STEGOCEPHALID (CRUSTACEA, AMPHIPODA) SPECIES COLLECTED IN THE BIOFAR AND BIOICE PROGRAMMES

JØRGEN BERGE & WIM VADER

SARSIA

BERGE, JØRGEN & WIM VADER 1997 12 22. Stegocephalid (Crustacea, Amphipoda) species collected in the BIOFAR and BIOICE programmes. – *Sarsia* 82:347-370. Bergen. ISSN 0036-4827.

The present paper presents a survey of the stegocephalid (Crustacea, Amphipoda) species collected during both the BIOFAR programme around the Faroe Islands and the BIOICE programme around Iceland. Altogether, the two programmes have secured 2419 stegocephalid specimens belonging to 16 species and 10 genera. 525 of these specimens were secured during the BIOFAR programme (47 different stations) while the remaining 1894 specimens were secured by the BIOICE programme from 66 different stations. Two new species are described, and 10 species new to the area reported.

Jørgen Berge & Wim Vader, Department of Zoology, Tromsø Museum, University of Tromsø, N-9037 Tromsø, Norway.

KEYWORDS: Amphipoda; Stegocephalidae; BIOFAR; BIOICE.

INTRODUCTION

The BIOFAR and the BIOICE programmes were large-scale sampling and identification surveys in which one of the main goals was to gain a taxonomic overview of the marine benthic fauna around the Faroe Islands and Iceland, respectively. The major part of the sampling in the BIOFAR programme was carried out from 1987 to 1990, while the BIOICE sampling was done from 1991 to 1994. The material was sorted to higher taxonomic categories (families for the amphipods), and several workshops have been arranged in which numerous taxonomists and students from all over the world have participated to identify the material belonging to their respective groups.

This work is based upon the collected stegocephalid species from both programmes, a total of 2419 specimens belonging to 16 species in 10 genera. To the authors' knowledge, this is the largest collection of stegocephalid amphipods in the world.

MATERIAL AND METHODS

This study is based almost entirely on material from the BIOFAR and the BIOICE projects. Supplementary material of *Stegocephalina biofar* sp. nov. was provided by Prof. A. Brandt (Hamburg, Germany).

Available data of the stations in which the specimens were captured are given in Appendixes 1 & 2. The temperatures for the BIOFAR stations are estimated bottom temperatures, see NØRREVANG & al. 1994. The mean temperature and depth (and corresponding standard deviations, abbreviated SD) that are calculated for the species are based on these data. Both mean temperature and mean depth are based on number of specimens, not number of stations.

The material was dissected under a Wild dissecting microscope. All dissected parts were then prepared in polyvinyl-lactophenol stained with rose-bengal. The drawings of these parts were then prepared using a Zeiss microscope. Both habitus drawings were prepared using the Wild dissecting microscope. Descriptions have been generated from the taxonomic database programs Taxasoft (GOUDA 1993) and Delta (DALLWITZ & al. 1996). The classification of setae mainly follows that of WATLING (1989). Deviations from this classification are explained in BERGE & VADER (1997b).

Type material is kept at the Icelandic Museum of Natural History.

Abbreviations. A1: Antenna 1; A2: Antenna 2; MX1: Maxilla 1; MX2: Maxilla 2; MXP: Maxilliped; L: Labium; LMND: Left mandible; RMND: Right mandible; LBR: Labrum; P1: Pereopod 1; P2: Pereopod 2; P3: Pereopod 3; P4: Pereopod 4; P5: Pereopod 5; P6: Pereopod 6; P7: Pereopod 7; Cox: Coxa; U1: Uropod 1; U2: Uropod 2; U3: Uropod 3; EP3: Epimeral plate 3; T: Telson

RESULTS

A total of 2419 stegocephalid specimens were collected during the two programmes. The distribution of the specimens to species and programme is listed in Table 1.

A total of 244 samples were collected with either the Rothlisberg & Pearcy epibenthic sampler (RP sampler) or the Detritus sledge during the BIOFAR programme. The corresponding number from the BIOICE programme was 360. In Table 2 , the minimum and maximum values of temperature and depth for each species are given (data from both programmes combined).

TAXONOMY AND DISTRIBUTION

Genus *Andaniella* Sars, 1891

Type species. *Andania pectinata* Sars, 1883

Species: *A. integripes* Bellan-Santini & Ledoyer, 1986; *A. pectinata* (Sars, 1883, 1891)

Only *A. pectinata* is known from the area.

Material. 29 specimens from 6 BIOFAR stations (stns 15, 172, 274, 458, 750 & 9014; see Appendix 1).
196 specimens from 24 BIOICE stations (stns 2, 3, 4, 11, 12, 13, 14, 16, 19, 20, 21, 22, 23, 24, 27, 28, 29, 30, 35, 36, 37, 39, 44 & 52; see Appendix 2).

Distribution. Norway; from Trondheimsfjorden, north to Varangerfjorden (Stephensen 1925); Spitsbergen (Stephensen 1925), Iceland, the Faroe Islands, the Davis Strait & Newfoundland (Shoemaker 1931) and Jan Mayen (Stephensen 1925). Often in association with Hydroida and Bryozoa (Sars 1891) and tunicates (Aurivillius 1885 & 1886, Vader 1984). This species is frequently found in cold water (mean temp 0.2 °C, see Table 2), but with a relatively high SD (1.4).

Table 1. List of stegocephalid species captured in the BIOFAR and BIOICE programmes. The numbers in columns 2 and 3 are the total number of specimens of that species captured in the programme. (The number of specimens from the BIOICE project is the total number of specimens identified so far, due to the sorting not yet being finished.)

Species:	BIOFAR	BIOICE
Andaniella pectinata	29	196
Andaniexis eilae	1	55
Andaniexis lupus	155	947
Andaniopsis nordlandica	0	74
Euandania gigantea	1	0
Phippsia gibbosa	0	1
Phippsia roemeri	11	117
Phippsiella bioice	0	23
Phippsiella similis	3	19
Stegocephalina biofar	135	12
Stegocephalina idae	0	9
Stegocephaloides auratus	41	205
Stegocephaloides barnardi	0	71
Stegocephaloides wagini	114	59
Stegocephalopsis ampulla	0	1
Stegocephalus inflatus	45	105

Genus *Andaniexis* Stebbing, 1906

Andania Boeck, 1871 (homonym, Lepidoptera)

Type species. *Andania abyssi* Boeck, 1871

Species. *A. abyssi* (Boeck, 1871); *A. australis* K.H.Barnard,1932; *A. eilae* Berge & Vader, 1997a; *A. gracilis* Berge & Vader, 1997a; *A. lupus* Berge & Vader, 1997a; *A. mimonectes* Ruffo,1975; *A. oculatus* Birstein & Vinogradov, 1970 (= *A. oculata* Barnard & Karaman 1991); *A. spinescens* (Alcock, 1894); *A. spongicola* Pirlot,1933; *A. stylifer* Birstein & Vinogradov, 1960; *A. subabyssi* Birstein & Vinogradov, 1955; *A. tridentata* Ledoyer, 1986

Andaniexis lupus (Berge & Vader, 1997a) and *A. eilae* (Berge & Vader, 1997a) are new to the area.

Material. *A. eilae*: 1 specimen from BIOFAR station 517 (see Appendix 1); 55 specimens from 9 BIOICE stations (stns 559, 560, 563, 564, 568, 587, 726, 727 & 728, see Appendix 2).
A. lupus: 155 specimens from 14 BIOFAR stations (stns 15, 82, 95, 167, 168, 169, 170, 171, 172, 458, 459, 731, 750 & 9014, see Appendix 1); 947 specimens from 32 BIOICE stations (stns 1, 2, 3, 4, 6, 9, 11, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 29, 30, 31, 40, 43, 561, 562, 563, 724, 726, 727, 728, 729 & 969, see Appendix 2).

Distribution. *Andaniexis abyssi*: Norway; north to Solbergfjorden (N. Norway) and south to Skagerrak (Stephensen 1925; Sars 1891; Buhl-Jensen 1986; Buhl-Mortensen 1996).
A. lupus: Norway; found in both Ullsfjorden and Malangen (N. Norway) on several locations; Iceland, the Faroe Islands and the Arctic (74°55.90'N 12°48.56'W and 82°09'N 83°08'E).
A. gracilis: Known from the Baffin Bay and the Davis Strait only.
A. eilae: Known only from Iceland and the Faroe Islands.

The first three species mentioned above (*abyssi*, *gracilis* and *lupus*) are closely related (Berge & Vader 1997a), and seem to have an allopatric distribution. *Andaniexis lupus* is found in both cold and warm waters, but with very high frequencies in cold waters (mean temp. –0.1 °C, SD 1.2). The low mean temperature for this species correlates with the northern distribution (Berge & Vader 1997a). Unfortunately, the temperature preferences for its sister species *A. abyssi* and *A. gracilis* are

not known (they both have a more southern distribution).

Andaniexis eilae is only known from relatively warm waters (mean 5.0 °C), with a minimum temperature of 3.8 °C. *A. eilae* is, however, only distantly related to the other species of the *abyssi*-group (*A. abyssi*, *A. gracilis*, *A. lupus*, *A. mimonectes*, *A. oculatus*, *A. stylifer* and *A. subabyssi*), see BERGE & VADER 1997a.

Genus *Andaniopsis* SARS, 1891

Type species. *Andania nordlandica* BOECK, 1871

Species. *Andaniopsis nordlandica* (BOECK, 1871)

Material. 74 specimens from 8 BIOICE stations (stns 558, 564, 566, 567, 585, 586, 969 & 990).

Distribution. This species is known from Skagerrak (BUHL-JENSEN 1986; BUHL-MORTENSEN 1996) and along the Norwegian coast (SARS 1891) north to Ullsfjorden, N. Norway. In western and northern Norway this species has been frequently caught together with *Andaniexis abyssi*, but also occasionally together with *A. lupus* at the latter's type locality in Ullsfjorden, northern Norway (unpublished data).

The BIOICE material indicates that *A. nordlandica* is restricted to warm waters (temp. 6.7 °C), with the lowest SD (0.3) found in this survey. Only at one station (BIOICE station 969, see Appendix 2) is this species collected together with *Andaniexis lupus*.

Genus *Euandania* STEBBING, 1899

Type species. *Andania gigantea* STEBBING, 1883

Species. *Euandania gigantea* (STEBBING, 1883); *E. nonhiata* ANDRES, 1985

Only *E. gigantea* is known from the area.

Material. 1 specimen from BIOFAR station 417.

Distribution. Cosmopolitan (BARNARD & KARAMAN 1991)
Pelagic species, known from depths down to 4575 m (WATLING & HOLMAN 1981).

Genus *Phippsia* STEBBING, 1906

Aspidopleurus SARS, 1891 (homonym, Pisces)

Type species. *Stegocephalus gibbosus* SARS, 1883

Species. *Phippsia gibbosa* (SARS, 1883); *P. roemeri* SCHELLENBERG, 1925

Both species are known from the area, *Phippsia gibbosa* is new to the area.

Material. *P. gibbosa*: 1 specimen from BIOICE station 570.

P. roemeri: 11 specimens from 6 BIOFAR stations (stns 172, 189, 267, 271, 481 & 698, see Appendix 1);

Table 2. Minimum and maximum values for depth (m) and temperature (°C), including mean value and standard deviation (SD) with corresponding n-values.

