Caprellidea (Crustacea; Amphipoda) from Faroe Islands Waters, with a Key to the North-Atlantic Species

Caprellidea (Crustacea; Amphipoda) í føroyskum sjógvi, við einum lykli til onnur sløg í Norðuratlantshavi

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Úrtak

Tvey sløg av caprellidea, sum ikki fyrr høvdu verið skrásett í sjónum kring Føroyar, vórðu eyðmerkt undir BIOFAR-verkætlanini, og tað loddrætta útbreiðsluøki hjá nøkrum øðrum sløgum, sum longu vóru kend í umráðnum, vaks. Caprellidfaunan kring Føroyar er ein løgin blanding av sløgum, ið liva í heitum sjógvi, og sløgum, ið liva í køldum sjógvi, sum koma fyri í óvanligum temperaturum. Í greinini er ein listi yvir caprellidsløg í Føroyum saman við viðmerkingum um landafrøðiligu og loddrøttu útbreiðslu teirra, og eisini eru lyklar til caprellidea í Norðuratlantshavi.

Abstract

During the BIOFAR program, two species of caprellids previously unrecorded from the waters surrounding the Faroe Islands where identified, and the vertical distribution range increased for a number of other species already known from the area. The caprellid fauna around the Faroes islands is a peculiar mixture of warm and cold water species, found at unusual temperatures. A species list of the caprellids from the Faroe Islands together with notes on their geographical and vertical distribution, and keys to the North Atlantic Caprellidea are given.

Introduction

The caprellid fauna around the Faroe Islands was previously recorded by Stephensen (1929). This, otherwise comprehensive work, was limited by the fact that few deep water surveys had been made at that time despite the fact that, bathymetrically and hydrographically, this is a very interesting area. One of the few deep water surveys which had been done was the Danish Ingolf Expedition, but the caprellids from this expedition had not been processed at that time (Stephensen, 1944).

The hydrography of the region is known to be very complex (Westerberg, 1990. Hansen, 1984. Stein, 1988. Malmberg and Kristmannsson 1992). A number of caprellid species (*Aeginella spinosa, Caprella microtuberculata, Metacaprella horrida, Phtisica mariner*) have been found way outside their known temperature range. This is considered to be a reflection of the complex hydrography. Fosså *et al.* (1992) reported a close correlation between species composi-

tion and water masses for the pelagic mysids and other crustaceans. Although the caprellid data would appear to contradict this, it may just be a reflection of the limited mobility, of some benthic faunal groups (such as caprellids), to respond to fluctuations in the physical parameters.

Material and methods

The station list, and the sampling gear used, have been thoroughly described by Nørrevang *et al.* (1994). A review of the water masses involved is given by Brattegard and Meland (1997).

The samples were sorted on board, fixed in 4% formalin with a borax buffer and transferred to 80% alcohol. The material is deposited in the Museum of Natural History, Tórshavn, Faroe Islands.

Results

Species list

Order AMPHIPODA

Suborder CAPRELLIDEA

Family CAPRELLIDAE White, 1847

Genus *Aeginella* Boeck, 1861

A. spinosa Boeck, 1861
Good description: Sars (1895 pl. 235).
Previous records from Faroe Island waters: Faroe Bank, Borðoyarnes, off Kalsoy (Stephensen, 1929). No locality given (McCain, 1968). From 60-63°N 7-9°W (Larsen, unpublished data)
BIOFAR station: 6, 7, 19, 28, 29, 32, 51, 56, 77, 82, 89, 100, 170, 172, 267, 269, 357, 380, 410, 424, 425, 500, 506, 546, 718, 126, 749, 769, 770, 776, 9012, 9018.
Depth range: 18-1026m.
Temperature range: -0.85 – 9.1 °C
Distribution: From Murmansk to Haugesund. Spitsbergen. Bear Island. South and east of Iceland. East and west of Greenland. Off Nova Scotia and Cape Cod.

