9		Helgoland, Sylt, Arcachon
<i>Protodorvillea kefersteini</i> McIntosh, 1869	7.9, 11.2		Isefjord, Koster area, Skagerrak, Vestfold – W Finnmark
<i>Ophryotrocha</i> sp.	7.3, 7.9	?	
<i>Diurodrilus minimus</i> Remane, 1925	7.9		Gullmar Fjord, Kiel, Helgoland, Bergen, Roscoff, Asia
Histriobdellidae			
<i>Histriobdella homari</i> van Beneden, 1858	lobster		Gullmar Fjord, Østfold, SW North Sea, S & W Br. Isles
Protodrilidae			
<i>Protodrilus rubropharyngeus</i> Jägersten, 1940	7.3, 7.9		Kieler Bucht, Gullmar Fjord (in the water edge), Limfjord, W & N Norway, E Britain, Yellow Sea

findings of meiofaunal polychaetes. *Protodorvillea kefersteini* McIntosh, 1869 is well known from the area, but only two specimens were found, both from shell gravel sediment. A few specimens of *Diurodrilus minimus* Remane, 1925 were found in a freshwater-shocked sample, but not in the other samples from the same locality. *Trilobodrilus axi* Westheide, 1967 was found and identified by numerous anterior ciliary rings, although in previous samples from Tjärnö *T. heideri* Remane, 1925 was found. One species of *Ophryotrocha* was recorded, but only juvenile specimens were collected. Therefore a positive identification was not possible, although the specimens appeared to be distinct from *O. puerilis* Claparède & Meczniow 1869, a species previously reported from Tjärnö. *Histriobdella homari* van Beneden, 1858 was found on the gills of *Nephrops norvegicus* Linnaeus, 1758. The most abundant meiofaunal polychaete was *Protodrilus rubropharyngeus* Jägersten, 1940. While not formally recorded, specimens of *Polygordius lacteus* Schneider, 1868 and *P. appendiculatus* Fraipont, 1887 were observed during student lab sessions.

Nematoda (Tab. 11)

The following comments should be regarded as a preliminary report on the nematode fauna recorded from the Tjärnö area. Some three hundred specimens have been examined and more are available in archived extracted material. As is common in collections of marine nematoda, a significant proportion of the individuals are either juveniles or females, which often lack all the diagnostic characters required for an accurate identification. Even when males are encountered, it may be necessary to examine a number of specimens before a full identification can be made.

The recorded nematode fauna of Sweden can be found on the website of the Swedish Museum of Natural History (http://www.nrm.se/theswedishmuseumofnaturalhistory/researchandcollections/zoology/invertebratezoology/research/factsoninvertebrates/newnematodolist.729_en.html), which lists a total of 1053 species, of which 597 have been recorded from marine or brackish water habitats.

From the material examined to date (Table 11), 27 families, 76 genera and perhaps 95 putative species have been isolated, a conservative estimate based on the assumption that all specimens identified only to genus level, arose from a single spe-

cies of that genus. Of these species, 33 have been given names, mostly tentatively, of which some 13 would be new to the Swedish fauna if they were subsequently confirmed: *Pomponema* aff. *sedecima* Platt, 1973, *Chromaspirina* aff. *parapontica* Luc & De Coninck, 1959, *Desmodora schulzi* Gerlach, 1950, *Eubostrichus* cf. *hopperi* Muthumbi, Verschelde & Vincx, 1995, *Pseudochromadora* aff. *pontica* (Filipjev, 1922), *Microlaimus* cf. *robustidens* Stekhoven & De Coninck, 1933, *Tricoma* cf. *brevirostris* (Southern, 1914), *Platycoma cephalata* Cobb, 1894, *Viscosia abyssorum* (Allgén, 1933), *Enoplolaimus* aff. *subterraneus* Gerlach, 1952, *Eleutherolaimus* cf. *riemanni* Blome, 1982, *Terschellingia* cf. *longicaudata* De Man, 1907 and *Trefusia* cf. *longicauda* De Man, 1893. In this listing, the designation "cf." (= confer) signifies specimens which most probably belong to the designated species, but which require more specimens to be examined for confirmation. The designation "aff." (= affinis) has been used less formally to signify specimens which may belong to the designated species, or to a similar or new species, there being significant unresolved doubt.

The families and genera recorded here, like most, have typically global distribution patterns. The putative species have all been recorded from the northern Atlantic, North Sea or Baltic regions. Distributions for named species have been taken from Gerlach & Riemann (1973, 1974) and Deprez et al. (2005). A single female specimen of *Amphimonhystera* sp. was found to be significantly different from descriptions of known species and may represent a new species to be described if further specimens are encountered.

Priapulida (Tab. 12)

The phylum Priapulida consists at present of only 19 species distributed over seven genera, of which only three genera (*Tubiluchus*, *Maccabeus* and *Meiopriapulidus*) are regarded as truly meiobenthic. The remaining four taxa: *Halicryptus*, *Priapulopsis*, *Priapulidus* and *Acanthopriapulidus*, contain macrobenthic species. Their larvae however, are found temporarily as meiofauna (Adrianov & Malakhov 1996, 1999). Numerous species of priapulids have also been found in the fossil record (see e.g., Conway Morris 1977, Gould 1989).

Three species of Priapulida have been recorded previously from Swedish waters: *Priapulidus caudatus* Lamarck, 1816, *Halicryptus spinulosus* von Siebold, 1849 and a new species of *Tubiluchus*. Of

Table 11. Nematoda. Families, genera and putative species recorded from the Tjärnö area. Taxonomy is traditional, based on Lorenzen (1994). For the use of cf. and aff.: see text.

	Localities	New for Swedish fauna	Known distribution
Chromadoridae			
<i>Actinonema</i> sp.	7.3	?	
<i>Chromadora</i> cf. <i>nudicapitata</i> Bastian, 1865	8.1		N. Sea, Baltic (incl. Skagerrak, Kattegat, Öresund), Atlantic, Mediterranean, Black Sea, Red Sea, Pacific
Chromadoridae gen.	3.2, 3.4, 5.9	?	
<i>Neo-/Dichromadora</i> sp.	5.9	?	
<i>Neochromadora</i> sp.	3.2, 3.4	?	
<i>Parapinanema</i> sp.	3.4	×	
<i>Prochromadorella</i> cf. <i>paramicrodonta</i> (Allgén, 1929)	3.2, 3.4, 5.9		N. Sea, Baltic (incl. Kattegat, Öresund), Atlantic, Red Sea, Pacific, Antarctica
<i>Ptycholaimellus</i> sp.	3.4	?	
Comesomatidae			
Comesomatidae sp.	3.4	?	
<i>Dorylaimopsis punctata</i> Ditlevsen, 1918	3.2, 3.4		N. Sea, (incl. Skagerrak, Öresund), Atlantic, Mediterranean
<i>Sabatieria celtica</i> Southern, 1914	3.2		N. Sea, Baltic (incl. Skagerrak, Öresund), Atlantic
<i>Sabatieria punctata</i> (Kreis, 1924)	8.1		N. Sea, Baltic (incl. Skagerrak, Kattegat, Öresund), Atlantic, Mediterranean
<i>Sabatieria</i> sp.	3.4, 5.9, 8.1	?	
<i>Setosabatieria hilarula</i> (De Man, 1922)	3.4		N. Sea, (incl. Skagerrak), Atlantic, Mediterranean, Indian Ocean
Cyatholaimidae			
Cyatholaimidae sp. 1	3.4, 5.9	?	
Cyatholaimidae sp. 2	3.4, 5.9	?	
<i>Paracanthonchus</i> sp.	3.4	?	
<i>Pomponema</i> aff. <i>sedecima</i> Platt, 1973	7.3	×(?)	Atlantic
Desmodoridae			
<i>Chromaspirina</i> aff. <i>parapontica</i> Luc & De Coninck, 1959	7.2	×(?)	English Channel, Atlantic
<i>Chromaspirina</i> sp. (?)	7.3	?	
<i>Desmodora schulzi</i> Gerlach, 1950	5.9, 7.2, 7.3	×	N. Sea, Atlantic, Mediterranean
Desmodoridae gen. (<i>Zalonema</i> ?)	3.2	?	
Desmodoridae sp.	5.9	?	
<i>Eubostrichus</i> cf. <i>hopperi</i> Muthumbi, Verschelde & Vincx, 1995	3.2, 3.4	×	N. Sea
<i>Metachromadora</i> sp.	7.2	?	
<i>Pseudochromadora</i> aff. <i>pontica</i> (Filipjev, 1922)	7.2	×	N. Sea, Atlantic, Mediterranean, Black Sea
<i>Spirinia</i> aff. <i>laevis</i> (Bastian, 1865)	7.2		N. Sea, Atlantic, Baltic
<i>Spirinia parasitifera</i> (Bastian, 1865)	3.2		N. Sea, Baltic (incl. Skagerrak, Kattegat, Öresund), White Sea, Atlantic, Mediterranean, Red Sea, Black Sea, Indian Ocean
<i>Spirinia</i> sp.	3.4, 8.1	?	
Stilbonematinae sp. A	3.2	?	
Stilbonematinae sp. B	3.4	?	
Epsilonematidae			
Epsilonematidae gen.	5.9	?	
<i>Perepsilononema</i> sp.	5.9	×	
Ethmolaimidae			
Ethmolaimidae gen.	3.4	?	