Species	Specimens	Min. temp.	Max. temp.	mean temp.	SD	n	Min. depth	Max. depth	mean depth	SD	n
Andaniella pectinata	225	–0.6	5.3	0.2	1.4	201	148	776	561	166	225
Andaniexis eilae	56	3.8	7.1	5.0	0.6	56	256	1295	899	131	56
Andaniexis lupus	1102	–0.9	7.0	–0.1	1.2	1102	256	1407	760	252	1016
Andaniopsis nordlandica	74	5.5	7.1	6.7	0.3	74	256	778	434	138	74
Euandania gigantea	1	3.4	-	-	-	-	894	-	-	-	-
Phippsia gibbosa	1	5.5	-	-	-	-	965	-	-	-	-
Phippsia roemeri	128	–0.5	3.9	0.1	1	113	346	894	457	82	128
Phippsiella bioice	23	3.7	5.4	4.7	0.4	19	803	1407	1048	134	23
Phippsiella similis	22	3.7	6.4	4.9	0.9	20	265	1162	508	379	22
Stegocephalina biofar	147	–0.9	1.0	–0.5	0.3	143	507	1042	705	102	147
Stegocephalina idae	9	4.2	-	-	-	-	1042	-	-	-	-
Stegocephaloides auratus	246	3.0	8.6	6.2	0.9	240	156	1162	544	211	245
Stegocephaloides barnardi	71	3.7	5.5	4.7	0.6	71	778	1407	957	143	71
Stegocephaloides wagini	164	–0.9	8.6	0.1	2.2	131	405	1407	877	229	164
Stegocephalopsis ampulla	1	-	-	-	-	-	391	-	-	-	-
Stegocephalus inflatus	150	–0.9	8.6	0.7	2.2	77	300	1042	600	214	149

117 specimens from 15 BIOICE stations (stns 4, 6, 9, 13, 14, 15, 16, 20, 21, 22, 23, 24, 29 & 30; see Appendix 2).

Distribution. *Phippsia roemeri* is known from E. Greenland and N. of Spitsbergen (Stephensen 1925), in addition to Iceland and the Faroe Islands. Although the standard deviation of the temperature range is relatively high, this species seem to be restricted to cold waters (mean temp. 0.1 °C, see Table 2).
Phippsia gibbosa was previously only known from the Norwegian coast (Sars 1891; Vader 1971).

Genus *Phippsiella* Schellenberg, 1925

Type species. *Stegocephalus similis* Sars, 1891

Species. *Phippsiella abyssicola* Oldevig, 1959; *P. bioice* Berge & Vader, 1997c; *P. cascadiensis* Moore, 1992; *P. kergueleni* Schellenberg, 1926; *P. longicornis* Gurjanova, 1962; *P. minima* Stephensen, 1925; *P. nipoma* J.L. Barnard, 1961; *P. pajarella* J.L. Barnard, 1967; *P. pseudophippsia* Bellan-Santini, 1984; *P. rostrata* K.H. Barnard, 1932; *P. similis* (Sars, 1891); *P. viscaina* J.L. Barnard, 1967

Phippsiella similis has previously been reported from the area (Stephensen 1925), while *P. bioice* is a new species (Berge & Vader 1997c). No specimens of *P. minima* were secured in the two programmes.

Material. *P. bioice*: 23 specimens from 6 BIOICE stations (stns 8, 9, 561, 563, 568 & 729; see Appendix 2).
P. similis: 3 specimens from BIOFAR station 698 (see Appendix 1); 19 specimens from 7 BIOICE stations (stns 7, 17, 39, 724, 727, 735 & 971; see Appendix 2)

Distribution. *P. bioice* is only known from Iceland.
P. similis is known from the Davis Strait and Spitsbergen (Stephensen 1925), Iceland, the Faroe Islands, Skagerrak and the Norwegian coast north to Nordland (Stephensen 1925). This species is frequently found on sponges (Vader 1984).
Both species seem to be restricted to relatively warm waters with a minimum temperature of 3.7 °C.

Genus *Stegocephalina* Stephensen, 1925

Type species. *Stegocephalina ingolfi* Stephensen, 1925

Characteristics. Maxilla 1 palp not exceeding outer plate, 1-articulate. Maxilla 2 gaping and geniculate, setae on outer plate without hooks. Mandibular incisor toothed. Inner plate of maxilliped long and usually narrow; palp article 3 long and narrow, longer than article 2. Dactylus on pereopods 3-6 weakly subchelate (type) or ordinary. Basis of pereopod 6 expanded. Telson cleft.

Species. ? *Stegocephalina biofar* sp. nov.; ? *S. idae* sp. nov.; *S. ingolfi* Stephensen, 1925; ? *S. katalia* (Barnard, 1962)

Remarks. This genus was originally described on the generally elongated appearance of all mouthparts. The elongated form of labrum has been described previously for both *Phippsiella minima* Stephensen, 1925 and *Stegophippsiella pacis* Bellan-Santini & Ledoyer, 1974, but examination of the holotype of *P. minima* revealed no such shape of labrum (Berge & Vader 1997c). The mouthparts of *Stegophippsiella pacis* resemble the elongated form of *S. ingolfi*, especially in maxilla 1 (palp thin, inner plate with the row of pappose setae reduced to a small apical group) and labrum. Other characters that lead us to group these two taxa together, are the presence of an expanded basis on pereopod 6 and an expanded merus of pereopods 6 & 7 with the lobes reaching about to the proximal end of propodus. Besides the non-ramous uropod 3 (an autapomorphic character-state), these two species differ in two important characters; *Stegophippsiella pacis* possesses hooked setae on outer plate of maxilla 2 and only one apical finger on labium.

There are thus characters that indicate that these two species may belong in the same genus. However, the relationships between the group of stegocephalid genera possessing a toothed mandibular incisor and a gaping and geniculate maxilla 2 (*Bathystegocephalus*, *Phippsia*, *Phippsiella*, *Stegocephalexia*, *Stegocephalina*, *Stegocephaloides*, *Stegocephalopsis*, *Stegocephalus*, *Stegophippsiella* and *Tetradeion*) are very 'cloudy' (Barnard & Karaman 1991; Berge & Vader 1997c), and fall outside the scope of this paper. Despite this, *Stegocephalina katalia* (Barnard, 1962) is transferred to *Stegocephalina* from *Stegocephalopsis* due to its very close relationship with *Stegocephalina biofar* sp. nov. The reasons for placing these two species in this genus are discussed in 'remarks' under *Stegocephalina biofar* (see below).

? *Stegocephalina biofar* sp. nov.
(Figs 1 & 2)

Material examined. BIOFAR stn 015: about 55 specimens, 17 May 1987, 62°37.68'N 04°40.37'W, 683 m, –

0.5 °C, Rothlisberg & Pearcy epibenthic sampler (RP-sampler); BIOFAR stn 170: 31 specimens, 8 May 1988, 62°31.86'N 03°31.08'W, 699 m, –0.6 °C, RP-sampler; BIOFAR stn 171: 4 specimens, 62°25.45'N 03°31.60' W, 601 m, 0.0 °C, RP-sampler; BIOFAR stn 172: 2 specimens, 62°19.12'N 13°54.79'W, 507 m, 1.0 °C, RP-sampler; BIOFAR stn 274: 3 specimens, 16 May 1988, 63°00.79'N 07°49.22'W, 698 m, –0.6 °C, detritus sledge; BIOFAR stn 458: 5 specimens, 4 June 1989, 62°54.92'N 07°00.23'W, 675 m, –0.57 °C, detritus sledge; BIOFAR stn 459: 11 specimens, 4 June 1989, 62°59.42'N 06°57.52'W, 910 m, –0.7°C , detritus sledge; BIOFAR stn 731: 3 specimens, 29 Sept. 1990, 60°29.7'N 07°14.1'W, 1042 m, –0.9 °C, detritus sledge; BIOFAR stn 770: 1 specimen, 6 Oct.1990, 62°20.4'N 03°11.7'W, 583 m, –0.25°C, detritus sledge; BIOFAR stn 9014: 20 specimens, 13 June 1986, 62°57.11'N 06°57.7'W, 763 m, –0.5 °C, RP-sampler.

BIOICE 2323: stn 3, 2 specimens 3 May 1993, 63°55.00'N 10°05.00'W, 623 m RP-sampler; BIOICE 2324: stn 4, 2 specimens, 3 May 1993, 63°45.00'N 10°11.00'W, 554 m, detritus sledge; BIOICE 2501: stn 9, 1 specimen, 12 July 1993, 66°25.24'N 25°50.32'W, 630 m, –0.4 °C, detritus sledge: BIOICE 2107: stn 18, 1 specimen, 6 July 1992, 67°50.14'N 19°33.29'W, 905 m, –0.6 °C, RP-sampler; BIOICE 2117: stn 22, 1 specimen, 7 July 1992, 67°28.32'N 19°31.79'W, 405 m, –0.3 °C, detritus sledge; BIOICE 2132: stn 29, 3 specimens, 8 July 1992, 66°44.65'N 18°55.30'W, 492 m, 0.1 °C, RP-sampler; BIOICE 2136: stn 30, 2 specimens, 8 July 1992, 66°43.56'N 18°57.20'W, 417 m, 0.6 °C, RP-sampler.

TM 10173: ArkX-1, stn 31-9, 30 specimens, 17 July 1994, 74°53'52"N, 12°25'39"W, 1525 m, epibenthic sledge, collected by Prof. A. Brandt (Hamburg).

Holotype. Male B, 3 mm, BIOFAR stn 170, 8 May 1988, 62°31.86'N 03°31.08'W, 699 m, –0.60 °C, RP-sampler.

Paratypes. 30 specimens from BIOFAR stn 170, 8 May 1988, 62°31.86'N 03°31.08'W, 699 m, –0.60 °C (estimated mean bottom temp.), RP-sampler.

Type locality. BIOFAR stn 170, 62°31.86'N 03°31.08'W, 699 m.

General distribution. From south-east of the Faroes north to about 75°N east of Greenland, and south-west to the Iceland Basin.

Head and Body. Length of females up to 6 mm, males up to 3 mm. Colour in living specimens unknown. Rostrum very small.

Antennae. Antenna 1 longer than antenna 2; peduncle article 2 about half the length of article 1; flagellum article 1 longer than peduncle article 1, but shorter than peduncle; 4 articles in flagellum; article 1 shorter than articles 2-4 combined; callynophore well developed in both sexes; accessory flagellum with 2 articles; length 5-7 x breadth; longer than peduncle article 1, but shorter than flagellum article 1.

Antenna 2 peduncle (articles 3-5) longer than flagellum; peduncle article 4 shorter than article 5; 7-8 articles in flagellum.

Mouthparts. Mouthparts partly visible below coxae in lateral view.

Mandible incisor toothed; right mandible with about as many teeth as the left one; lacinia mobilis toothed and about as powerful as incisor.

Maxilla 1 palp 1-articulate; short, less than half the length of outer plate; apex not reaching apex of outer plate; without any long or robust setae; terminal setae simple and very short; outer plate not as broad as inner plate; outer plate distally with 9 robust Maxilla-Setae in a 6/3 arrangement; MS 1-3 strongly cuspidate, MS 4-6 weakly cuspidate; MS A-C not cuspidate; inner plate with a well developed shoulder; with 7-8 large pappose setae in one row.

Maxilla 2 gaping and geniculate; with 3-5 long setae on outer plate; setae on outer plate without hooks; about equal in length to outer plate; setae on inner plate arranged in 2 rows, both apparently marginal; one row of 8-11 large pappose setae, and one row of 2-4 robust but simple setae.

Maxilliped with very few setae; palp 4-articulate; broad, article 1 about as broad as inner plate; palp article 2 weakly produced on inner margin (sometimes looks like a shoulder); shorter than article 1; article 3 longer than article 2; inner plate reaching above the middle of palp article 2, but not reaching palp article 3; distal margin convex with 2 apical nodular setae; outer plate subovate; distal part of inner margin of outer plate with a number of submarginal simple setae in a row, robust setae on the proximal part (only seen in mature females).