Genus *Aeginina* Norman, 1905

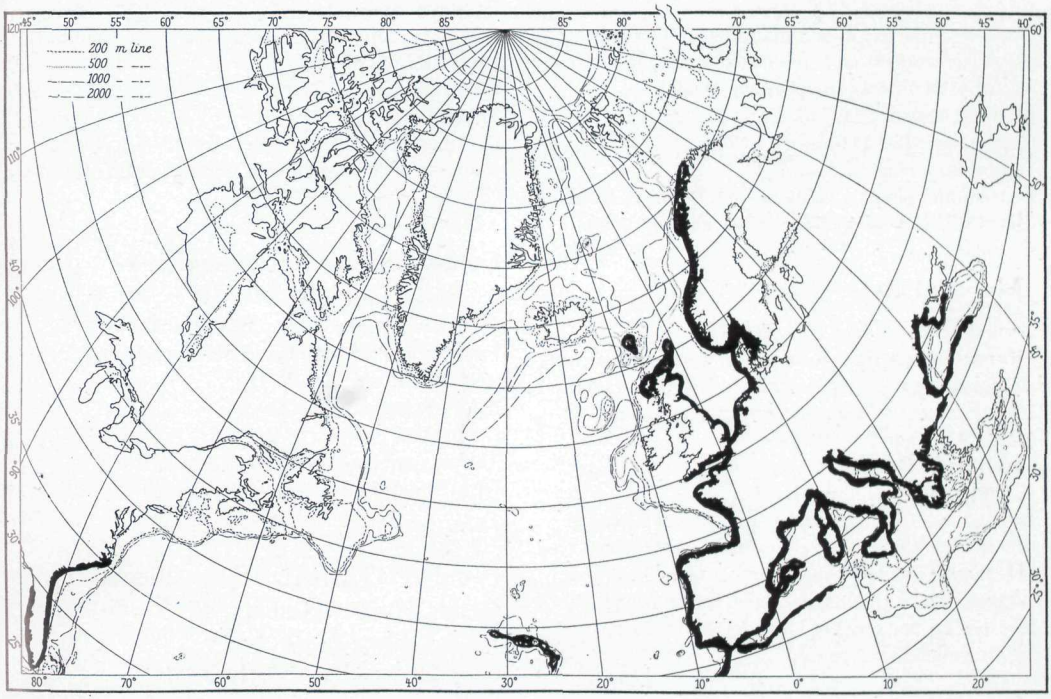
A. longicornis Krøyer, 1842
Good description: Laubitz (1972:24).
Previous records from Faroe Island waters: No locality given (McCaine, 1968. Laubitz, 1972).
BIOFAR station: None.
Depth range: 1-2258m.
Temperature range: -1.5 – 2.0 °C.
Distribution: South oast of Norway. Jan Mayen. Bear Island. Svalbard. Franz Josef Land. Nova Selmiya. Off Murmansk. West and northeast coast of Greenland. Scotland, Iceland, Shetland Islands. From Newfoundland to North Carolina. Arctic coast of Canada and Hudson Bay.

Genus *Caprella* Lamarck, 1801

C. ciliata G.O. Sars, 1883
Good description: Sars (1895 pl. 239).
Previous records from Faroe Island waters: None.
BIOFAR station: 404.
Depth range: 70-1838m.
Temperature range: 7.8 °C.
Distribution: South coast of Norway. Denmark. South and east of Iceland. South Denmark Strait.

C. liniaris (Linné, 1767)
Good description: Sars (1895 pl. 236).
Previous records from Faroe Island waters: No locality given (McCaine, 1968. Laubitz, 1972). Extensively (Stephensen, 1929).
BIOFAR station: 3, 51, 65, 368, 370, 408.
Depth range: 0-400m (1000m*). *Pers.comm. Dr. S. Vassilenko.
Temperature range: 7.1 – 8.2 °C.
Distribution: Coast of Europe from the English Channel to Murmansk. Svalbard. East and west of Iceland. Baffin Island. Coast from Nova Scotia to Cape Cod.

C. microtuberculata G.O. Sars, 1879
Good description: Laubitz (1972:38).
Previous records from Faroe Island waters: Ingolf sta. 2, 3, 44, 144. (Laubitz, 1972).
BIOFAR station: 76, 380.
Depth range: 40-1440m.
Temperature range: 0.6 – 8.2 °C.
Distribution: East Greenland. North and southeast of Iceland. Svalbard. Off Bear Island. Franz Josef Land. Nova Selmiya. Off North Cape.