Table 11. Nematoda (continued).

	Localities	New for Swedish fauna	Known distribution
Microloaimidae			
<i>Bolbolaimus</i> cf. <i>dentatus</i> (Allgén, 1935)	3.4	×	N. Sea, Baltic (Incl. Öresund), Mediterranean, Atlantic
Microloaimidae gen.	3.4	?	
<i>Microlaimus</i> cf. <i>marinus</i> Schulz, 1932	5.9		N. Sea, Baltic (Incl. Öresund)
<i>Microlaimus</i> cf. <i>robustidens</i> Stekhoven & De Coninck, 1933	7.3	×	N. Sea, English Channel
Monoposthidae			
<i>Monoposthia costata</i> (Bastian, 1865)	8.1		N. Sea, Baltic (Incl. Skagerrak, Kattegat, Öresund), White Sea, Atlantic, Mediterranean, Black Sea, Indian Ocean, Pacific
Selachinematidae			
<i>Latronema</i> sp.	7.3	?	
<i>Richtersia</i> sp.	3.4	?	
Desmoscolecidae			
<i>Desmoscolex</i> sp. A	3.2, 3.4	?	
<i>Desmoscolex</i> sp. B	5.9	?	
<i>Desmoscolex</i> sp. C	3.4, 5.9	?	
<i>Desmoscolex</i> sp. D	5.9	?	
<i>Greeffia beatei</i> Lorenzen, 1969	5.9		N. Sea, Baltic
<i>Quadriconema</i> sp.	3.4	?	
<i>Triconema</i> cf. <i>brevirostris</i> (Southern, 1914)	5.9	×(?)	Atlantic, Black Sea
Ceramonematidae			
<i>Pselionema</i> sp. A	7.3	?	
<i>Pselionema</i> sp. B	7.3	?	
Leptolaimidae			
<i>Camacolaimus</i> sp.	5.9	?	
<i>Halaphanolaimus pellucidus</i>	5.9		N. Sea, (Incl. Skagerrak), Atlantic, Mediterranean
Leptolaimidae gen.	3.4	?	
<i>Leptolaimus</i> sp.	3.4, 7.3	?	
<i>Stephanolaimus</i> aff. <i>elegans</i> Ditlevsen, 1918	7.2		N. Sea, Baltic (Incl. Öresund), Atlantic
<i>Manunema</i> sp.	5.9	×	
Anticomidae			
<i>Anticomus</i> cf. <i>acuminata</i> (Eberth, 1863)	5.9, 7.3		N. Sea, Baltic (Incl. Skagerrak, Kattegat, Öresund), Barents Sea, Atlantic, Mediterranean, Black Sea, Red Sea, Indian Ocean, Pacific, Antarctica
Enchelidiidae			
<i>Calyptronema</i> sp.	5.9	?	
<i>Eurystomina</i> sp. A	3.2	?	
Enoplidae			
<i>Enoplus</i> sp.	3.2	?	
<i>Platycomus cephalata</i> Cobb, 1894	5.9	×	N. Sea, Atlantic, Mediterranean
Oncholaimidae			
<i>Adoncholaimus</i> sp.	7.2	?	
Oncholaimidae gen. B	3.4	?	
Oncholaimidae gen. C	3.4	?	
<i>Oncholaimus</i> /Metoncholaimus sp.	3.2	?	
<i>Pontonema</i> cf. <i>vulgare</i> (Bastian, 1865)	3.2		N. Sea, Baltic (Incl. Skagerrak, Öresund), White Sea, Barents Sea, Atlantic, Black Sea
<i>Viscosia abyssorum</i> (Allgén, 1933)	3.4, 8.1	×	N. Sea, Pacific
<i>Viscosia</i> sp.	5.9, 7.3, 8.1	?	
<i>Viscosia viscosa</i> (Bastian, 1865)	8.1		N. Sea, Baltic (Incl. Skagerrak, Kattegat, Öresund), Atlantic

Table 11. Nematoda (continued).

	Localities	New for Swedish fauna	Known distribution
Oxystominidae			
<i>Halalaimus</i> sp.	3.4	?	
Thoracostomopsidae			
<i>Enoptoides</i> sp.	5.9, 8.1	?	
<i>Enoploaimus</i> aff. <i>subterraneus</i> Gerlach, 1952	7.3	×	N. Sea, Mediterranean
<i>Enoploaimus</i> sp.	5.9, 7.2, 7.3, 8.1	?	
<i>Mesacanthion</i> sp.	3.2	?	
<i>Thoracostoma coronatum</i> (Eberth, 1863)	3.2		N. Sea, (Incl. Skagerrak), Atlantic, Mediterranean, Pacific
Rhabdodemaniidae			
<i>Rhabdodemania</i> sp.	7.3	?	
Axonolaimidae			
<i>Odontophora</i> cf. <i>setosa</i> Allgén, 1929	3.4		N. Sea, Baltic (Incl. Skagerrak, Öresund), Atlantic, Mediterranean
<i>Odontophora</i> sp.	3.4	?	
Diplopeltidae			
<i>Araeolaimus</i> sp. A	3.2	?	
<i>Araeolaimus</i> sp. B	3.4	?	
Diplopeltidae gen.	3.4	?	
<i>Diplopeltula</i> cf. <i>incisa</i> (Southern, 1914)	3.4		N. Sea, Baltic (Incl. Öresund), Atlantic, Mediterranean
Linhomoeidae			
<i>Eleutherolaimus</i> cf. <i>riemanni</i> Blome, 1982	8.1	×	N. Sea
<i>Eleutherolaimus</i> sp.	5.9, 8.1	?	
Linhomoeidae gen.	3.4	?	
<i>Metalinhomoeus</i> sp. (?)	3.2	?	
<i>Terschellingia</i> cf. <i>longicauda</i> De Man, 1907	3.2		N. Sea, Baltic (Incl. Skagerrak, Öresund), Atlantic, Mediterranean, Black Sea, Arabian Sea, Red Sea, Indian Ocean, Pacific
<i>Terschellingia</i> sp.	3.4	?	
Monhysteridae			
Monhysteridae gen.	3.4, 5.9	?	
<i>Monhystrella</i> sp.	3.4	?	
Sphaerolaimidae			
<i>Sphaerolaimus</i> sp.	3.4	?	
Xyalidae			
<i>Amphimonhystrella</i> sp. (?n.)	3.4	×	?
<i>Echinotheristus</i> sp.	5.9, 7.3	×	
Trefusiidae			
<i>Trefusia</i> cf. <i>longicauda</i> De Man, 1893	3.2, 3.4		N. Sea, Baltic, Atlantic
Trefusiidae gen.	3.4	?	

Table 12. Priapulida. Order and family level taxonomy follows Adrianov and Malakhov (1996). Distribution data of the different species is based on van der Land (1970) and the website of Christian Lemburg <http://www.wuser.gwdg.de/~clembur/welcome.htm#links>.