Labrum about as long as broad; lobes weakly asymmetrical; without a pair of terminal simple setae, but with many small simple setae on each lobe.

Labium with two simple distal fingers, one much larger than the other.

Pereopods. Coxal plates and epimeral plates smooth, not covered with setae; coxae 2 & 3 normal, clearly longer than 2 times the breadth.

Pereopod 1 coxal plate not deep, ratio depth:breadth clearly less than 1.5; basis straight; propodus length 3.5 x breadth; with 6-11 marginal robust setae in one row; dactylus smooth.

Pereopod 2 longer, but not especially thinner than pereopod 1; ischium elongated, ratio length:breadth between 1 and 2; distal posterior margin with a group of

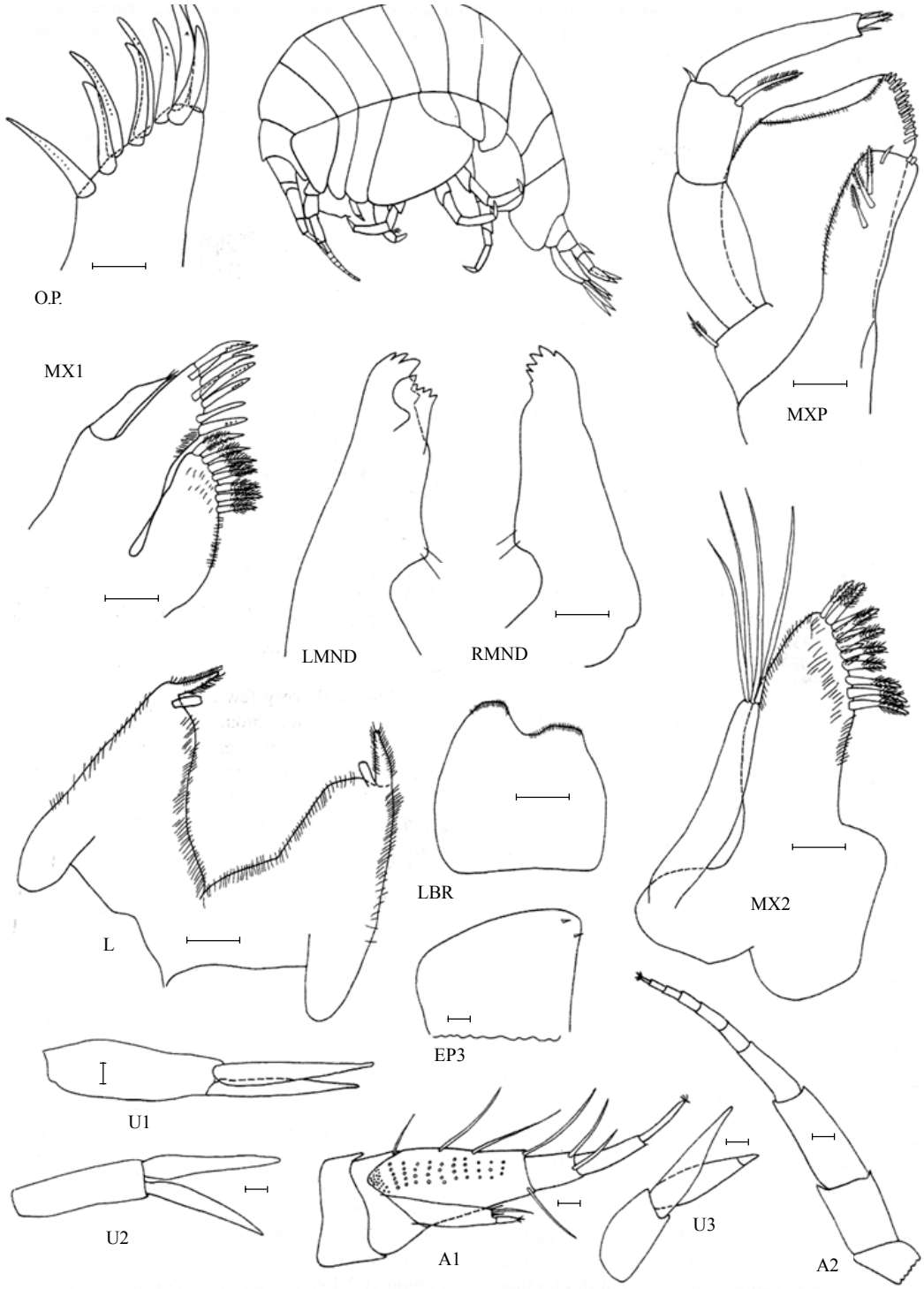

Fig. 1. *Stegocephalina biofar* sp. nov. Unless otherwise stated, the figures are from the holotype. Habitus: Female C, TM 10173; O.P: Outer plate of maxilla 1, Female A, TM 10173. Scales attached are 0.05 mm.

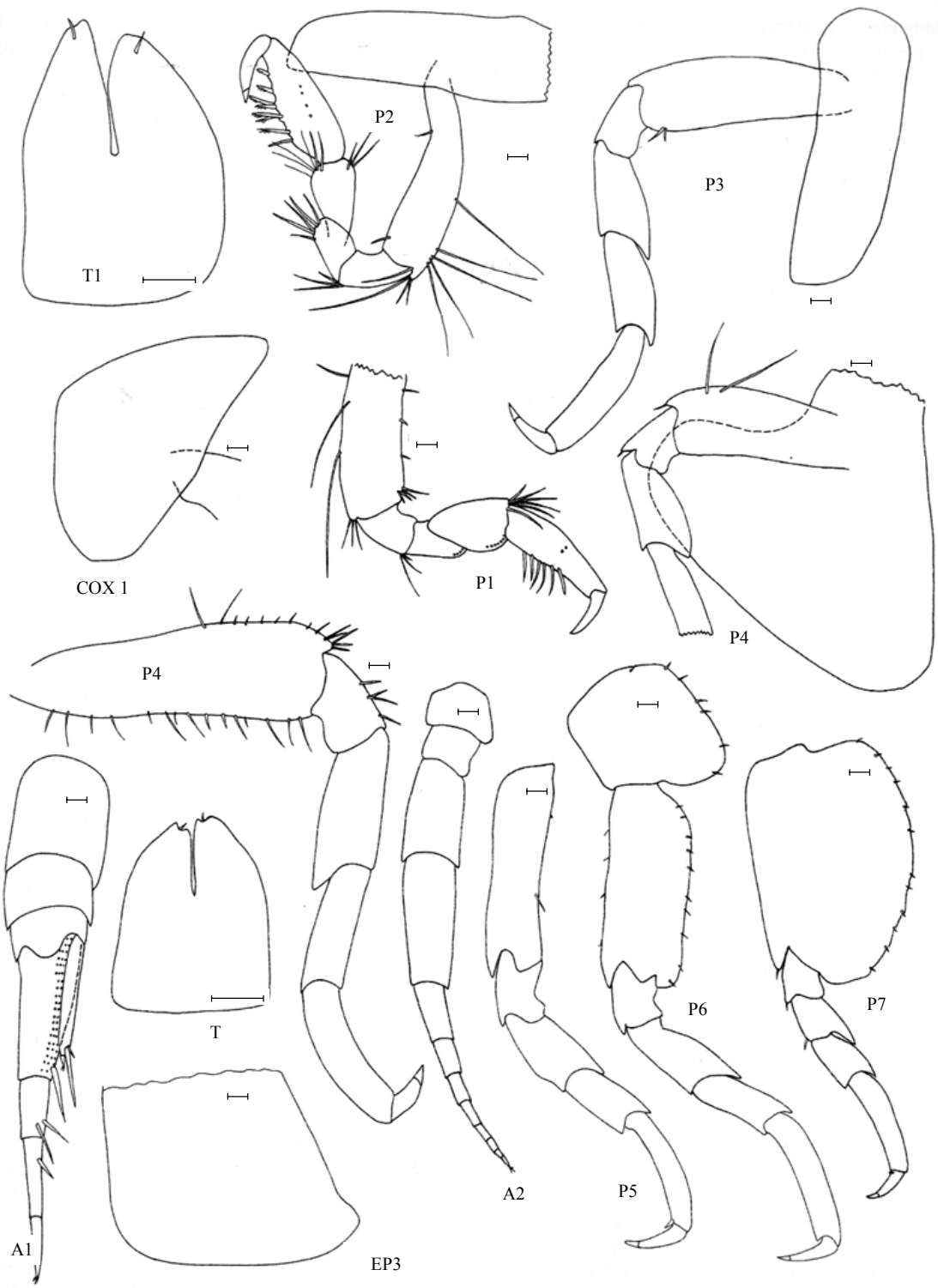

Fig. 2. *Stegocephalina biofar* sp. nov. Unless otherwise stated, the figures are from the holotype. A1, A2, P4, EP3 and T 1: Female A, TM 10173. Scales attached are 0.05 mm.

long plumose setae; propodus length 2.5-3 x breadth; propodus larger in males than in females; posterior margin with 6-9 groups of robust setae; dactylus smooth.

Pereopods 3 - 7 almost without setae and with a distinct nail on dactylus.

Pereopod 4 heart shaped; coxa with anterior margin convex; the entire lower margin curved; posteroventral lobe medium sized, not reaching the base of the 7th pereon segment; max. depth 3 x breadth of attachment-line; basis without or with very few long simple setae; distal anterior margin without a group of plumose setae; ischium distal posterior margin without any group of plumose setae.

Pereopod 6 basis weakly expanded; rounded below; the expansion smooth; merus about equal in length to carpus; posterior lobe not reaching the middle of carpus; propodus between 3/2 and 2 times the length of carpus.

Pereopod 7 smaller than pereopod 6, but clearly larger than 2/3 of pereopod 6; basis rounded distally with the posterior margin crenulated; reaching about to the end of ischium; merus about equal in length to carpus; the posterior lobe reaches about to the middle of carpus; propodus longer than 2x the length of carpus; dactylus shorter than half the length of propodus.

Oostegites on pereopods 2 to 5. Gills on pereopods 2 to 7.

Pleonites and urosomites. Pleonites 1 to 3 dorsally smooth. Urosomites dorsally smooth and not fused.

Epimeral plate 3 without serrations; the posteroventral corner weakly produced into a rounded lobe.

Uropods 1-3 unequal in size, uropod 1 longest and uropod 3 shortest.

Uropod 1 peduncle equal to rami; smooth

Uropod 2 peduncle about equal to rami; smooth

Uropod 3 peduncle clearly shorter, but longer than half the length of rami; outer ramus 2-articulate, article 2 short (like a nail); outer ramus shorter than inner ramus; rami without robust setae.

Telson. Telson longer than broad, but shorter than 1.5 x the breadth, about as long as peduncle uropod 3; cleft about 1/2 of total length, with apically rounded lobes; one submarginal seta near apex of each lobe.

Variables. The length of the cleft on the telson varies between 0.35-0.5 of the total length of telson. Flagellum article 1 of antenna 1 is longer in relation to the entire flagellum in males and immature females than in large adult females.

Biology. Unknown, but most samples are from cold water, the mean temperature was –0.5 °C with a SD of only 0.3. This is the only stegocephalid species sampled that seems to be truly restricted to cold waters (maximum temperature 1.0 °C, but only 7 out of 147 specimens where collected in areas with temperatures > 0 °C).

Etymology. This species is named after the BIOFAR programme during which it was first recognized. The specific epithet is a noun in apposition.