Map 1. North Atlantic distribution of Phtisica marina.
Kort 1. Útbreiðslan av Phtisica marina í Norðuratlantshavi.

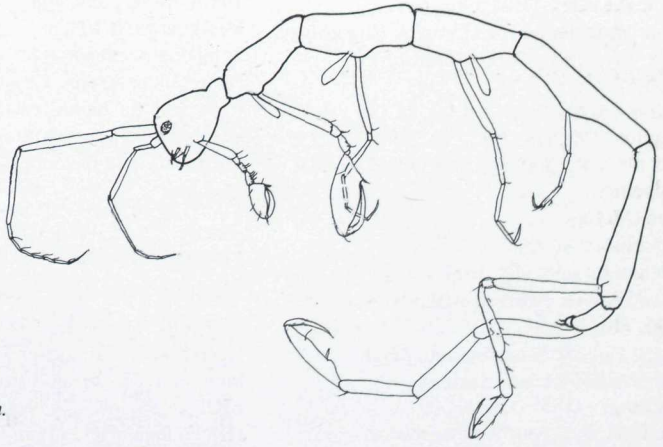


Fig. 1. Phtisica marina, adult male. Scalebar 13 mm.
Mynd 1. Phtisica marina, vaksið kalldýr. Máteind 13 mm.

C. rinki Stephensen, 1917
Good description: Laubitz and Mills (1972:374).
Previous records from Faroe Island waters: Ingolf st. 44. 61°42'N 9°36'W (Stephensen, 1944).
BIOFAR station: 335, 738.
Depth range: 180-1416m.
Temperature range: 2.5 – 3.7 °C.
Distribution: Single specimens from Denmark Strait, Cape Cod, St. Lawrence Bay, Cape Farevel, West Greenland.

C. septentrionalis Krøyer, 1879
Good description: McCain (1968:47).
Previous records from Faroe Island waters: Extensively all around the Faroes. (Stephensen, 1929. McCaine, 1968. Laubitz, 1972. Larsen, unpublished data).
BIOFAR station: 98, 113, 149.
Depth range: 0-1026m.
Temperature range: 0.0 – 7.9 °C.
Distribution: Coast of Europe from Bay of Biscay to Murmansk. Nova Selmiya. Svalbard. Jan Mayen. Coast of Iceland. Shetland Island. Coast of Greenland from Angmassalik to Upernavik. Thule. Baffin Island. Hudson Bay and coast of Labrador. Nova Scotia. Newfoundland to Cape Cod.

Genus *Metacaprella* Mayer, 1903

M. horrida (G.O. Sars, 1877)
Good description: Laubitz (1972:64).
Previous records from Faroe Island waters: No locality given (Laubitz, 1972). Extensively (Larsen, unpublished data).
BIOFAR station: 15, 41, 48, 51, 76, 77, 82, 98, 113, 124, 169, 170, 171, 172, 174, 188, 228, 230, 274, 275, 361, 424, 447, 479, 480, 500, 502, 699, 700, 750, 751, 752, 769, 770, 9012.
Depth range: 35-1359m.
Temperature range: -0.85 – 9.0 °C.
Distribution: Coast of mid- and north Norway. Svalbard. Nova Selmiya. North Scotland. Shetland Island. Irminger Sea. North of Iceland. Cape Farevel. Scoresbysund. Single specimens from Arctic Canada. Shelf of Newfoundland.

Genus *Proaeginia* Stephensen, 1940

P. norvegica Stephensen, 1931.
Good description: Laubitz and Mills (1972:380).
Previous records from Faroe Island waters: None
BIOFAR station: 726.
Depth range: 174-2702m.
Temperature range: 6.7 °C.
Distribution: Single specimens from North Norway, southeast Iceland, southwest Greenland and off Cape Cod.

Genus *Thorina* Stephensen, 1944

T. spinosa Stephensen, 1944
Good description: Stephensen (1944:50).
Previous records from Faroe Island waters: 61°15'N 9°35'W (Stephensen, 1944).
BIOFAR station: None.
Depth range: 900m.
Temperature range: Unknown.
Distribution: Know from type locality only.