	Localities	New for Swedish fauna	Known distribution
Priapulomorpha			
Tubiluchidae			
<i>Tubiluchus</i> n. sp.	11.2	×	
Priapulidae			
<i>Priapulus caudatus</i> Lamarck, 1816	11.2		Northern circumpolar

these three species two were found during the meiofauna-workshop (Tab. 12).

Two larvae of *P. caudatus* were found in the Tjärnö area during the workshop. This species is included in the species account even though it is a macrobenthic species, since the larvae are found in the meiofauna community. *Priapulius caudatus* has been found all over the northern circumpolar area and additionally in the Mediterranean Sea. In Sweden they have been recorded around the Gullmarsfjord area (Sofia Wennberg, pers. comm.).

The specimens of *Tubiluchus* sp. found in Tjärnö (Tab. 12) probably belong to a new species. We found both larvae, a postlarva and adults. Unfortunately the latter were severely damaged, making them only useful for DNA extraction. This undescribed species was first discovered by Prof. Erséus (Gothenburg University) from the shell gravel at Kalkgrund. The specimens more closely resemble *Tubiluchus corallicola* van der Land, 1968 instead of *T. arcticus* Adrianov, Malakhov, Tchesunov & Tsetlin, 1989, which occurs in the same geographical area (Kristensen, pers. comm.). However, a thorough description is needed to assess the status of the present specimens.

Kinorhyncha (Tab. 13)

The phylum Kinorhyncha comprises currently over 160 species worldwide belonging to 18 genera (Sørensen & Pardos 2007). However, several species are waiting to be described. Kinorhynchs are exclusively marine metazoans inhabiting algae and various sediment types.

Around 15 species have been reported from the western coast of Sweden in particular the Gullmarsfjord, Kristineberg (Nyholm 1947a,b). Conversely, many of the species are based on immature specimens and on insufficient descriptions, hence the number of valid species is presumably only half this amount (see Zelinka 1928, Nyholm 1947a,b).

The kinorhynch fauna in the Tjärnö area has not been studied extensively. It however closely resembles the fauna of the Gullmarsfjord. During the meiofauna-workshop a total of six species of Kinorhyncha was collected belonging to four different genera (see Tab. 13). At least half of these species (*Pycnophyes communis* Zelinka, 1908, *Echinoderes* cf. *dujardinii* Claparède, 1863 and *Semnoderes armiger* Zelinka, 1928) have also been found in the Gullmarsfjord (see Nyholm 1947b). The two unidentified species (*Pycnophyes* sp. and *Echinoderes* sp., (Tab. 13) might be respectively *Pycnophyes flaveolatus* Zelinka, 1928 and *Echinoderes elongata* (Nyholm, 1947), which

Table 13. Kinorhyncha. Order, suborder and family level taxonomy follows Higgins (1990) and Sørensen and Pardos (2007). Distribution data of the different species is based on Zelinka (1928), Nyholm, 1947b, Sørensen and Pardos (2007).

	Localities	New for Swedish fauna	Known distribution
Homalorhagida			
Homalorhagae			
Pycnophyidae			
<i>Pycnophyes communis</i> Zelinka, 1908	7.8, 11.5		North Atlantic
<i>Pycnophyes</i> sp.	7.8, 11.5	?	
Cyclorhagida			
Cyclorhagae			
Centroderidae			
<i>Centroderes spinosus</i> (Reinhard, 1881)	7.8, 11.5	x	Black, Adriatic and Mediterranean Sea
Echinoderidae			
<i>Echinoderes</i> sp.	7.8	?	
<i>Echinoderes</i> cf. <i>dujardinii</i> Claparède, 1863	13.2, 13.3		Adriatic and Mediterranean Sea, Swedish waters
Conchorhagae			
Semnoderidae			
<i>Semnoderes armiger</i> Zelinka, 1928	7.8, 11.5		Mediterranean Sea, West European

have both been collected in the Gullmarsfjord. A thorough comparison between the Tjärnö and the Gullmarsfjord species was not possible due to the insufficient species description of both species. One new species for the Swedish fauna, *Centroderes spinosus* (Reinhard, 1881), was found (Tab. 13), although Nyholm (1947b) had already stated that the genus *Centroderes* is represented in Swedish waters. The species *Campyloderes adheres* Nyholm, 1947 was not found during this workshop. The species description is unfortunately very inadequate and there are several inconsistencies in regard to what is stated in the text and what is shown on the figures, hence a resampling of the type locality and redescription of the species should clarify whether this is a valid species or not (see Nyholm 1947a). Several authors have stated that *C. adheres* probably belongs to the genus *Centroderes*, since the two genera are easily mistaken from each other due to very long tusk-like ventral spines found on trunk segment 1 in both species (see Higgins 1967, 1969; Neuhaus 2004). Conclusively, *Campyloderes adheres* might turn out to be synonymised with *Centroderes spinosus*.

Gastrotricha (Tab. 14)

The phylum Gastrotricha includes microscopic, worm-like invertebrates characteristic of freshwater and marine environments. In freshwater, gastrotrichs are a ubiquitous component of periphyton and benthos and to a more limited extent also of plankton. In marine habitats on the other hand they are mainly interstitial. The phylum is cosmopolitan with approximately 750 species divided into two orders: Macrodasysida, with about 280 strap-shaped species, all but two of which are marine or estuarine, and Chaetonotida with about 470 tenpin-shaped species, tree-fourth of which inhabit freshwater systems. Relevant novelties about taxonomy, phylogeny, biology and ecology can be found in Liesenjohann et al. (2006), Todaro et al. (2006a,b,c), Balsamo et al. (2007), Hochberg (2007), Hummon (2007a,b), Hummon & Todaro (2007), Kieneke & Zekely (2007), Kieneke et al. (2007), Lee & Chang (2007), Priyalakshmi et al. (2007), Zébazé Toguét et al. (2007), Leasi & Todaro (2008), Marotta et al. (2008). A dichotomous key to the genera of the phylum is provided by Todaro & Hummon (2007).

The Swedish gastrotrich fauna, both marine and freshwater is poorly known. To date 22 species, including 18 Macrodasysida and 4 Chae-

tonotida (further on abbreviated as M and C respectively), have been reported from marine habitats, whereas only seven species have been recorded in freshwater (e.g. Remane 1932, Lang 1936a, Swedmark 1950, Karling 1954, Wieser 1954, Boaden 1960, Swedmark & Teissier 1967, Jansson 1968a,b,c, Fauna Europea "www.faunaeur.org").

Faunistic comparison with well investigated countries is astonishing. Limiting the assessment only to the marine taxa, approximately 180 species have been recorded in more than 230 localities in Italy (Todaro et al. 2001, 2003) and 117 species are known from 137 localities in the British Isles (Hummon 2007c). A total of 146 species, including 51 from Norway, have been reported in northern European seas. Swedish gastrotrich records are few due to a low number of surveyed locations and the fact that mainly littoral sites have been investigated. During the meiofauna-workshop an ample diversity of habitats was surveyed and it is therefore not surprising that a total of 32 species of Gastrotricha (19M, 13C) were discovered, including 13 species new for Sweden and seven apparently new to science. The definitive affiliation of the latter will be made at the end of the ongoing taxonomical surveys.

From a biogeographical point of view, only a few records really stand out. Most species collected around Tjärnö have been found also in the Mediterranean sea and in other regions of the world (e.g. *Lepidodasys martini*, *Turbanella cornuta*, *Aspidiophorus marinus*, *Xenrichula punctata* etc.), while others seem to be restricted to the north Atlantic and adjacent seas (e.g. *Dinodasys mirabilis*, *Urodasys mirabilis* etc.). *Chaetonotus tempestivus* and *Thaumastoderma moebjergi* are reported here for the second time ever. The first species was described from the island of Sylt (Mock 1979) while the second one was recently described from the Faroe Bank (Clausen 2004). Both findings certainly bear relevance beyond biogeography. Morphological details of the Swedish specimens should permit clarification of the taxonomic status of the former species, as its affiliation with the taxon *Chaetonotus* casts doubts, and improve the description of the latter. Live specimens of *T. moebjergi* show a pair of unmistakable red eye-spots at the front end, a characteristic overlooked in the fixed specimens studied by Clausen (2004). Moreover it is not known whether *U. mirabilis* is new to Sweden or not. Lang (1936a) reported this species from Lous Flak, a buoy marking the border between Sweden

and Denmark, but did not give any reference to which side of the border it was actually found.