Remarks. *S. biofar* is morphologically very different from the type species of this genus. These differences are mostly due to the generally elongated mouthparts in the type species. Other important differences are the presence of a second article on outer ramus of uropod 3 and the absence of a greatly expanded merus on pereopods 6 & 7. Both species possess, however, 2 simple fingers on labium, a small and thin palp on the first maxilla, a similar maxilliped (although the palp of *S. biofar* is considerably more powerful than that of *S. ingolfi*) and unhooked setae on outer plate of maxilla 2.

Stegocephalina biofar is, for the time being, allocated to this genus together with the closely related species *Stegocephalopsis katalia*. The only major differences between these two species are the absence of a second article on outer ramus of uropod 3, a heart-shaped coxa 4 and the 'giant sheath-based left lacinia mobilis' (Barnard & Karaman 1991) in *S. katalia*, see also Table 3 below.

This species also has relatively close affinities to *S. idae*. The relationship between these species will be discussed under *S. idae* (see Table 3). Together with *S. biofar* and *S. katalia*, these three species are for the time being allocated to this genus although there are some obvious differences between them and the type species *S. ingolfi* (see above).

? *Stegocephalina idae* sp. nov.
(Figs 3-5)

Material examined. BIOICE 2697: stn 726, 2 specimens (both females), 2 Sept. 1994, 64°10.20'N 27°43.10'W, 1042 m, 4.2 °C, RP-sledge; BIOICE 2346: stn 15, 7 specimens (3 females, 4 immature), 6 May 1993, 63°23.00'N 12°38.00'W, 501 m, RP-sledge.

Holotype. Female A BIOICE 2697: 5 mm, 2 Sept. 1994, 64°10.20'N 27°43.10'W, 1042 m, 4.2 °C, RP-sledge.

Paratype. Female B BIOICE 2697: 5 mm, 2 Sept. 1994, 64°10.20'N 27°43.10'W, 1042 m, 4.2 °C, RP-sledge.

Type locality. BIOICE 2697: 64°10.20'N 27°43.10'W, 1042 m.

General distribution. Known only from 2 BIOICE samples: BIOICE 2697 (Type locality) and BIOICE 2346.

Head and Body. Length of females up to 5 mm, males unknown. Colour in living specimens unknown. Rostrum very small.

Antennae. Antenna 1 as long as antenna 2; peduncle article 2 more than half the length of article 1; flagellum article 1 shorter than peduncle, but longer than peduncle article 1; article 1 of flagellum about 2 times the length of article 2; flagellum 4-articulate; accessory flagellum with 1 article; length 7 x breadth; longer than peduncle article 1; about as long as flagellum article 1; restricted at about 2/3 of total length with 2-3 simple robust setae.

Antenna 2 peduncle (articles 3-5) about equal to flagellum; peduncle article 4 shorter than article 5; flagellum much longer than peduncle article 5; flagellum 6-articulate.

Mouthparts. Mouthparts not visible below coxae.

Mandible incisor toothed; the right mandible with about as many teeth as the left one; lacinia mobilis toothed and about as powerful as the incisor.

Maxilla 1 palp 1-articulate; longer than half the length of outer plate; apex reaching to about apex of outer plate; lacking long or robust setae distally; terminal setae simple and very short; outer plate broader than inner; outer plate distally with 9 robust Maxilla-Setae in a 6/3 arrangement; MS 1-6 weakly cuspidate; MS A-C not cuspidate; inner plate without or with a weakly developed shoulder; with 5 large pappose setae in one row.

Maxilla 2 gaping and geniculate; with 7-10 long setae on outer plate; setae on outer plate cleft distally; shorter than outer plate; setae on inner margin arranged in 2 apparently marginal rows of setae, one of 9 pappose and one of 7 simple or weakly cuspidate setae, decreasing in size with the largest closest to outer plate.

Maxilliped palp 4-articulate; broad, about as broad as inner plate; palp article 2 weakly produced on inner margin (sometimes looks like a shoulder); article 2 shorter than article 1; article 3 longer than article 2; the base of palp article 1 at about the middle of inner plate; inner plate not reaching palp article 2; inner plate with distal margin clearly concave; distally with 2 nodular setae; outer plate subovate; not longer than 2 x breadth; inner margin of outer plate with slender robust setae.

Labrum about as long as broad; lobes strongly asymmetrical; without any setae.

Labium with one simple distal finger; the finger powerful but not crenulate.

Pereopods. Coxal plates and epimeral plates smooth, not covered with setae; coxae 2 & 3 normal, clearly longer than 2 times the breadth.

Pereopod 1 coxal plate not deep, ratio depth:breadth clearly less than 1.5; basis straight; propodus subrectangular; length 3 x breadth; propodus posterior margin with 3 groups of robust setae; dactylus smooth.

Pereopod 2 general appearance like pereopod 1; ischium elongated, ratio length:breadth between 1 and 2; distal posterior margin with a group of long plumose setae; propodus subrectangular; length 3.5 x breadth; 6 groups of robust setae; dactylus smooth.

Pereopods 3-7 almost without setae; with a distinct nail on dactylus.

Pereopod 4 coxa anterior margin straight; the entire lower margin curved; heart-shaped; length max.depth 3 x breadth of attachment-line; basis without or with very few long simple setae; anterior margin with a group of plumose setae distally; ischium posterior margin with a group of plumose setae distally.

Pereopod 6 basis expanded; rounded below; the expansion smooth; merus about equal in length to carpus; posterior lobe not reaching the middle of carpus; propodus between 3/2 and 2 x length of carpus.

Pereopod 7 smaller than pereopod 6, but clearly larger than 2/3 of pereopod 6; basis rounded distally with posterior margin serrated; reaching about to the end of ischium; merus about equal in length to carpus; the posterior lobe not reaching beyond the middle of carpus; propodus longer than 2 times the length of carpus; dactylus about 1/2 x length of propodus.

Oostegites on pereopods 2 to 5. Gills on pereopods 2 to 7.

Pleonites and uropods. Pleonites 1 to 3 dorsally smooth. Urosomites dorsally smooth and not fused.

Epimeral plate 3 without serrations; the posteroventral corner weakly produced into a rounded lobe; with hind margin curved.

Uropods 1-3 reaching equally far behind the body.

Uropod 1 peduncle longer than rami.

Uropod 2 peduncle about equal to rami.

Uropod 3 peduncle shorter than rami; longer than half the length of rami; outer ramus 2-articulate, article 2 between half and two third the length of article1; rami subequal; rami without robust setae.

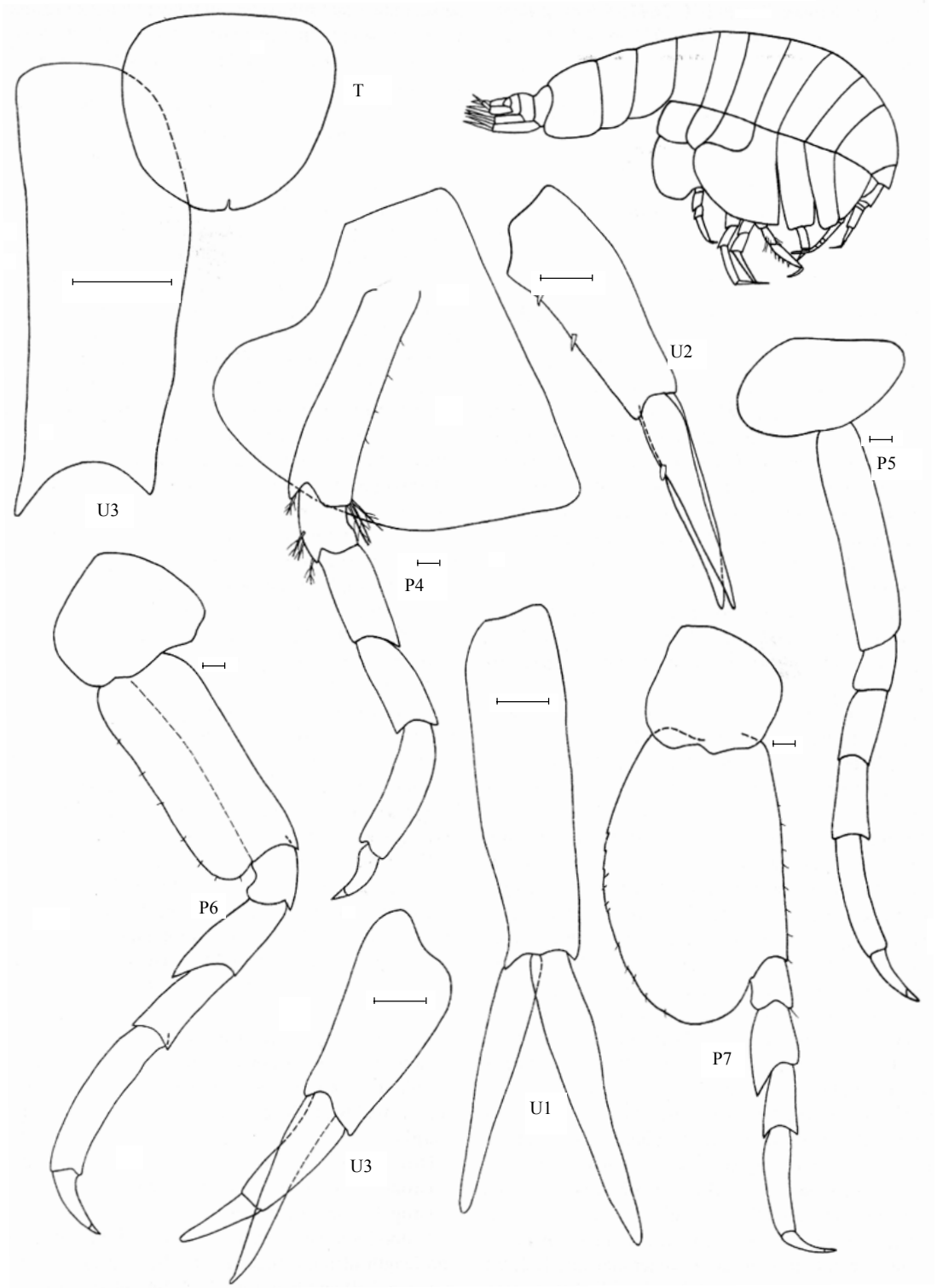

Fig. 3. *Stegocephalina idae* sp. nov. Unless otherwise stated, the figures are from the holotype. T and Habitus: Female B, BIOICE 2346. Scales attached are 0.05 mm.