Family PHTISICIDAE Vassilienko, 1968

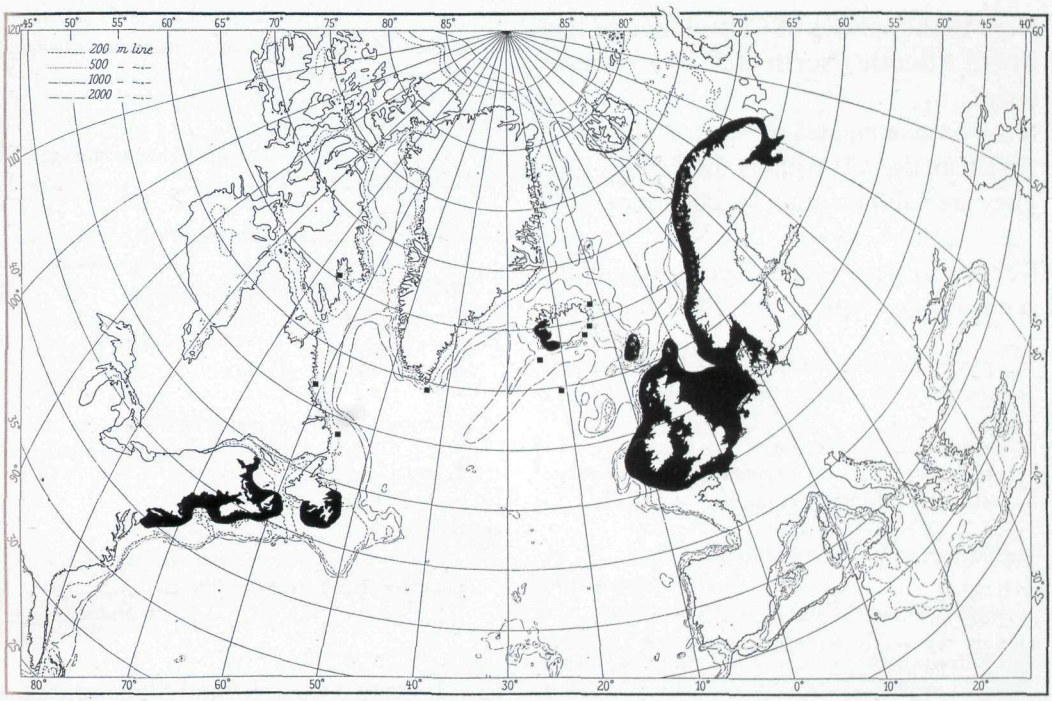
Genus *Phtisica* Slabber, 1769

P. marina Slabber, 1769
Good description: McCain (1968:96).
Previous records from Faroe Island waters: Skálafjørður (Stephensen, 1929). Tórshavn (Larsen, unpublished data). No locality given (McCaine, 1968).
BIOFAR station: 6, 7, 8, 27, 29, 32, 73, 77, 78, 103, 165, 176, 357, 359, 408.
Depth range: 0-1032m.
Temperature range: -0.85 – 9.1°C.
Distribution: Azores. Coast from west Africa to North Cape, incl. the North coast of the Mediterranean Sea. East, north and northwest of the British Islands. Shetland. Coast of south Carolina to the Gulf of Mexico.

Family PROTELLIDAE McCaine, 1970

Genus *Protellina* Stephensen, 1944

P. ingolfi Stephensen, 1944
Good description: Larsen (1996).
Previous records from Faroe Island waters: None.
BIOFAR station: 478.
Depth range: 630-1435m.
Temperature range: -0.8 – (-0.4) °C.
Distribution: Norwegian Sea 65°34'N 7°31'W. North Iceland.



Map 2. North Atlantic distribution of Caprella linearis.
Kort 2. Útbreiðslan av Caprella linearis í Norðuratlantshavi.