Beside the supplementary information on morphology and/or biology gathered during the workshop and regarding the species found, it is anticipated that additional information will emerge as the specimens stored for ultrastructure and/or DNA analysis will be studied. Finally, it should be emphasized that most species were recovered from 2-3 locations where the substratum

consisted of clean sand, devoid of silt and poor in detritus, whereas muddy locations yielded few species, if any: a clear indication for future faunistic research.

Tardigrada (Tab. 15)

The phylum Tardigrada consists of microscopic, multicellular coelomates with four pairs of telescopic legs. With an adult size of 0.08-1.2 mm

Table 14. Gastrotricha. Taxonomy follows Todaro & Hummon (2007); distribution of some species includes data (*) from Hummon (2007c); na, not applicable.

	Localities	New for Swedish fauna	Known distribution
Macrodasysidae			
<i>Macrodasys</i> sp. 1	7.9	×	na
<i>Macrodasys</i> sp. 2	7.7	×	na
<i>Urodasys mirabilis</i> Remane, 1926	11.3	×	NE-Atlantic and adjacent waters incl. Öresund
Lepidodasyidae			
<i>Dolichodasys elongatus</i> Gagne, 1977	5.12	×	North Europe, Mediterranean sea, USA, Brazil
<i>Lepidodasys martini</i> Remane, 1926	7.9, 12.3		North Europe, Mediterranean sea, USA
<i>Lepidodasys</i> sp. 1	7.9	×	na
<i>Lepidodasys platyurus</i> Remane, 1927	11.4	×	Wales, Poland, Mediterranean sea, Black sea
<i>Mesodasys laticaudatus</i> Remane, 1951	7.9		North Europe, Mediterranean sea, USA, Red Sea*
<i>Paradasys subterraneus</i> Remane, 1934	5.12	×	NE-Atlantic and adjacent waters, Baltic Sea, Mediterranean sea
Planodasyidae			
<i>Crasiella diplura</i> Clausen, 1968	7.9, 12.3	×	Norway, Scotland, USA (Bahamas*, Florida*)
Thaumastodermatidae			
<i>Acanthodasys aculeatus</i> Remane, 1927	7.9		Cosmopolitan
<i>Diplodasys ankei</i> Wilke, 1954	11.4		North Europe, USA
<i>Tetranchyroderma megastomum</i> Remane, 1927	7.9		Cosmopolitan
<i>Tetranchyroderma</i> sp. 1	7.9	×	na
<i>Thaumastoderma moebjergi</i> Clausen, 2004	7.9	×	Faroe bank
<i>Thaumastoderma heideri</i> Remane, 1927	7.9, 12.3		Cosmopolitan
Turbanellidae			
<i>Dinodasys mirabilis</i> Remane, 1926	7.9		NE-Atlantic and adjacent waters
<i>Turbanella cornuta</i> Remane, 1925	7.9		Cosmopolitan
<i>Turbanella lutheri</i> Remane, 1952	7.9		NE-Atlantic and adjacent waters, Baltic Sea
Chaetonotidae			
<i>Aspidiophorus marinus</i> Remane, 1926	13.1		Cosmopolitan
<i>Chaetonotus atrox</i> Wilke, 1954	5.12		Cosmopolitan
<i>Chaetonotus inaequidentatus</i> Kisielewski, 1988	11.3	×	Roscoff, Channel islands*, Mediterranean sea
<i>Chaetonotus somniculosus</i> Mock, 1979	7.9	×	Sylt (Germany), Römö (Denmark), North America (Cape Cod area*)
<i>Chaetonotus</i> sp. 1	7.9	×	na
<i>Chaetonotus tempestivus</i> Mock, 1979	7.10	×	Sylt (Germany)
<i>Chaetonotus varicosquamatus</i> Mock, 1979	7.9, 12.3	×	NE-Atlantic and adjacent waters, Mediterranean sea
<i>Hachaetonotus aculifer</i> (Gerlach, 1953)	5.12	×	North Europe, Mediterranean sea, USA
<i>Halichaetonotus paradoxus</i> (Remane, 1927)	7.9, 12.3	×	North Europe, Mediterranean sea, USA
<i>Halichaetonotus</i> sp. 1	7.9	×	na
<i>Halichaetonotus</i> sp. 2	5.12	×	na
<i>Halichaetonotus atlanticus</i> Kisielewski, 1988	7.9	×	Atlantic coast of France, Mediterranean sea.
Xenotrichulidae			
<i>Xenotrichula punctata</i> Wilke, 1954	5.12	×	North Europe, Mediterranean sea, USA, Caribbean

they are among the smallest Metazoa. The taxon Tardigrada (water bears) currently consists of over 960 described species belonging to 105 genera (Guidetti & Bertolani 2005). However, taxonomists expect that at least 10,000 species exist, many of them marine species. Tardigrades are classified in three classes, Heterotardigrada, Mesotardigrada and Eutardigrada (Ramazzotti & Maucci 1983). About 770 species are semi-terrestrial/limnic and only 190 species are truly marine. Tardigrades are found from the highest elevations in the Himalayas to deep trenches in the deep sea, but all species have in common that they are all aquatic animals in the active state.

Around 10 marine species have been described or reported from the western coast of Sweden, where G. Thulin did most of his marine research on tardigrades (Thulin 1928). However, most of Thulin's records were never published. His collection is now deposited in the Zoological Museum, University of Copenhagen.

The marine fauna of tardigrades in the Tjärnö area has not been studied at all. However, during several Danish field courses a few species were recorded, such as the arthrotardigrades: *Arctinarctus doryphorus doryphorus* Schulz, 1935, *Batillipes mirus* Richters, 1909 and *Tanarctus gracilis* Renaud-Mornant, 1980, the echiniscoidid tardigrade *Echiniscoides sigismundi sigismundi* (Schultze, 1865) and the eutardigrades *Halobiotus crispae* Kristensen, 1982 and *H. appelloefi* (Richters, 1908).

During the meiofauna-workshop a total of 6 species of Tardigrada were collected belonging to five different genera (see Tab. 15). New for Sweden were two species of arthrotardigrades: *Raiarctus aureolatus* Renaud-Mornant, 1981 and *Batillipes bullacaudatus* McGinty & Higgins, 1968. *Raiarctus aureolatus* was originally described from Madagascar, but later on also found in carbonate sand from Florida (USA), Brest and Roscoff (France) and Faroe Bank (Faroe Islands). In the Tjärnö area the species is found together with *Arctinarctus doryphorus* in shell gravel or carbonate sand (*Amphioxus* sand). *Tanarctus gracilis*, originally described subtidally from North Carolina, was found in the same type of sediment in 1997 at Kalkgrund (Koster area), but the species was not recorded during the meiofauna-workshop. The most common subtidal species in the Tjärnö area is *Arctinarctus doryphorus doryphorus* originally described from Helgoland on the surface of the echinoderm *Echinocyamus pusillus*. In the Tjärnö area the tardigrade was found in carbonate sand, not in association with the sea urchin.

Batillipes bullacaudatus was original described from Florida (USA), and only the four-toed larva, not the six-toed adult, was found around Saltö in a population of *B. mirus*. *B. mirus* is the most common beach tardigrade in the Tjärnö area – always found in well-sorted quartz sand. At Saltö a large population was found just outside the tidal zone at a depth of 0.5 m.

Table 15. Tardigrada. Class, order, and family level taxonomy follows Guidetti and Bertolani (2005), Kristensen and Higgins (1984) and Ramazzotti and Maucci (1983). Distribution data of the different species is based on Marcus (1929), Ramazzotti and Maucci (1983) and Grimaldi de Zio et al. (2003).