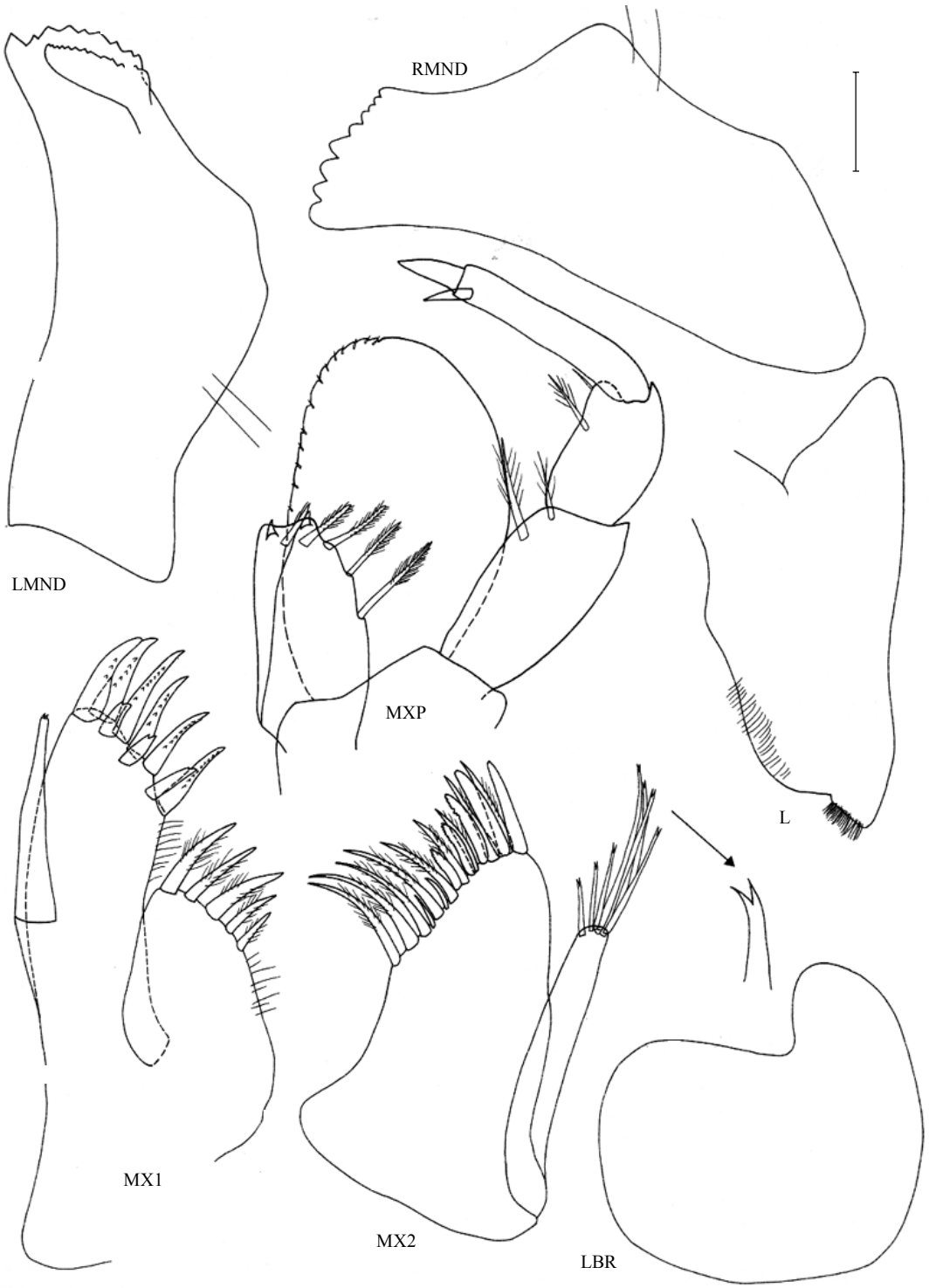

Fig. 4. *Stegocephalina idae* sp. nov. Unless otherwise stated, the figures are from the holotype. MXP: Female A, BIOICE 2346. Scale attached is 0.05 mm.

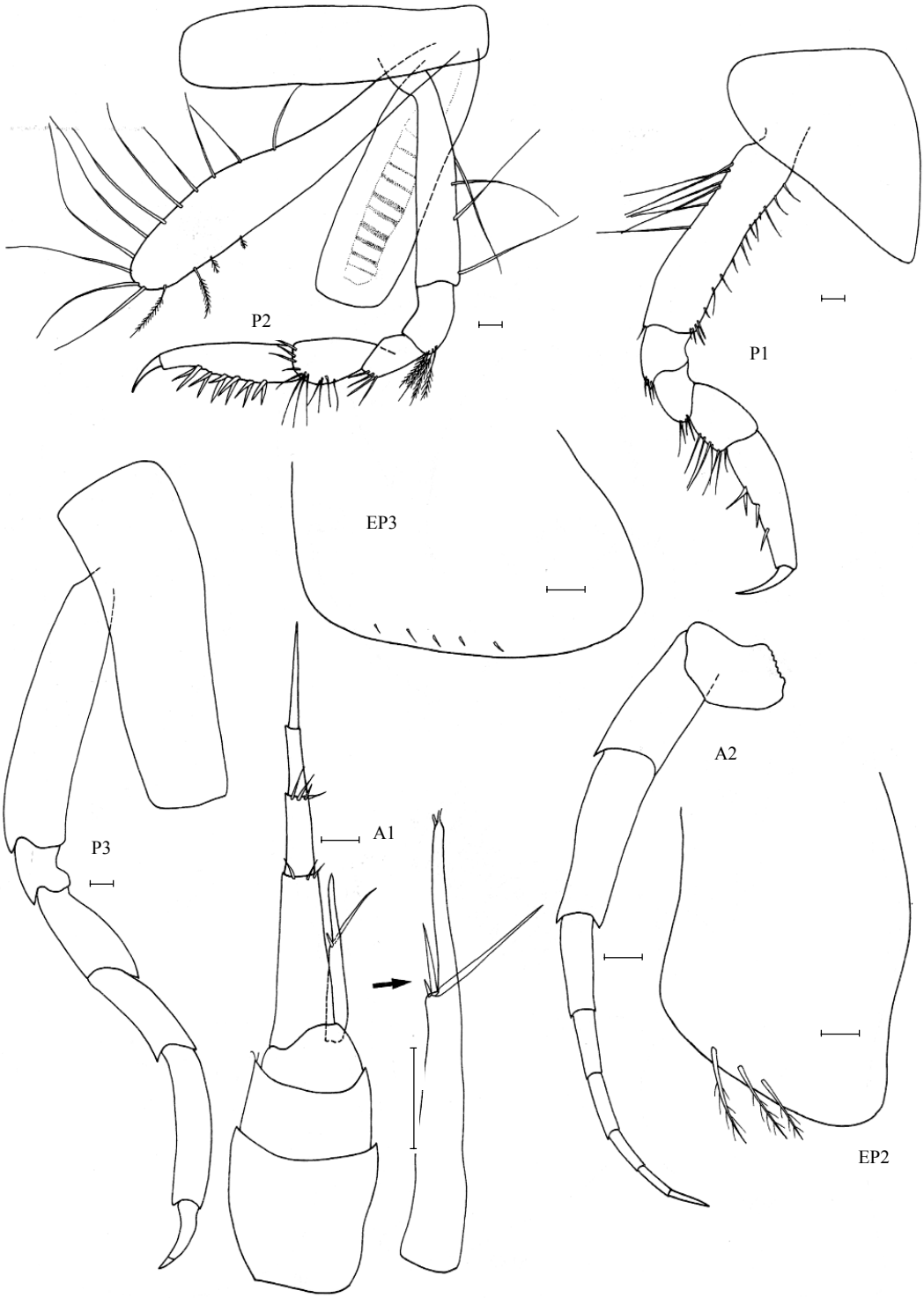

Fig. 5. *Stegocephalina idae* sp. nov. Unless otherwise stated, the figures are from the holotype. EP2 and EP3: Female B, BIOICE 2346. Scales attached are 0.05 mm.

Telson. Telson about as long as broad; about half length of peduncle uropod 3; without any setae; cleft and rounded; cleft not more than 1/3 of total length.

Biology. Unknown.

Etymology. This species is named after Jørgen Berge's daughter Ida Raddum Berge.

Remarks. The morphology of this species resembles that of both *S. biofar* and *Stegocephalopsis katalia* (e.g. pereopods 1-7, maxilla 1 and maxilliped). It is, however, clearly separated from the other two on several characters, first of all those listed in Table 3 (see below) in which *S. biofar* and *S. idae* are compared.

Stegocephalina ingolfi Stephensen, 1925
(Fig. 6)

Holotype. Female 9 mm, *Ingolf* stn 78; 60°37'N 27°52'W, 1505 m, 4.5 °C.

Paratype. Juvenile 6 mm, *Ingolf* stn 78; 60°37'N 27°52'W, 1505 m, 4.5 °C.

Type locality. *Ingolf* stn 78; 60°37'N 27°52'W, 1505 m, 4.5 °C.

Distribution. Known from the type locality only.

Material examined. The type material is the only known material of this species.

All the figures are from the paratype, but the written description is primarily based upon the holotype (due to the poor condition of the holotype, it was not possible to make figures from it) and the original description. These two specimens (holotype and paratype secured by the *Ingolf* expedition) are the only known specimens of this species.

Head and body. Colour in living specimens unknown. Rostrum very small. Eyes absent.

Antennae. Antenna 1 as long as antenna 2; peduncle article 2 about half the length of article 1; article 1 of flagellum larger than the rest of flagellum; flagellum 4-articulate; accessory flagellum with 1 article; shorter than both peduncle article 1 and flagellum article 1.

Antenna 2 peduncle (articles 3-5) longer than flagellum; flagellum much longer than peduncle article 5; peduncle article 4 equal to article 5; flagellum 8-articulate.

Mouthparts. Mandible incisor toothed; both mandibles with more than 5-6 teeth, but the right mandible with clearly fewer teeth than the left one; lacinia mobilis toothed and about as powerful as incisor.

Maxilla 1 palp 1-articulate; shorter than half the length of outer plate; with 3 long terminal pappose setae; terminal setae shorter than half the length of the palp; without any terminal robust setae; outer plate about as broad as inner plate; inner plate without or with a weakly developed shoulder; inner plate with 5 large pappose setae in one row, but with many marginal small simple setae.

Maxilla 2 gaping and geniculate; with 10 long setae on outer plate; setae on outer plate without hooks; about equal in length to outer plate; setae on inner plate arranged in 2 rows, one marginal and one submarginal; about 25 marginal simple setae, decreasing in size with the largest closest to outer plate; about 60 submarginal pappose setae on inner plate.

Maxilliped palp 4-articulate; thin, the breadth of palp

Table 3. Differences between *Stegocephalopsis katalia, Stegocephalina biofar* and *S. idae*.

Character	*Stegocephalopsis katalia*	*Stegocephalina biofar*	*Stegocephalina idae*
labrum	lobes almost symmetrical	lobes almost symmetrical	lobes strongly asymmetrical
maxilla 1 palp	very small	very small	small, but larger than that of *S. biofar*
maxilla 2 maxilla 2, setae on outer plate	clearly gaping and geniculate ordinary	clearly gaping and geniculate ordinary	weakly gaping and geniculate apically cleft
telson	longer than broad, cleft about ½ of total length	longer than broad, cleft about ½ of total length	about as long as broad, weakly cleft
uropod 3, outer ramus	1-articulate	article 2 like a nail	article 2 about as long as article 1
coxa 4	sub-rectangular	heart-shaped	more similar to that of *Stegophippsiella pacis*

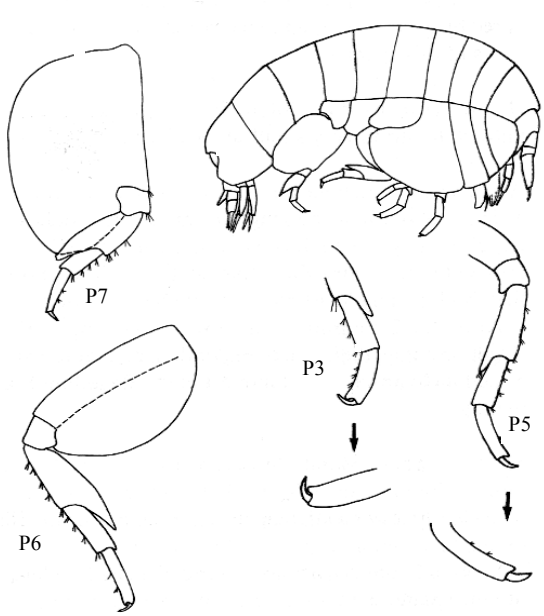

Fig. 6. *Stegocephalina ingolfi*. The figures are from the paratype.

article 1 not more than half the breadth of inner plate; palp article 2 not produced distally; article 2 shorter than article 1; article 3 longer than article 2; inner plate reaching palp article 3; distal margin slightly produced on outer corner; 2 apical nodular setae; outer plate subovate, inner margin obliquely truncated and straight; without robust setae.