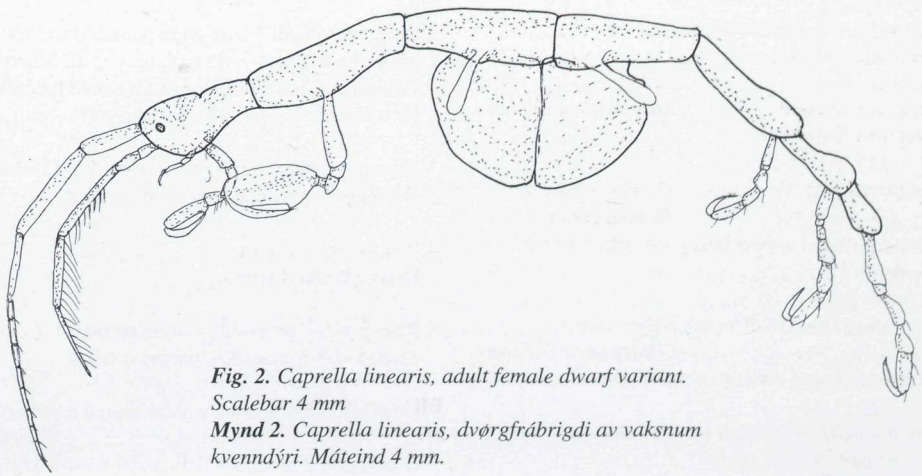


***Fig. 2.** Caprella linearis, adult female dwarf variant. Scalebar 4 mm*
***Mynd 2.** Caprella linearis, dvørgfrábrigdi av vaksnum kvenndýri. Máteind 4 mm.*

Keys to the species of Caprellidea in the North Atlantic (North of 55 degrees latitude).

It has been attempted to construct keys, which are useable without dissection. They are valid for adult specimens only.

Key 1: To genera and species where the genus is monotypic in the North Atlantic.

1. 7 pair of well developed pereopods ***Phtisica marina***
   Max. 5 pairs of well developed pereopods..... 2

2. Gnathopod 2 dactylus, longer than propodus reaching merus ***Protoaeginella muriculata***
   Gnathopod 2 dactylus not reaching merus..... 3

3. Abdomen with 5 clearly defined segments ***Cercops holbölli***
   Abdomen without 5 clearly defined segments.. 4

4. 3 pairs of gills ***Protellina ingolfi***
   2 pairs of gills..... 5

5. Antenna 1 with accessory flagellum ***Parvipalpina verrucosa***
   Antenna 1 without accessory flagellum..... 6

6. Pereopod 3 and 4 reduced 7
   Pereopod 3 and 4 missing..... 11

7. Pereopod 5 reduced. ***Mayerella limnicola***
   Pereopod 5 not reduced 8

8. Pereonites appear hexagonal when viewed dorsally ***Hemiaegina minuta***
   Pereonites do not appear hexagonal when viewed dorsally..... 9

9. Pereopod 5 placed midlength on pereonite 5 ***Luconacia incerta***
   Pereopod 5 placed distally on pereonite 5 10

10. Head and pereonite 1 with 1 large spine, pereonite 2 with one pair of large spines ***Pseudoprotella phasma***
    Head and all pereonites smooth ***Paracaprella tenuis***

11. Pereopod 5 strongly reduced ***Pariambius typicus***
    Pereopod 5 not reduced 12

12. Mandibular palp absent ***Caprella/Metacaprella*** (key 2)
    Mandibular palp present..... 13

13. Head and pereonite 1 with only 1 spine, pereonite 2 with 1 pair of large spines ***Aeginella spinosa***
    Other spine formula or spines missing..... 14

14. Eyes absent ***Thorina*** (key 3)
    Eyes present 15

15. Pereonite 4 and 5 50% longer than pereonite 3 ***Proaeginina norvegica***
    Pereonite 3, 4 and 5 of similar size 16

16. Antenna 2 flagellum with 3 articles ***Parpipalpus capillaceus***
    Antenna 2 flagellum with 2 articles ***Aeginina*** (key 4)

Key 2: Genera Caprella and Metacaprella

1. Antenna 2 without swimming setae, body very slender ***C.acanthifera***
   Antenna 2 with swimming setae, body normal . 2

2. Pereonites 2 and 3 with large paired tubercles, pereonite 5-7 basis with tubercles ***C. tuberculata***
   Pereonites 2 and 3 without large paired tubercles, pereonite basis 5-7 without tubercles..... 3