	Localities	New for Swedish fauna	Known distribution
Arthrotardigrada			
Batillipedidae			
<i>Batillipes mirus</i> Richters, 1909	13.2		North Atlantic
<i>Batillipes</i> cf. <i>bullacaudatus</i> McGinty and Higgins, 1968	13.2	×	Florida
Halechiniscidae			
Styraconyxinae			
<i>Raiarctus aureolatus</i> Renaud-Mornant, 1981	5.2	×	North Atlantic, Madagascar
Tanarctinae			
<i>Arctinarctus doryphorus doryphorus</i> Schulz, 1935	5.2, 5.9, 7.1		North Atlantic
Echiniscoididae			
<i>Echiniscoides sigismundi sigismundi</i> (Schulz, 1865)	6.11, 9.2, 13.3		North Atlantic
Hypsibiidae			
Hypsibiinae			
<i>Halobiotus crispae</i> Kristensen, 1982	13.3		Arctic temperate

The echiniscoidid tardigrade *Echiniscoides sigismundi sigismundi* was found both on the green algae *Enteromorpha* sp. (Sillebobukten) and associated to the tidal barnacle *Semibalanus balanoides* (several places on Saltö). This species is a cryptobiont and tolerates drying out during low tide.

True marine eutardigrades are very rare and the genus *Halobiotus* is the only really exclusive marine genus. *Halobiotus crispae* was originally described from Disko Island, Greenland. It is common in the sediment in a *Mytilus edulis* bank, just below the low water zone in the Tjärnö area (Saltö). Another interesting but dubious species is *H. appelloefi*. It was very common in 1997 in deeper water just outside the station. We tried to recollect this species at 2-3 m in muddy sediments. Unfortunately, the sediment was covered with a

thick layer of dead green and brown algae and the species was not recorded during the workshop. The reason why this species is so interesting is that it may be a psedosimplex state (winter form) of the more common *H. stenostomus* (Richters, 1908).

Copepoda (Tab. 16)

Knowledge on the systematics and diversity of harpacticoid copepods in Swedish waters has steadily accrued over the last 150 years, starting with the initial brackish-water records by Lilljeborg (1853, 1902) and Lindström (1855). Although Sars (1903-1909) was among the first to record marine harpacticoids from the Bohuslän area (based on P. T. Cleve's collection), it was the extensive work by Lang (1935a-c, 1936a-c, 1948) that unveiled the true diversity of the taxon in

Table 16. Copepoda. Taxonomy of Harpacticoida at family level and below follows Wells' (2007) comprehensive checklist.

	Localities	New for Swedish fauna	Known distribution
Calanoida			
Pseudocyclopiidae			
<i>Pseudocyclopia giesbrechti</i> Wolfenden, 1902	3.2	×	Scotland, W & S Norway, Shetlands
Stephidae			
<i>Stephos minor</i> (T. Scott, 1892)	3.2	×	Scotland, S Norway
Cyclopoida			
Cyclopinidae			
<i>Cyclopina norvegica</i> Boeck, 1865	5.12		British Isles, North Sea, N Norway, W Sweden, S Baltic, Arctic Seas, ? Mediterranean
<i>Cyclopinoides littoralis</i> (Brady, 1872)	5.12		British Isles, France, North Sea, W Norway, Skagerrak, Italy
Harpacticoida			
Ameiridae			
<i>Filixilia attenuata</i> (Thompson, 1893)	11.3	×	Ireland, Isle of Man, Isles of Scilly, S Celtic Sea, Helgoland, S Norway, ?Portugal, ?Romania, ?Israel
<i>Interleptomesochra eulitoralis</i> (Noodt, 1952)	5.12	×	British Isles, Belgian coast, German Bight, Portugal, Israel
<i>Leptomesochra confluens</i> Sars, 1911	11.3		Helgoland, S Norway, Skagerrak
<i>Leptomesochra macintoshi</i> (T. & A. Scott, 1895)	10.2	×	British Isles, German Bight, Kiel Bay
<i>Nitocra spinipes</i> Boeck, 1865	10.3		NW Atlantic incl. Öresund, Baltic, Mediterranean and Black Sea, Arctic Seas
<i>Nitocra typica</i> Boeck, 1865	5.12		NE Atlantic, incl. Skagerrak, Baltic, Mediterranean and Black Sea
<i>Proameira hiddenseensis</i> (Schäfer, 1936)	10.3	×	Belgian coast, Helgoland, Hiddensee, Finland
<i>Sicameira leptoderma</i> Klie, 1950	11.3	×	Belgian and Dutch coasts, Helgoland
<i>Stenocopia longicaudata</i> (T. Scott, 1892)	11.3		British Isles, Brittany, Belgium, Helgoland, W & SW Norway, Skagerrak

this region. Lang's (1948) monograph listed 231 species of marine and brackish water harpacticoid copepods recorded from Swedish waters, of which no less than 206 occurred in the Gullmar Fjord. Subsequent authors added records from algal washings along the Swedish west coast (Dahl 1948) and a sandy beach in east Scania (Brinck et al. 1955, Noodt 1955). Por's (1963, 1964) studies in a wide range of habitats in the Skagerrak identified 129 species of which 42 were new to Sweden and 9 new to Science, and marked the

end of the major descriptive phase in Swedish copepod taxonomic research. Except for Lang's (1965) checklist of the Askö copepod fauna and a few isolated records from Bonden (Wells et al. 1975, Huys & Conroy-Dalton 1996) our knowledge of the Swedish fauna has since then primarily advanced through ecological and experimental studies (e.g. Jansson 1966, 1967a-b, 1968a-c, 1971; Nilsson 1987; De Troch et al. 2005; Koski et al., 2005; Arroyo et al. 2007). Recent authors (Wells 1980, Clément & Moore 1995, Clément & Olafsson

Table 16. Copepoda (continued).

	Localities	New for Swedish fauna	Known distribution
Ancorabolidae			
<i>Lobopleura expansa</i> (Sars, 1908)	3.2	×	N Norway
Arenopontiidae			
<i>Arenopontia</i> n. sp.	11.3	×	
Canthocamptidae			
<i>Cylindropsyllus laevis</i> Brady, 1880	5.12, 11.3		NE Atlantic incl. Skagerrak, Kiel Bay and W Mediterranean
<i>Evansula cumbraensis</i> Huys & Conroy-Dalton, 2006	10.2	×	Isle of Cumbrae, Firth of Forth, Isle of Sylt
<i>Evansula incerta</i> (T. Scott, 1892)	4.1	×	Firth of Forth
<i>Evansula pygmaea</i> (T. Scott, 1903)	11.3	×	Firth of Forth
<i>Itunella muelleri</i> (Gagern, 1922)	5.18		British Isles, France, W & S Norway, Germany (Kiel Bay, Baltic), Simrishamn, Finland, Iceland, White Sea, Nova Scotia, Mediterranean, Black Sea
<i>Mesochra lilljeborgi</i> Boeck, 1865	5.18		NE Atlantic incl. Skagerrak, Arctic Seas, Baltic, Mediterranean and Black Sea, Caspian Sea
<i>Mesochra pygmaea</i> (Claus, 1863)	10.3		NE Atlantic incl. Skagerrak, Arctic Seas, Baltic, Mediterranean and Black Sea
<i>Stenocaris gracilis</i> Sars, 1909	10.2	×	Aberdeenshire, S Norway
<i>Stenocaris kliei</i> Kunz, 1936	10.2, 11.3	×	Irish Sea, Southern Bight of North Sea, Helgoland
<i>Stenocaropsis pristina</i> (Wells, 1968)	5.12	×	Isles of Scilly
Canuellidae			
<i>Canuella furcigera</i> Sars, 1903	12.1-2		NE Atlantic, incl. Skagerrak and Mediterranean
<i>Canuella perplexa</i> T. & A. Scott, 1893	11.3		NE Atlantic, incl. Skagerrak and Mediterranean
Cletodidae			
<i>Cletodes longicaudatus</i> (Boeck, 1873)	10.1, 10.3		British Isles, Brittany, W & SW Norway, Skagerrak, Mediterranean
<i>Cletodes tenuipes</i> T. Scott, 1897	12.1-2		British Isles, Helgoland, N Norway, Skagerrak, Öresund, Belt Sea, Arctic Seas
<i>Enhydrosoma curticauda</i> Boeck, 1873	10.1		British Isles, German Bight, N Norway, Skagerrak, Kiel Bay, White Sea
<i>Enhydrosoma longifurcatum</i> Sars, 1909	12.1-2		Scotland, Ireland, N & W France, German Bight, W & SW Norway, Skagerrak, Kiel Bay

Table 16. Copepoda (continued).