Labrum clearly longer than broad; lobes symmetrical; with one pair of terminal simple setae, one setae on each lobe.

Labium with two simple distal fingers.

Pereopods. Coxal plates and basis of pereopods 6 & 7 smooth, not covered with setae; coxae 2 & 3 normal, clearly longer than 2 times the breadth.

Pereopod 1 coxal plate deep, between 1.5 and 2 x deeper than broad; basis anterior margin clearly not straight; propodus length 3.0 x breadth; subrectangular; 15-17 marginal robust setae in one row; dactylus smooth.

Pereopod 2 thinner, but not especially longer than pereopod 1; ischium elongated, ratio length:breadth between 1 and 2; propodus length 4 x breadth; subrectangular; dactylus smooth.

Pereopods 3-7 with setae and a distinct nail on dactylus; general appearance normal, but weakly subchelate (not pereopod 7).

Pereopod 3 merus, carpus and propodus posterior margin with 2-8 groups of robust setae.

Pereopod 4 coxa with the anterior margin slightly concave; the entire lower margin curved; posteroventral lobe small, reaching about the base of the 6th pereon segment; max. depth 3.5 x breadth of attachment-line; basis with long simple setae on anterior margin; merus, carpus and propodus posterior margin with 2-8 groups of robust setae.

Pereopod 5 merus and carpus anterior margin with 2-8 groups of robust setae; propodus anterior margin with 0-2 groups of robust setae.

Pereopod 6 basis expanded; rounded below; the expansion smooth; posterior lobe reaching propodus; merus, carpus and propodus anterior margin with 2-8 groups of robust setae.

Pereopod 7 smaller than pereopod 6, but clearly larger than 2/3 of pereopod 6; basis greatly expanded, rounded distally, posterior margin smooth, posterior lobe reach propodus; merus, carpus and propodus anterior margin with 2-8 groups of robust setae; dactylus shorter than half the length of propodus.

Pleonites and urosomites. Epimeral plate 3 without serrations; the posteroventral corner weakly produced into a rounded lobe; epimeral plates smooth, not covered with setae.

Urosomites dorsally smooth, not fused.

Uropod 1 peduncle clearly longer than rami.

Uropod 2 peduncle clearly longer than rami.

Uropod 3 peduncle clearly shorter than rami; outer ramus 1-articulate; outer ramus clearly longer than inner ramus.

Telson. Telson longer than broad, but shorter than 1.5 times the breadth; cleft and pointed; cleft about half the length of telson.

Biology. Unknown.

Remarks. Why both the BIOICE and the BIOFAR project failed to secure any specimen of this species is not known, as samples were taken relatively close to the type locality. There were, however, very few samples from warm water at great depths.

For differences with the other species in this genus, see remarks under *S. biofar*.

Genus *Stegocephaloides* Sars, 1891

Type species. *Stegocephalus christianiensis* Boeck, 1871

Species. *Stegocephaloides attingens* K.H. Barnard, 1916; *S. auratus* (Sars, 1883); *S. australis* K.H. Barnard, 1916; *S. barnardi* Berge & Vader, 1997b; *S. camoti* J.L. Barnard, 1967; *S. christianiensis* (Boeck, 1871); *S. vanhoeffeni* Schellenberg, 1926; *S. wagini* (Gurjanova, 1936)

Stegocephaloides auratus has previously been reported from the area (Stephensen 1925), while *S. barnardi* and *S. wagini* are new to the area.

Material. *S. auratus*: 41 specimens from 12 BIOFAR stations (stns 19, 27, 28, 32, 65, 68, 70, 75, 261, 267, 493 & 494, see Appendix 1); 205 specimens from 25 BIOICE stations (stns 7, 17, 558, 559, 561, 564, 566, 567, 570, 572, 580, 583, 585, 586, 587, 724, 735, 969, 971, 972, 973, 977, 990, 1004 & 1005, see Appendix 2).

S. barnardi: 71 specimens from 9 BIOICE stations (stns 559, 560, 567, 568, 587, 726, 727, 728 & 729, see Appendix 2).

S. wagini: 114 specimens from 10 BIOFAR stations (stns 73, 113, 481, 500, 517, 522, 705, 730, 731 & 750, see Appendix 1); 59 specimens from 13 BIOICE stations (stns 6, 7, 12, 14, 15, 16, 18, 19, 23, 29, 561, 726 & 729, see Appendix 2).

Distribution. *S. auratus*: the Bay of Biscay (Sorbe & Weber 1995), Iceland, the Faroe Islands, Skagerrak and the Norwegian coast north to Trondheimsfjorden (Stephensen 1925; Sars 1891; Buhl-Jensen 1986; Buhl-Jensen & Fosså 1991; Buhl-Mortensen 1996). The high mean temperature (6.2 °C) and the minimum temperature of 3.0 °C (see Table 2) reflect its southern distribution.

S. barnardi: known only from Iceland and possibly the Eastern Mediterranean (Barnard 1964; Berge & Vader 1997b). The mean temperature for this species (Table 2) was 4.7 °C with a relatively low SD (0.6), indicating that this species is restricted to warmer waters (minimum temperature 3.7 °C) and a southern distribution.

S. wagini: in addition to Iceland and the Faroe Islands, this species is only known from the Arctic Basin and the Kara Sea (Gurjanova 1936 & 1951; Berge & Vader 1997b). This is reflected in the low mean temperature (0.1 °C, Table 2), although the highest temperature was as high as 8.6 °C, and a SD of 2.2. This species seems therefore not to be restricted to colder waters.

Genus *Stegocephalopsis* (Phipps, 1774)

Stegocephalopsis Schellenberg, 1925

Type species. *Cancer ampulla* Phipps, 1774

Species. *Stegocephalopsis ampulla* (Phipps, 1774); *S. latus* (Haswell, 1879); *S. pacifica* (Bulycheva, 1952)

Only *Stegocephalopsis ampulla* is known from the area.

Material. 1 specimen from BIOICE station 20, see Appendix 2.

Distribution. *Stegocephalopsis ampulla* is known as an arctic circumpolar species (Stephensen 1925).

Genus *Stegocephalus* Krøyer, 1842

Type species. *Stegocephalus inflatus* Krøyer, 1842

Species. *Stegocephalus hancocki* Hurley, 1956; *S. inflatus* Krøyer, 1842

Only *S. inflatus* is known from the area.

Material. 45 specimens from 15 BIOFAR stations (stns 15, 82, 88, 89, 95, 124, 169, 171, 380, 458, 699, 730, 731, 744 & 9014, see Appendix 1); 105 specimens from 22 BIOICE stations (stns 1, 2, 3, 4, 6, 7, 9, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 27, 29, 30, 35 & 726, see Appendix 2).

Distribution. This species is very abundant in the North Atlantic and in the Arctic; it is known from many locations all around the Arctic Ocean, the Kara Sea, the Murman coast, the White Sea, Franz Joseph's land and the Siberian Polar Sea (Sars 1891, Gurjanova 1951 & 1962), the Baffin Bay and the Davis Strait (Stephensen 1925), Spitsbergen (Sars 1891), Greenland (Stephensen 1925), Iceland, the Faroe Islands, Shetland (Sars 1891), Skagerrak (Buhl-Jensen 1986) and all along the Norwegian coast (Sars 1891).

DISCUSSION

Four species (*Andaniotes islandica* (Stephensen, 1925) (= *A. corpulentus* (Thomson, 1882), *Phippsiella minima* Stephensen, 1925, *Stegocephalina ingolfi* Stephensen, 1925 and *Andaniexis abyssi* (Boeck, 1871)), all reported from this or adjacent areas by Stephensen (1925), were not recaptured during either of the two programmes. For *Andaniexis abyssi*, the reason for this is that this

species has been divided into three separate species with an allopatric distribution (BERGE & VADER 1997a): *Andaniexis abyssi*, *A. gracilis* and *A. lupus*. The latter is the one that occurs in both Iceland and the Faroe Islands, while *A. abyssi* has a much more southern distribution than *A. lupus*, and *A. gracilis* is only known from the Baffin Bay and the Davis Strait.

For the remaining three species, the failure to capture them in both the BIOICE and the BIOFAR programmes is not easy to explain. The specimens of *P. minima* and *S. ingolfi*, secured by the *Ingolf* expedition, are still the only specimens known today. *A. corpulentus*, however, is known from both the South and North Atlantic Ocean (BARNARD & KARAMAN 1991).

Appendix 3 contains a list of all stegocephalid species (29 species) reported from either the North Atlantic or the Arctic, and their respective distributions. Including the four species discussed above, 19 of these species are reported from Iceland and the Faroe Islands. The fact that no other areas have such a high number of stegocephalid species (see Appendix 3), may be a result of the large-scale and systematic sampling during the BIOICE and the BIOFAR programmes. As a consequence, no strong inferences can be made on the basis of the distribution data available at this point. There is, however, one feature that seems to be obvious from the table (Appendix 3): Only *Andaniexis gracilis* BERGE & VADER, 1997a has a truly west-Atlantic distribution (*Phippsiella abyssicola* OLDEVIG, 1959 is only known from the north Greenland Sea and is considered to be an arctic species), all other species that are present in the north-west Atlantic or Arctic are also present in the north-east Atlantic.

There are six species (*Andaniella pectinata*, *Andaniexis lupus*, *Phippsia roemeri*, *Stegocephalina biofar*, *Stegocephaloides wagini* and *Stegocephalus inflatus*) that are found at a conspicuously low mean temperature (see Table 2), varying between –0.5 to 0.7 °C, the other 9 species (not included *Stegocephalopsis ampulla*, for which the temperature is unknown) in Table 2 vary between 3.4 and 6.7 °C). Two of the 'cold-water' species (*Stegocephalus inflatus* and *Andaniella pectinata*) are widely distributed in the North Atlantic and the Arctic, while the remaining 4 species seem to reach their southern limit of distribution in the cold waters around the Faroe Islands. There is, however, one feature about the mean temperature that is important to notice: all 'cold-water' species, except *Stegocephalina biofar*, are also found in samples with a higher temperature. Thus they are not restricted to cold waters, they only seem to tolerate low temperatures (contrary to the species with a relatively high mean temperature).

Although *Andaniopsis nordlandica* appears to be restricted to warm waters (from Table 2), this species is found all along the Norwegian coast up to Ullsfjorden (N. Norway at about 70 °N), often together with *Andaniexis lupus* (a species not restricted to warm waters) or *Andaniexis abyssi*. The proportion of *Andaniopsis nordlandica* compared *to Andaniexis lupus* and *A. abyssi* is, however, much lower in samples from northern Norway than in these from southern and western Norway (personal observations).

ACKNOWLEDGEMENTS

We would like to thank Arne Nørrevang and Gudmundur V. Helgason for letting us study the BIOFAR and BIOICE material and arranging the Amphipod Identification Workshops at Fredrikshavn (1993) and Sandgerði (1995).

We would also like to thank Prof. A. Brandt (Hamburg) and Dr Niel Bruce (Copenhagen) for their kind help in procuring material required for this work. Thanks also to Dr Traudl Krapp (Bonn) and Prof. Marit Christiansen (Oslo) for detailed and constructive criticism of an earlier draft.

The authors are in great debt to Ellen Beck (Tromsø Museum) for inking all drawings.

REFERENCES

Andres, H.G. 1985. Die Gammaridea (Crustacea: Amphipoda) der deutschen Antarktis-Expeditionen 1975/1976 und 1977/1978. 4. Acanthonotozomatidae, Paramphithoidae und Stegocephalidae. – *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Zoologisches Institut* 82:119-153.