3. Ventral spine between gnathopods 2 ***C. equilibra***
   No ventral spine between gnathopods 2..... 4

4. Head with rostrum 5
   Head without rostrum..... 7

5. Pereopod 5-7 propodus margin convex ***C. andrea***
   Pereopod 5-7 propodus margin concave 6

6. Gnathopod 2 propodus with proximal poison tooth ***C. penantis***
   Gnathopod 2 propodus with distal poison tooth ***C. diladata***

7. Gnathopod 2 basis with distal and medial spines ***C. carina***
Gnathopod 2 basis without medial spine 8

8. Antenna 1 Flagellum longer than peduncle 9
Antenna 1 flagellum shorter than peduncle 10

9. Pereonite 1-4 ornamentation consisting of spines ***C. dubia****
Pereonite 1-4 ornamentation consisting of tubercles ***C. microtuberculata****

10. Pereopod 5-7 propodus margin without spines ***C. unica***
Pereopod 5-7 propodus margin with spines 11

11. Pereonite 5-7 without ornamentation 12
Pereonite 5-7 with ornamentation 13

12. Male gnathopod 2 propodus densely setose, female pereonite 5 50% larger than pereonite 4 ***C. ciliata***
Male gnathopod 2 propodus not densely setose, female pereonite 5 not larger than pereonite 4.. 13

13. Head without spines 14
Head with spines 15

14. Head with 1 large elongate tubercle ***C. septentrionalis var. punctata***
Head without large elongate tubercule..... 18

15. Head with single spine 16
Head with at least one pair of spines 17

16. Eye diameter as large as antenna 1 thickness, body densely covered with small tubercles ***C. rinki***
Eye diameter smaller than antenna 1 thickness, unpaired spines on pereonites ***C. septentrionalis var. monocera***

17. Head with clearly defined paired spines, body densely covered with small unpaired spines ***Metacaprella horrida***
Head with weakly defined paired spines, body smooth ***C. linearis***

18. Male gnathopod 2 basis of same length as pereonite 3, Ratio of total length to length of basis greater than 13. ***C. liniaris***
Male gnathopod 2 basis shorter than pereonite 3, Ratio of total length to length of basis less than 13 ***C. septentrionalis var. loveni***

* As seen below, these 2 species are considered variations of the same species.

Key 3: Genus *Thorina*

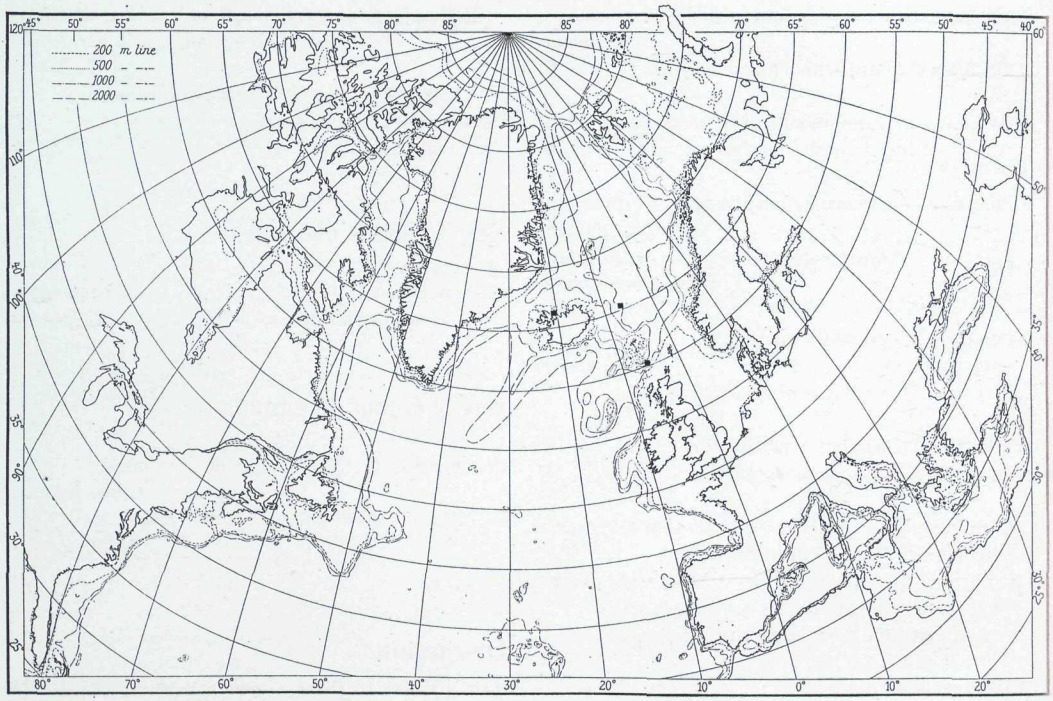
1. Body smooth ***T. elongata***
Body with large spines ***T. spinosa***