	Localities	New for Swedish fauna	Known distribution
<i>Enhydrosoma propinquum</i> (Brady, 1880)	12.1-2		British Isles, Brittany, German Bight, S Norway, Skagerrak, Mediterranean
<i>Ectinosoma tenuipes</i> T. & A. Scott, 1896	11.5		British Isles, S Norway, Skagerrak
<i>Spinapecuris curvirostris</i> (T. Scott, 1894)	10.1		British Isles, La Rochelle, N Norway, Skagerrak, Kiel Bay, W Mediterranean
<i>Strongylacron buchholzi</i> (Boeck, 1873)	12.1-2		British Isles, W France, Belgium, German Bight, Skagerrak, Kiel Bay
Dactylopusiidae			
<i>Dactylopusia tisboides</i> (Claus, 1863)	12.1-2		British Isles, Brittany, Helgoland, N Norway, Shetlands, Skagerrak, Kiel Bay, Arctic Seas, Madeira, Mediterranean
<i>Dactylopusia vulgaris</i> Sars, 1905	10.3		British Isles, Brittany, Helgoland, N Norway, Iceland, Skagerrak, Kiel Bay, Arctic Sea, Mediterranean
<i>Diarthrodes nobilis</i> (Baird, 1845)	10.3		British Isles, N France, Helgoland, Skagerrak, Kiel Bay, Shetlands, Lofoten, Arctic Seas, W Mediterranean, Madeira
<i>Paradactylopusia brevicornis</i> (Claus, 1866)	10.3		British Isles, English Channel, Helgoland, N & S Norway, Skagerrak, Kiel Bay, Mediterranean, Black Sea
Ectinosomatidae			
<i>Arenosetella</i> n. sp.	11.3	×	
<i>Arenosetella tenuissima</i> (Klie, 1929)	11.3	×	British Isles, Brittany, North Sea, Belgium and Dutch coasts, Isle of Sylt, Kiel Bay, Baltic
<i>Arenostella germanica</i> Kunz, 1937	5.12		British Isles, North Sea, Belgium and Dutch coasts, German Bight, SW Baltic, Mediterranean, Black Sea, ?Panama, ?Chile
<i>Bradya furcata</i> Sars, 1920	12.1-2		Skagerrak
<i>Bradya typica</i> Boeck, 1873	12.1-2		NE Atlantic incl. Skagerrak, Öresund and Kiel Bay, Arctic Seas
<i>Ectinosoma normani</i> T. & A. Scott, 1896	10.2, 11.3		British Isles, Belgian and Dutch coasts, Isle of Sylt, Helgoland, N Norway, Skagerrak, Arctic Seas, Mediterranean
<i>Halectinosoma bodotriaensis</i> Clément & Moore, 2000	11.5	×	British Isles, Norway, NW Mediterranean
<i>Halectinosoma cf. tenerum</i> (Sars, 1920)	10.2, 11.3		Isles of Scilly, S Norway, Skagerrak
<i>Halectinosoma elongatum</i> (Sars, 1904)	5.12		S North Sea, W & S Norway, Skagerrak, Kiel Bay
<i>Halectinosoma gothiceps</i> (Giesbrecht, 1881)	5.12		British Isles, Brittany, Belgian and Dutch coasts, German Bight, Skagerrak, Kiel Bay
<i>Halectinosoma herdmani</i> (T. & A. Scott, 1896)	10.2, 11.3	×	NE Atlantic incl. Kiel Bay, Banyuls-sur-Mer, Israel and Black Sea
<i>Halectinosoma</i> n. sp.	5.12	×	
<i>Hastigerella leptoderma</i> (Klie, 1929)	10.2, 11.3	×	British Isles, Brittany, Belgian and Dutch coasts, German Bight, Kiel Bay, Portugal, W Mediterranean
<i>Klieosoma triarticulatum</i> (Klie, 1949)	10.3	×	Humberside, Helgoland
<i>Noodtiella gracile</i> Mielke, 1975	5.12	×	Isle of Sylt
<i>Pseudobradya beduina</i> Monard, 1935	10.2	×	Belgian and Dutch coasts, Brittany, Elbe mouth, SW Mediterranean
<i>Pseudobradya pulchella</i> Sars, 1920	12.1-2		Skagerrak, Öresund
<i>Pseudobradya robusta</i> Sars, 1910	10.2	×	SW Norway

Table 16. Copepoda (continued).

	Localities	New for Swedish fauna	Known distribution
Euterpinidae			
<i>Euterpina acutifrons</i> (Dana, 1848)	5.12		Cosmopolitan, planktonic
Hamondiidae			
<i>Ambunguipes rufocincta</i> (Brady, 1880)	11.3		British Isles, N France, W Norway, Skagerrak, Mediterranean, Madeira
Harpacticidae			
<i>Harpacticus chelifer</i> (O.F. Müller, 1776)	10.3		NE Atlantic, incl. Skagerrak
<i>Harpacticus uniremis</i> Krøyer, 1842	10.3		NE Atlantic, throughout sub-Arctic to the boreal Pacific
<i>Tigriopus brevicornis</i> (O.F. Müller, 1776)	5.18		NE Atlantic, incl. Skagerrak, Kattegat and F155
<i>Zaus caeruleus</i> Campbell, 1929	10.3	×	Norfolk, Helgoland, Bergen, but principally Arctic and NE Pacific
<i>Zaus goodsiri</i> Brady, 1910	10.3	×	Greenland, Arctic Seas, S North Sea, British Isles, W Norway
<i>Zaus spinatus</i> Goodsir, 1845	5.18		NE Atlantic, incl. Skagerrak and Öresund
Laophontidae			
<i>Asellopsis hispida</i> Brady & Robertson, 1873	12.1-2		British Isles, Brittany, Belgium, German Bight, W & S Norway, Skagerrak, Kiel Bay, Mediterranean
<i>Corbulaseta bulligera</i> (Farran, 1913)	11.3	×	Ireland, Isles of Scilly, Belgium, Mediterranean
<i>Echinolaophonte horrida</i> (Norman, 1876)	3.1		British Isles, Helgoland, N & S Norway, Skagerrak, Kiel Bay, Arctic Seas, Greenland, Iceland, Mediterranean
<i>Esola bulbifera</i> (Norman, 1911)	10.2, 11.3	×	British Isles, E Mediterranean, ?W Australia
<i>Heterolaophonte hamondi</i> Hicks, 1975	10.3	×	Norfolk, Isle of Sylt
<i>Heterolaophonte littoralis</i> (T. & A. Scott, 1893)	12.1-2		British Isles, Helgoland, W Norway, Skagerrak, Kiel Bay, Mediterranean
<i>Heterolaophonte stroemi</i> (Baird, 1834)	10.3		NE Atlantic incl. Kattegat, Arctic Seas, Greenland
<i>Klieonychocamptus kliei</i> (Monard, 1935)	10.3	×	Isles of Scilly, Roscoff
<i>Laophonte cornuta</i> Philippi, 1840	11.3		allegedly cosmopolitan
<i>Laophonte elongata</i> Boeck, 1873	10.1, 10.3		Ireland, Brittany, Helgoland, W Norway, Skagerrak, Mediterranean
<i>Laophonte longicaudata</i> Boeck, 1865	10.1, 12.1-2		British Isles, W Norway, Skagerrak
<i>Laophonte serrata</i> (Claus, 1863)	10.3		British Isles, Helgoland, W Norway, Skagerrak
<i>Paralaophonte breviostris</i> (Claus, 1863)	10.3		British Isles, Brittany, Belgium, W Norway, Skagerrak, Mediterranean, Black Sea
<i>Paronychocamptus curticaudatus</i> (Boeck, 1865)	5.18		British Isles, Brittany, Belgian and Dutch coasts, Isle of Sylt, Helgoland, Skagerrak, Mediterranean
Laophontopsidae			
<i>Laophontopsis borealis</i> Huys & Willems, 1989	12.1-2	×	Norfolk, Eastern Scheldt, S Norway
Leptastacidae			
<i>Aquilastacus serratus</i> Huys & Conroy-Dalton, 2005	11.3	×	Southern Bight of North Sea
<i>Arenocaris bifida</i> Nicholls, 1935	5.12	×	all around coast of U.K., incl. Isle of Man, North Sea coast from Wimereux to Eastern Scheldt, Amrum, Kiel Bay
<i>Leptastacus laticaudatus</i> Nicholls, 1935	5.12		British Isles, continental Europe from Isle of Sylt to Bassin d'Arcachon, Skagerrak, Kiel Bay, W Mediterranean

Table 16. Copepoda (continued).