Barnard, J.L. 1961. Gammaridean Amphipoda from depths of 400 to 6000 meters. – *Galathea Reports* 5:23-128.

— 1962. South Atlantic abyssal amphipods collected by R.V. *Vema*. Abyssal Crustacea. – *Vema Research Series* 1:1-78.

— 1964. Deep-Sea Amphipoda (Crustacea) collected by the R/V "*Vema*" in the eastern Pacific Ocean and the Caribbean and Mediterranean Seas. – *Bulletin of the American Museum of Natural History* 127:3-46.

— 1967. Bathyal and abyssal gammaridean Amphipoda of Cedros Trench, Baja California. – *Bulletin of the United States National Museum* 260:1-205.

Barnard, J.L. & G.S. Karaman 1991. The families and genera of marine gammaridean Amphipoda (except marine gammaroids). – *Records of the Australian Museum* Suppl.13:1-866.

Barnard, K.H. 1916. Contributions to the crustacean fauna of South-Africa. - No 5. The Amphipoda. – *Annals of the South African Museum* 15:105-302.

— 1930. Amphipoda. British Antarctic ("Terra Nova") Expedition, 1910 – *Natural History Reports, Zoology* 8:307-454.

— 1932. Amphipoda. – *Discovery Reports* 5:1-326.

Berge, J. & W. Vader 1997a. Atlantic and Mediterranean species of the genus *Andaniexis* Stebbing (Amphipoda, Stegocephalidae). – *Journal of Natural History* 31:1429-1455.

— 1997b. North Atlantic species of the genus *Stegocephaloides* Sars (Amphipoda, Stegocephalidae). *Sarsia* 82:325-346.

— 1997c. North Atlantic and Mediterranean species of the genus *Phippsiella* Schellenberg (Amphipoda, Stegocephalidae). – *Journal of Natural History* 31:1501-1532.

Bellan-Santini, D. 1985. Amphipodes profonds de Mediterranée (Campagnes Biomède I, Polymède I et II). – *Bulletino del Museo Civico di Storia Naturale, Verona* 10:263-313.

Boeck, A. 1871. Crustacea Amphipoda borealia et arctica. – *Videnskabs-Selskabets Forhandlinger for 1871*:83-280.

— 1872. *De Skandinaviske og Arktiske Amphipoder*. 1-160. A.W. Brøgger, Christiania.

Buhl-Jensen, L. 1986. The benthic amphipod fauna of the west-Norwegian continental shelf compared with the fauna of five adjacent fjords. – *Sarsia* 71:193-208.

Buhl-Jensen, L. & J.H. Fosså 1991. Hyperbenthic crustacean fauna of the Gullmarfjord area (western Sweden): species richness, seasonal variation and long-term changes. – *Marine Biology* 109:245-258.

Buhl-Mortensen, L. 1996. Amphipod fauna along an offshore-fjord gradient. – *Journal of Natural History* 30:23-49.

Chevreux, E. & L. Fage 1925. Amphipodes. – *Faune de France* 9:1-488.

Dallwitz, M.J., T.A. Paine & E.J. Zurcher 1996. *Supplement to Edition 4 of: User's Guide to the DELTA System: A General System for Processing Taxonomic Descriptions.* Edition 4.04. CSIRO Division of Entomology, Canberra. 13 pp.

Dana, J.D. 1852. On the classification of the Crustacea Choristopoda or Tetradecapoda. – *American Journal of Sciences and Arts*, Series 2, 14:297-316.

Fenwick, G.D. & D.H. Steele 1983. Amphipods of Placentia Bay, Newfoundland. – *Memorial University of Newfoundland. Occasional Papers in Biology* 7:1-22.

Gouda, E.J. 1993. TAXASOFT: Taxonomic Software by E.J. Gouda Ver. 1.0

Gurjanova, E.F 1936. Beitrage zur Amphipodenfauna des Karischen Meeres. – *Zoologischer Anzeiger* 116:145-152.

— 1951. Bokoplavy morej SSSR i sopredel'nykh vod (Amphipoda-Gammaridea). – *Akademiia Nauk SSSR, Opredeliteli po Faune SSSR* 41:1-1029.

— 1962. Bokoplavy severnoi chasti Tixogo Okeana (Amphipoda-Gammaridea) chast' 1. – *Akademii Nauk SSSR, Opredeliteli po Faune SSSR* 74:1-440.

Karaman, G.S. 1974. 62. Contribution to the knowledge of the Amphipoda. The family Stegocephalidae from the Adriatic Sea. – *Poljoprivreda i Sumarstvo* 20(4):53-65.

Krøyer, H. 1842. Nye nordiske Slægter og Arter af Amphipodernes Orden, henhørende til Familien *Gammarina*. (Foreløpigt Uddrag af et større Arbejde). – *Naturhistorisk Tidsskrift* 4:141-166.

Ledoyer, M. 1986. Crustacés amphipodes gammariens. – *Faune de Madagascar* 59:599-1112.

Lincoln, R.J. 1979. *British Marine Amphipoda: Gammaridea*. – London: British Museum (Natural History). 658 pp.

Moore, P.G. 1992. A study on amphipods from the superfamily Stegocephaloidea Dana 1852 from the northeastern Pacific region: systematics and distributional ecology. – *Journal of Natural History* 26:905-936.

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

Oldevig, H. 1959. Arctic, subarctic and Scandinavian amphipods in the collections of the Swedish Natural History Museum in Stockholm. – *Göteborgs Kungliga Vetenskaps-Vitterhets-Samhälles Handlingar* 8:1-132.

Phipps, C.J. 1774. Appendix, pp. 189-193 pl. 12 of*: A Voyage Towards the North Pole, Undertaken by His Majesty's Command, 1773*. – J. Nourse. London.

Pirlot, J.M. 1933. Les Amphipodes de l'expedition du Siboga. Deuxième partie. Les amphipodes gammarides II. -Les amphipodes de la mer profonde. 1 (Lysianassidae, Stegocephalidae, Stenothoidae, Pleustidae, Lepechinellidae). – *Siboga-Expedition, Monographie* 33c:115-167, figs 35-60.

Ruffo, S. 1975. Studi sui crostei anfipodi. Nuovi Lisianassidi e Stegocefalidi del Mediterraneo. – *Bolettino del Museo Civico di Storia Naturale, Verona*: 441-453.

— (ed.) 1993. The Amphipoda of the Mediterranean. Part 3. – *Memoires de l'Institut Oceanographique, Monaco* 13:77-813.

Sars, G.O. 1883. Oversigt af Norges Crustaceer med foreløbige Bemærkninger over de nye eller mindre bekjendte Arter. I. (Podophthalmata - Cumacea - Isopoda - Amphipoda). – *Christiania Videnskabs-Selskabets Forhandlinger* 1883:1-124.

— 1891. Amphipoda. – *An Account of the Crustacea of Norway With Short Description and Figures of All the Species*, Part IX:185-212.

Schellenberg, A. 1925. Die Gammariden Spitzbergens nebst einer Uebersicht der von Römer & Schaudinn 1898 im nordlichen Eismeer gesammelten Arten. – *Mittheilungen aus dem Zoologischen Museum Berlin* 11:195-231.

— 1926 Amphipoda 3: Die Gammariden der Deutchen Tiefsee-Expedition. – *Wissenschaftliche Ergebnisse Deutschen Tiefsee-Expedition...."Valdivia" 1898-1899* 23:195-243.

Shoemaker, C.R 1931. The stegocephalid and ampeliscid amphipod crustaceans of Newfoundland, Nova Scotia, and New Brunswick in the United States National Museum. – *Proceedings of the United States National Museum* 79:1-18.

Stebbing, T.R.R. 1888. The 'Challenger' Amphipoda – *Annals and Magazine of Natural History* (5) 11:203-207.

— 1906. Amphipoda 1. Gammaridea. – *Das Tierreich* 21:1-806.

Steele, D.H. 1967. The morphology of the marine amphipod *Stegocephalus inflatus* Krøyer. – *Canadian Journal of Zoology* 45:1129-1133.

Stephensen, K. 1925. Crustacea Malacostraca. VI. (Amphipoda. II) – *Danish Ingolf-Expedition* 3: 101-178.

— 1935. The Amphipoda of N. Norway and Spitsbergen with adjacent waters. – *Tromsø Museum Skrifter* 3(1): 1-140.

Thomson, G.M. 1882. Additions to the crustacean fauna of New Zealand. – *Transactions of the New Zealand Institute* 14:230-238.

Vader, W. 1971. Additions to the Amphipoda of Northern Norway. – *Astarte* 4:47-51.

— 1984a. Notes on Norwegian marine Amphipoda 7. Amphipod associates of *Geodia* sponges in western Norway. – *Fauna norvegica Series A* 5:14-16.

— 1984b. Notes on Norwegian marine Amphipoda 8. Amphipods found in association with sponges and tunicates. – *Fauna norvegica Series A* 5:16-21.

Watling, L. 1989. A classification system for crustacean setae based on the homology concept. – Pp. 15-27 in: Felgenhauer, B.E., L. Watling & A.B. Thistle (eds). *Functional Morphology of Feeding and Grooming in Crustacea Crustacean Issues* 6. Balkema, Rotterdam.

Watling, L. & H. Holman 1981. Additional acanthonotozomatid, paramphithoid, and stegocephalid Amphipoda from the Southern Ocean. – *Proceedings of the Biological Society of Washington* 94:181-227.

Accepted 16 October 1997

Appendix 1. Distribution of stegocephalid species on the different station in the BIOFAR project. Station-data are taken from NØRREVANG & al. (1994). Positions are given in degrees and minutes with decimals (ddmm.mm). Specimens = the total number of specimens of a species at one station; Ds = detritus sledge; RP = Rothlisberg & Pearcy epibenthic sampler; Tmp = estimated mean bottom temp. (°C); 1 = Norwegian Sea Deep Water; 2 = Atlantic Water; 3 = North Icelandic / Arctic Intermediate Water; Sediment = notes on the type of material brought up by the sampling gear; c = coarse; C = cobbles and stones; f = fine; F = fines, i.e. clay and silt; G = gravel; M = mud, i.e. fines with organic material; S = sand; sb = soft bottom; Shg = shell gravel; Shs = shell sand.

Species	Stn no.	Speci-mens	Gear	Lat. N	Long. W	Depth	Temp °C	Water mass	Sediment
Andaniella pectinata	15	12	RP	623768	044037	683	–0.5	1	S
A. pectinata	172	5	RP	621912	035479	507	1.0	1 3	S
A. pectinata	274	1	Ds	630079	074922	698	–0.6	1	G.C
A. pectinata	458	6	Ds	625492	070023	675	–0.57	1	G.fC
A. pectinata	750	4	Ds	62487x	05441x	600	0.0	1 3	M.S.G.C
A. pectinata	9014	1	RP	625711	6577x	763	–0.5	1	-
Andaniexis eilae	517	1	Ds	603574	113771	1099	5.6	2 3	G
Andaniexis lupus	15	9	RP	623768	044037	683	–0.5	1	S
A. lupus	82	1	RP	603134	082507	732	–0.1	1	-
A. lupus	95	2	Ds	604151	051863	803	–0.7	1	-
A. lupus	167	1	RP	62468x	03312x	1032	–0.85	1	-
A. lupus	168	3	RP	624172	033724	899	–0.66	1	F
A. lupus	169	1	RP	623729	033244	808	–0.6	1	-
A. lupus	170	50	RP	623186	033108	699	–0.6	1	-
A. lupus	171	11	RP	622545	033160	601	0.0	1	S
A. lupus	172	48	RP	621912	035479	507	1.0	1 3	S
A. lupus	458	3	Ds	625492	070023	675	–0.57	1	G.fC
A. lupus	459	1	Ds	625942	065752	910	–0.68	1	S.C
A. lupus	731	7	Ds	60297x	07141x	1042	–0.9	1	S.G.C
A. lupus	750	1	Ds	62487x	05441x	600	0.0	1 3	M.S.G.C
A. lupus	9014	17	RP	625711	06577x	763	–0.5	1	-
Euandania gigantea	417	1	RP	621656	105813	894	3.4	1 2 3	F.fG.C
Phippsia roemeri	172	1	RP	621912	035479	507	1.0	1 3	S
P. roemeri	189	2	Ds	625082	063970	509	2.0	3	G.C
P. roemeri	267	5	RP	624240	083375	498	3.9	2 3	S
P. roemeri	271	1	Ds	625230	080924	559	2.2	3	sb
P. roemeri	481	1	Ds	610016	511389	604	0.0	1	M.cG.C
P. roemeri	698	1	Ds	615228	091468	643	3.9	2 3	cS.G.C
Phippsiella similis	698	3	Ds	615228	091468	643	3.9	2 3	cS.G.C
Stegocephalina biofar	15	56	RP	623768	044037	683	–0.5	1	S
S. biofar	170	30	RP	623186	033108	699	–0.6	1	-
S. biofar	171	4	RP	622545	033160	601	0.0	1	S
S. biofar	172	2	RP	621912	035479	507	1.0	1 3	S
S. biofar	274	4	Ds	630079	074922	698	–0.6	1	G.C

Appendix 1 continued.