Key 4: Genus Aeginina

1. Antenna 1 flagellum longer than peduncle. ***A. aenigmatica***
Antenna 1 shorter flagellum than peduncle ***A. longicornis***

Discussion

The faunistic data show some correlations between water temperature and species composition. The fauna could be divided into a warm water group and a eurytherm species group. No exclusive cold water species group were found, and even species considered to be arctic or subarctic (*Aeginella spinosa. Caprella microtuberculata, Metacaprella horrida*) where found at temperatures above 9.0°C. This is a comparatively high temperature for arctic species, and may be an influence of the seasonal variations in the dominant water masses. A typically warm-water species, *Phtisica mariner*, was found at an unheard of low temperature of -0.85°C (although only once), also suggesting very variable conditions. As for the salinity, however, all the Caprellidea from the BIOFAR cruises where taken within a relatively narrow



Map 3. *North Atlantic distribution of Protellina ingolfi.*
Kort 3. *Útbreiðslan av Protellina ingolfi í Norðuratlantshavi.*

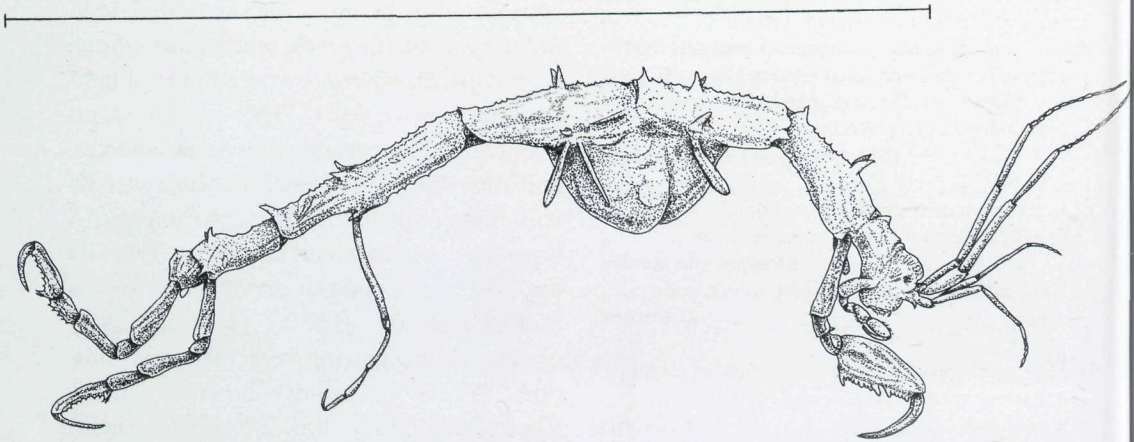


Fig. 3. *Protellina ingolfi, adult female. Scalebar 19 mm.*
Mynd 3. *Protellina ingolfi, vaksið kvenndýr. Máteind 19 mm.*

salinity range (34.88 – 35.30 0/00) and no correlation could be found with this parameter.

During the BIOFAR program, *C. ciliata* and *P. norvegica* were recorded for the first time from Faroe Island waters. The bathymetric distribution has been extended for *A. spinosa*, *C. ciliata*, *P. marina* and *P. ingolfi*. Other material also extended the bathymetric range for *M. horrida*.

The result of the BIOFAR program sparked a BIOFAR II program, concentrating on the shallow water fauna. This program is still in progress, but the material collected so far indicates that the caprellid fauna in shallow water is almost exclusively dominated by *C. septentrionalis* in any of its morphological forms.