	Localities	New for Swedish fauna	Known distribution
<i>Leptastacus pygmaeus</i> Huys, 1992	11.3	×	Southern Bight of North Sea
<i>Leptastacus</i> n. sp.	11.3	×	
<i>Paraleptastacus espinulatus</i> Nicholls, 1935	10.2, 11.3	×	all around coasts of British Isles, Brittany, Belgian and Dutch coast, Isle of Sylt, Kiel Bay
<i>Paraleptastacus holsaticus</i> Kunz, 1937	11.3		Murmansk, Kiel Bay, Simrishamn, Gulf of Bothnia (Finnish side), Aberdeenshire, Belgian coast, Bulgaria
<i>Paraleptastacus</i> n. sp.	11.3	×	
<i>Paraleptastacus spinicauda</i> (T. & A. Scott, 1895)	11.3		NE Atlantic incl. Baltic (incl. Luleå Archipelago, Simrishamn and Askö) and W Mediterranean, ?Aral Sea
<i>Paraleptastacus wilsoni</i> Whybrew, 1986	5.1	×	Massachusetts
<i>Psammostacus confluens</i> Nicholls, 1935	5.12	×	Scotland, Wales, French coast from Brittany to Landes, Amrum
<i>Schizothrix rostrata</i> (Nicholls, 1939)	11.3	×	Isle of Grindøy (Tromsø), St. Lawrence River (Canada)
Leptopontiidae			
<i>Leptopontia doopori</i> Huys & Conroy-Dalton, 1996	10.2, 11.3	×	Norfolk, SW Netherlands
<i>Leptopontia punctata</i> Huys & Conroy-Dalton, 1996	11.3		Isle of Bonden, Helgoland
<i>Leptopontia</i> n. sp.	5.12	×	
Longipediidae			
<i>Longipedia coronata</i> Claus, 1863	10.1, 10.2		NE Atlantic, incl. Skagerrak and Mediterranean
<i>Longipedia helgolandica</i> Klie, 1949	5.12		NE Atlantic, excl. Mediterranean, Namibia
<i>Longipedia minor</i> T. & A. Scott, 1893	10.3		NE Atlantic, incl. Skagerrak, Mediterranean and Black Sea, Gulf of Guinea, Angola
Miraciidae			
<i>Amphiascoides debilis</i> (Giesbrecht, 1881)	12.1-2		British Isles, Brittany, S North Sea, W & S Norway, Skagerrak, Finland
<i>Amphiascopsis cinctus</i> (Claus, 1866)	10.3		Ireland, Brittany, Helgoland, W Norway, Skagerrak, Mediterranean, ?Bermuda
<i>Amphiascus minutus</i> (Claus, 1863)	5.12		British Isles, North Sea, N Norway, Skagerrak, Kiel Bay, Faroes, Iceland, Arctic Seas, Mediterranean
<i>Amphiascus propinquus</i> Sars, 1906	10.3		Isles of Scilly, W Norway, Skagerrak, Kiel Bay
<i>Amphiascus tenuiremis</i> (Brady, 1880)	12.1-2		British Isles, Brittany, German Bight, N Norway, Skagerrak, Kiel Bay, Arctic Seas
<i>Bulbamphiascus incus</i> Gee, 2005	10.2	×	Scotland
<i>Delavalia longicaudata</i> (Boeck, 1873)	10.3		British Isles, N Norway, Skagerrak, Kiel Bay, Arctic Seas
<i>Diosaccus tenuicornis</i> (Claus, 1863)	11.3		British Isles, English Channel, North Sea, N & S Norway, Skagerrak, Belt Sea, Mediterranean, Canary Islands
<i>Eoschizopera syltensis</i> (Mielke, 1975)	11.3	×	Isle of Sylt
<i>Haloschizopera clotensis</i> Moore & O'Reilly, 1993	10.3	×	Scotland
<i>Haloschizopera pygmaea</i> (Norman & T. Scott, 1905)	12.1-2		British Isles, Brittany, Helgoland, W Norway, Skagerrak
<i>Paramphiascella vararensis</i> (T. Scott, 1903)	10.3		Scotland, S Ireland, Helgoland, W Norway, Skagerrak, Kiel Bay, Arctic Seas

Table 16. Copepoda (continued).

	Localities	New for Swedish fauna	Known distribution
<i>Protosammotopa norvegica</i> Geddes, 1968	11.3	×	W Norway, Belgian coast
<i>Psammotopa phyllosetosa</i> (Noodt, 1952)	11.3	×	British Isles, Brittany, Portugal, Belgian coast, German Bight
<i>Rhyncholagena lagenirostris</i> (Sars, 1911)	11.5, 12.1-2	×	S Norway
<i>Robertgurneya ilievocensis</i> (Monard, 1935)	10.3	×	N Ireland, Brittany, Belgian and Dutch coasts
<i>Robertgurneya remanei</i> Klie, 1950	10.3	×	Helgoland
<i>Robertgurneya spinulosa</i> (Sars, 1911)	10.1		W & S Norway, Skagerrak
<i>Stenelia gibba</i> Boeck, 1865	12.1-2		British Isles, Helgoland, N Norway, Skagerrak, Kiel Bay, Arctic Seas
Neobradyidae			
<i>Neobradya pectinifera</i> T. Scott, 1892	11.3		United Kingdom, W Norway, Skagerrak
Normanellidae			
<i>Normanella mucronata</i> Sars, 1909	10.3		British Isles, Brittany, W & S Norway, Skagerrak
Paramesochridae			
<i>Apodopsyllus</i> n. sp.	11.3	×	
<i>Apodopsyllus spinipes</i> (Nicholls, 1939)	11.3	×	W Scotland, Belgian coast, W Mediterranean
<i>Diarthrodella secunda</i> Kunz, 1954	10.2	×	Belgian and Dutch coasts, Isle of Sylt, Kiel Bay, W Mediterranean
<i>Kliopsyllus constrictus</i> (Nicholls, 1935)	5.12	×	British Isles, Belgian and Dutch coasts, Isle of Sylt, Kiel Bay, Portugal, ?Bulgaria
<i>Kliopsyllus holsaticus</i> (Klie, 1929)	10.2, 11.3	×	British Isles, Belgian and Dutch coasts, Isle of Sylt, Kiel Bay, Portugal
<i>Kliopsyllus longifurcatus</i> Scheibel, 1975	11.3	×	Isle of Sylt, Kiel Bay
<i>Kliopsyllus paraholsaticus</i> Mielke, 1975	5.12	×	Isle of Sylt, Belgian coast
<i>Kliopsyllus perharidiensis</i> (Wells, 1963)	5.12	×	British Isles, Roscoff, ?Angola
<i>Kliopsyllus</i> n. sp. 1	11.3	×	
<i>Kliopsyllus</i> n. sp. 2	5.12	×	
<i>Leptopsyllus</i> n. sp.	11.3	×	
<i>Paramesochra dubia</i> T. Scott, 1892	11.3		British Isles, Brittany, Helgoland, S Norway, Skagerrak
<i>Paramesochra helgolandica</i> Kunz, 1937	5.12		Irish Sea, Belgian and Dutch coasts, Isle of Sylt, Helgoland, Skagerrak, Beltsee, ?Bulgaria
<i>Paramesochra mielkei</i> Huys, 1987	10.2, 11.3	×	Southern Bight of North Sea, Isle of Sylt
<i>Paramesochra pterocaudata</i> Kunz, 1936	11.3		Helgoland, Skagerrak
<i>Paramesochra</i> n. sp.	5.12	×	
Paramesochridae n. gen. n. sp.	11.3	×	
<i>Remanea arenicola</i> Klie, 1929	11.3		British Isles, Baltic (incl. Simrishamn and Gdansk), Portugal
<i>Scottopsyllus (Intermedopsyllus) intermedius</i> (T. & A. Scott, 1895)	10.2, 11.3		British Isles, Dutch and Belgian coasts, Isle of Sylt, Helgoland, Skagerrak, Öresund, Kiel Bay, Portugal, ?Bulgaria
<i>Scottopsyllus (Scottopsyllus) minor</i> (T. & A. Scott, 1895)	10.2, 11.3		British Isles, Dutch and Belgian coasts, Isle of Sylt, Skagerrak, Kiel Bay, France, ?Bulgaria
<i>Scottopsyllus (Scottopsyllus)</i> n. sp.	10.2	×	
Parastenheliidae			
<i>Karllangia ornatissima</i> (Monard, 1935)	11.3	×	Isles of Scilly, Roscoff, Ile de Ré, Israel
Peltidiidae			
<i>Alteutha interrupta</i> (Goodsir, 1845)	10.3		British Isles, Shetlands, N France, S North Sea, W Norway, Skagerrak, Mediterranean
<i>Peltidium purpureum</i> Philippi, 1839	10.3		British Isles, W Norway, Skagerrak, Mediterranean

Table 16. Copepoda (continued).