No new species of caprellids where found in the area, but a dwarf variant of *C. liniaris* was identified from station 322 and 542. Ovigous specimens of an unusual small size were found, but dissection of mouthparts showed no variation from that of *C. liniaris*. There is, therefore, no basis for erecting a new species. Specimens of *C. microtuberculata* collected during the BIOFAR and BIOICE cruses indicate that *C. dubia* Hansen, 1888 is a junior synonym of *C. microtuberculata* (Larsen research in progress). New information provided from specimens of *P. ingolfi* collected from station 478 (and BIOICE station 2501) has provided a reevaluation of the systematic position of this species (Larsen, 1996; 1997).

Acknowledgments

Funding for this research has been provided by the Danish Research Academy. I am grateful to Dr. N.N. Tait, Macquarie University, for critical reading of the manuscript. To Dr. O.S. Tendal for suggesting the work to be done in the first place.

Contribution from the BIOFAR program

References

Brattegard, T. and Meland, K. 1997. Mysidacea (Crustacea) in the Faroe area. *Fróðskaparrit*, 45: 69-95.

Fosså, J.H., Brattegard, T. and Westerberg, H. 1992. Fauna groups related to distribution of water masses in Faroes water. *Norðurlandahúsið ársrit 1991-1992*: 76-77 (Abstract of lecture)

Hansen, H.J. 1888. Oversigt over det vestlige Grønlands fauna af malacistrake krebsdyr. (Malacostraca marin Groenlanddiae occidentalis). *Videnskabelige meddelelser Naturhistorisk Forening*. 4(9): 5-217.

Hansen, B. 1984. The circulation of the Northern part of the Northeast Atlantic. *Rit Fiskideildir. Journal of the Marine Research Institute of Reykjavik*. 9: 110-127.

Larsen, K. 1996. A redescription of *Protellina ingolfi*, Stephensen 1944 (Crustacea, Amphipoda) from the Northeastern atlantic, *Journal of the marine biological Association of the United Kingdom*. 76: 657-664.

Larsen, K. 1997. A new species of *Metacaprella* (Crustacea: Amphipoda: caprellidea) from east Africa, with key to the genera of Protellidae and discussion of generic characters. *Journal of Natural History*. 31: 1203-1212.

Laubitz, D.R. 1972. The caprellidae (Crustacea, Amphipoda) of the Atlantic and Arctic Canada. *Publications in Biological Oceanography*. 4: 1-82.

Laubitz, D.R. and Mills, E.l. 1972. Deep-Sea Amphipoda from the western North Atlantic ocean. caprellidae. *Canadian Journal of Zoology*. 50(4): 371-383.

Malmberg, S.Å. and Kristmannsson, S.S. 1992. Hydrographic conditions in Icelandic waters, 1980-1989. *ICES marine Science symposium*. 195: 76-92.

McCain J.C. 1968. The caprellidae (Crustacea, Amphipoda) from the western North Atlantic. *Contribution from the Smithsonian Institution. U.S. National Museum*. 278: 1-147

Nørrevang, A., Brattegard, T., Josefson, A.B., Sneli, J.-A. and Tendal, O.S., 1994. List of BIOFAR stations. *Sarsia* 79: 165-180.

Sars, G.O. 1895. Amphipoda. Parts XXXI and XXXII.

An Account of the Crustacea of Norway with short descriptions and figures of all the species. 1. I-VIII: 673-711, supplement. pls. 1-8. Cammermeyer, Christiania (Oslo).

Stein, M. 1988. Variability of Watermasses, Currents and Ice in the Denmark Strait. *NAFO Science Counsil Studies*. 12: 71-84.

Stephensen, K. 1929. Marine Crustacea, Amphipoda. *Zoology of the Faroes.* 2(1): 1-40.

Stephensen, K. 1944. Malacostraca 8, Amphipoda 4. *The Dansih Ingolf Expedition*. 3D: 1-51.

Westerberg, H. 1990. Benthic temperature in the Faroe area. Department of Oceanography, University of Gothenburg.Report no 51. 15 pp. + maps. ISSN 0349-0122.