	Localities	New for Swedish fauna	Known distribution
Porcellidiidae			
<i>Porcellidium sarsi</i> Bocquet, 1948	10.3	×	British Isles, W Norway, Roscoff
Pseudotachidiidae			
<i>Danielssenia typica</i> Boeck, 1873	10.1, 12.1-2		NE Atlantic, incl. Skagerrak and Baltic, Arctic Seas, Alaska
<i>Idomene forficata</i> Philippi, 1843	10.1		British Isles, W Norway, Oslofjorden, Skagerrak, Kattegat, F53, Italy
<i>Jonesiella fusiformis</i> Brady, 1880	12.1-2	×	English Channel, W coast of Britain, Isles of Scilly, Mediterranean
<i>Micropsammis noodti</i> Mielke, 1975	5.12	×	Isle of Sylt
Rhizothrichidae			
<i>Rhizothrix curvata</i> Brady, 1880	11.3		British Isles, Brittany, Helgoland, SW Norway, Skagerrak, Öresund, Mediterranean, Black Sea
<i>Rhizothrix gracilis</i> (T. Scott, 1903)	5.12	×	British Isles, Isle of Sylt, Helgoland, S Norway, German Baltic, W Mediterranean
<i>Rhizothrix minuta</i> (T. Scott, 1903)	5.12		British Isles, Brittany, Helgoland, Öresund, Kiel Bay
Tachidiidae			
<i>Microarthridion littorale</i> (Poppe, 1881)	5.12		NE Atlantic incl. Öresund and Baltic, Novaya Zemlya
<i>Tachidius discipes</i> Giesbrecht, 1881	5.18		NE Atlantic incl. Öresund and Baltic, Svalbard, Italy
Tegastidae			
<i>Tegastes longimanus</i> (Claus, 1863)	10.3	×	W Norway, Helgoland
<i>Tegastes satyrus</i> (Claus, 1860)	Whale bone bacterial film	×	SW Norway, W Mediterranean
Tetragonicipitidae			
<i>Pteropsyllus consimilis</i> (T. Scott, 1894)	11.3	×	British Isles, Brittany, W & S Norway
Thalestridae			
<i>Amenophia peltata</i> Boeck, 1865	10.3		British Isles, Helgoland, W Norway, Skagerrak, Kiel Bay, Arctic Seas, Greenland
<i>Parathalestris clausi</i> (Norman, 1868)	10.3		British Isles, N France, North Sea, Helgoland, N Norway, Skagerrak, Kiel Bay, Shetlands
<i>Parathalestris irelandica</i> Roe, 1958	10.3	×	Ireland, Belgian coast
<i>Thalestris longimana</i> Claus, 1863	5.18		British Isles, N & W France, Helgoland, W Norway, Skagerrak, Kiel Bay, Faeroes, Arctic Seas, Greenland, Mediterranean
Thompsonulidae			
<i>Thompsonula hyaenae</i> (Thompson, 1889)	10.3		NE Atlantic, incl. Skagerrak and Mediterranean
Tisbidae			
<i>Scutellidium longicauda</i> (Philippi, 1840)	10.3		NE Atlantic incl. Skagerrak, Mediterranean and Black Sea
<i>Tisbe holothuriae</i> Humes, 1957	10.3	×	SW England, Belgium, Helgoland, Portugal, Italy
Misophrioida			
Misophriidae			
<i>Misophria pallida</i> Boeck, 1865	3.2	×	Scotland, W Norway, Mediterranean
Platycopioida			
Platycopiidae			
<i>Platycopia perplexa</i> Sars, 1911	3.2	×	S Norway

2001) have verified and corrected Swedish records for certain members of the families Ectinosomatidae and Longipediidae.

Analysis of the samples obtained during the workshop revealed 159 species of Harpacticoida belonging to 31 families (out of 35 known from Sweden) and an additional 6 species of hyperbenthic Platycopioidea, Cyclopoida, Misophrioida and Calanoida. Of these, 78 species (47 %) have not been recorded from Sweden before, and 13 species (including one new genus) proved new to science. This effectively raises the number of harpacticoid species in the Swedish marine fauna to over 350, representing about 10 % of the +3300 marine species described worldwide. All new species are interstitial representatives, indicating the mesopsammic fauna from sandy beaches and subtidal shell-gravel (maerl) is still imperfectly known. This observation can obviously be extrapolated to the whole of northwest Europe since several interstitial species found during this study have thus far not been recorded from outside their type locality, e.g. *Stenocaropsis pristina* (Isles of Scilly), *Noodtiella gracile*, *Micropsammis noodti* and *Eoschizopera syltensis* (Isle of Sylt) and *Aquilastacus serratus* (Southern Bight of the North Sea).

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Biodiversity, morphology and ecology of small benthic organisms

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MEIOFAUNA MARINA

Biodiversity, morphology and ecology
of small benthic organisms

Volume 17

CONTENTS

- Willems, W. R., M. Curini-Galletti, T. J. Ferrero, D. Fontaneto, I. Heiner, R. Huys, V. N. Ivanenko, R. M. Kristensen, T. K anneby, M. O. MacNaughton, P. Mart inez Arbizu, M. A. Todaro, W. Sterrer and U. Jondelius: Meiofauna of the Koster-area, results from a workshop at the Sven Lov en Centre for Marine Sciences (Tj arn , Sweden) 1
- Vandepitte, Leen, Jan Vanaverbeke, Bart Vanhoorne, Francisco Hernandez, Tania Nara Bezerra, Jan Mees and Edward Vanden Berghe: The MANUELA database: an integrated database on meiobenthos from European marine waters 35
- Mokievsky, Vadim O., Maria A. Miljutina, Alexei V. Tchesunov and Pavel V. Rybnikov (†): Meiobenthos of the deep part of the White Sea 61
- P erez-Garc a, Jos e A., Maickel Armenteros, Lisbet D az-Asencio, Misael D az-Asencio, Alexei Ruiz-Abierno, Ra ul Fern andez-Garc es, Yoelvis Bola nos-Alvarez and Carlos Alonso-Hern andez: Spatial distribution of nematode assemblages in Cienfuegos Bay (Caribbean Sea), and their relationships with sedimentary environment 71
- Adrianov, Andrey V., Anastassya S. Maiorova and Vladimir V. Malakhov: Meiofaunal stages in the development of the sipunculans *Thysanocardia nigra* (Ikeda, 1904) and *Themiste pyroides* (Chamberlin, 1920) from the Sea of Japan (Sipuncula: Sipunculidea) 83
- da Rocha, Cl elia M. C., M onica M. Ver osa,  rika C. L. dos Santos, D bora F. Barbosa, Daniel A. S. de Oliveira and Jos e R. B. de Souza: Marine tardigrades from the coast of Pernambuco, Brazil 97
- Bartsch, Ilse: Six upper littoral halacarid mites (Acari: Halacaridae) from Moreton Bay, Queensland. Description of three new species and three new records 103
- Hummon, William D.: *Tetranchyroderma parapapui* n. sp. (Gastrotricha, Thaumastodermatidae), a North American analog to the European *T. papui*, with a redescription of the latter 121
- Delogu, Valentina and Marco Curini-Galletti: Otoplanidae (Platyhelminthes, Proseriata) from the northern Adriatic Sea 133