Species	Stn no.	Speci-mens	Gear	Lat. N	Long. W	Depth	Temp °C	Water mass	Sediment
S. biofar	458	5	Ds	625492	070023	675	–0.57	1	G.fC
S. biofar	459	11	Ds	625942	065752	910	–0.68	1	S.C
S. biofar	731	3	Ds	60297x	07141x	1042	–0.9	1	S.G.C
S. biofar	770	1	Ds	62204x	03117x	583	–0.25	1	F.G.C
S. biofar	9014	19	RP	625711	6577x	763	–0.5	1	-
Stegocephaloides auratus	19	14	Ds	62120x	0425xx	276	6.5	2 3	sb
S. auratus	27	2	RP	61541x	05038x	225	7.5	2	S
S. auratus	28	1	Ds	615369	050735	218	7.6	2	-
S. auratus	32	1	RP	614175	054771	354	6.5	2 3	-
S. auratus	65	1	Ds	6135xx	08054x	322	7.9	2	-
S. auratus	68	5	Ds	61263x	09204x	600	8.1	2	-
S. auratus	70	3	Ds	612469	084397	352	7.5	2	-
S. auratus	75	1	Ds	611327	082547	156	8.6	2	cShs
S. auratus	261	8	RP	613557	093547	1003	3.0	1 2 3	-
S. auratus	267	2	RP	624240	083375	498	3.9	2 3	S
S. auratus	493	1	Ds	604938	095327	800	7.6	2	sb.F.fSh
S. auratus	494	1	Ds	604493	094369	703	8.1	2	sb.fs.C
Stegocephaloides wagini	73	1	RP	61143x	08295x	185	8.6	2	-
S. wagini	113	2	RP	613908	084813	872	0.0	1	-
S. wagini	481	2	Ds	610016	511389	604	0.0	1	M.cG.C
S. wagini	500	1	Ds	602687	082264	714	–0.05	1	G.cC
S. wagini	517	1	Ds	603574	113771	1099	5.6	2 3	G
S. wagini	522	4	Ds	603953	123630	514	8.6	2	F.fS.fC
S. wagini	705	12	Ds	603838	073102	1038	–0.83	1	F.G.C
S. wagini	730	3	Ds	60322x	07082x	949	–0.7	1	F.G.C
S. wagini	731	65	Ds	60297x	07141x	1042	–0.9	1	S.G.C
S. wagini	750	14	Ds	62487x	05441x	600	0.0	1 3	M.S.G.C
Stegocephalus inflatus	15	10	RP	623768	044037	683	-0.5	1	S
S. inflatus	82	1	RP	603134	082507	732	-0.1	1	-
S. inflatus	88	1	Ds	60320x	06557x	770	–0.6	1	F.G
S. inflatus	89	1	Ds	60316x	0647xx	396	4.0	2 3	fS.C
S. inflatus	95	2	Ds	604151	051863	803	–0.7	1	-
S. inflatus	124	1	RP	621694	093893	600	3.9	2 3	-
S. inflatus	169	15	RP	623729	033244	808	–0.6	1	-
S. inflatus	171	1	RP	622545	033160	601	0.0	1	S
S. inflatus	380	1	RP	621348	035815	425	1.8	3	Sp
S. inflatus	458	1	Ds	625492	070023	675	–0.57	1	G.fC
S. inflatus	699	3	RP	603459	121663	357	8.6	2	-
S. inflatus	730	5	Ds	60322x	07082x	949	–0.7	1	F.G.C
S. inflatus	731	1	Ds	60297x	07141x	1042	–0.9	1	S.G.C
S. inflatus	744	1	Ds	62103x	11000x	1022	3.1	1 2 3	G.C
S. inflatus	9014	1	RP	625711	6577x	763	–0.5	1	-

Appendix 2. Distribution of stegocephalid species in different samples from the BIOICE project. Positions are given in degrees and minutes with decimals (ddmm.mm). Ds = detritus sledge; RP = Rothlisberg & Pearcy epibenthic sampler; T = Triangular dredge; M = mud; S = sand;g = gravel; st = stones; Sg = Sandy gravel; Sl = Silt; Mg = Muddy gravel; f = fine; C= Coral

Species	Smpl. no.	Stn no.	Speci-mens	Lat. N	Long. W	Depth	Temp. °C	Gear	Sediment
Andaniella pectinata	2319	2	5	640100	093700	776	-	RP	-
A. pectinata	2323	3	4	635500	100500	623	-	RP	-
A. pectinata	2067	4	1	660860	173642	196	3.8	RP	-
A. pectinata	2325	4	3	634500	101100	555	-	RP	Sl. 4 st
A. pectinata	2087	11	7	671541	172678	735	–0.4	RP	-

Appendix 2 continued.

Species	Smpl. no.	Stn no.	Speci-mens	Lat. N	Long. W	Depth	Temp. °C	Gear	Sediment
A. pectinata	2088	12	75	671432	175141	617	–0.4	RP	S. Sl
A. pectinata	2090	13	20	671334	174894	539	–0.3	RP	-
A. pectinata	2091	14	1	671138	174644	405	–0.3	RP	-
A. pectinata	2093	14	1	671185	174530	407	–0.3	Ds	-
A. pectinata	2099	16	1	663693	181451	112	4.9	Ds	S. St
A. pectinata	2108	19	8	674552	192902	749	–0.5	RP	-
A. pectinata	2110	19	1	674571	192951	762	–0.5	Ds	M.g.st
A. pectinata	2111	20	1	674291	192990	588	–0.5	Ds	M
A. pectinata	2113	20	5	674345	192820	603	–0.5	RP	-
A. pectinata	2359	20	1	641700	105000	394	-	Ds	Sg
A. pectinata	2360	20	2	641700	104900	391	-	RP	Sl. S
A. pectinata	2114	21	1	674177	192761	489	–0.5	RP	-
A. pectinata	2362	21	1	642900	102600	495	-	RP	-
A. pectinata	2364	22	7	643500	100300	605	-	RP	
A. pectinata	2367	23	10	643800	094300	719	-	RP	-
A. pectinata	2122	24	2	671069	193362	346	0.2	Ds	-
A. pectinata	2124	24	2	671102	193385	347	0.2	RP	-
A. pectinata	2128	27	2	665902	184997	203	2.7	RP	-
A. pectinata	2129	28	1	664588	184175	678	–0.1	Ds	Sg.M
A. pectinata	2132	29	10	664465	185530	492	0.1	RP	-
A. pectinata	2134	29	4	664446	185493	504	0.1	Ds	Mg
A. pectinata	2135	30	1	664437	185732	418	0.6	Ds	Mg
A. pectinata	2149	35	1	664493	200516	293	3.0	RP	-
A. pectinata	2150	36	2	664195	200249	149	5.1	RP	-
A. pectinata	2152	36	3	664188	200298	148	5.1	Ds	fS
A. pectinata	2154	37	3	663402	200310	100	2.2	Ds	Sg
A. pectinata	2156	37	5	663395	200071	97	2.2	RP	-
A. pectinata	2161	39	3	661725	200633	130	5.3	Ds	s. st
A. pectinata	2175	44	1	663028	183226	203	4.6	Ds	M
A. pectinata	2056	52	1	661704	184885	120	5.3	Ds	St
Andaniexis eilae	2403	559	12	630290	214960	838	5.5	RP	S
A. eilae	2404	559	1	630290	215080	802	5.5	Ds	S. Sl
A. eilae	2406	560	17	625920	214700	934	4.6	RP	-
A. eilae	2415	563	8	630018	210054	819	5.4	RP	-
A. eilae	2418	564	1	630993	211208	256	7.1	RP	-
A. eilae	2430	568	4	630790	195720	1016	4.8	RP	-
A. eilae	2475	587	6	630420	213490	842	5.5	RP	S. Sl
A. eilae	2697	726	4	641020	274310	1042	4.2	RP	-
A. eilae	2701	727	1	640550	274970	1121	3.8	RP	-
A. eilae	2704	728	1	635050	274280	1295	3.8	RP	-
Andaniexis lupus	2317	1	3	640700	090300	996	-	RP	-
A. lupus	2318	2	4	640200	093700	772	-	Ds	S.Sl
A. lupus	2319	2	2	640100	093700	776	-	RP	-
A. lupus	2321	3	1	635600	100000	639	-	Ds	S.Sl
A. lupus	2323	3	2	635500	100500	623	-	RP	-
A. lupus	2325	4	1	634500	101100	555	-	RP	-
A. lupus	2330	6	19	630500	112000	453	-	RP	S
A. lupus	2077	9	57	674051	171038	1048	–0.5	RP	S. Sl
A. lupus	2337	9	30	622700	125500	1099	-	RP	S. Sl
A. lupus	2087	11	28	671541	172678	735	–0.4	RP	-
A. lupus	2088	12	107	671432	175141	617	–0.4	RP	S. Sl
A. lupus	2090	13	40	671334	174894	539	–0.3	RP	-
A. lupus	2091	14	105	671138	174644	405	–0.3	RP	-
A. lupus	2093	14	5	671185	174530	407	–0.3	Ds	M. S
A. lupus	2100	17	65	680006	192526	1141	–0.6	RP	-
A. lupus	2107	18	300	675014	193329	905	–0.6	RP	S. M

Appendix 2 continued.

Species	Smpl. no.	Stn no.	Speci-mens	Lat. N	Long. W	Depth	Temp. °C	Gear	Sediment
A. lupus	2108	19	11	674552	192902	749	–0.5	RP	-
A. lupus	2110	19	1	674571	192951	762	–0.5	Ds	M.g.st
A. lupus	2113	20	15	674345	192820	603	–0.5	RP	-
A. lupus	2114	21	6	674177	192761	489	–0.5	RP	
A. lupus	2118	22	32	672923	193270	393	–0.3	RP	-
A. lupus	2364	22	13	643500	100300	605	-	RP	S. Sl
A. lupus	2367	23	11	643800	094300	719	-	RP	-
A. lupus	2124	24	11	671102	193385	347	0.2	RP	-
A. lupus	2132	29	6	664465	185530	492	0.1	RP	-
A. lupus	2136	30	5	664356	185720	417	0.6	RP	-
A. lupus	2137	31	2	664311	191949	297	2.1	RP	-
A. lupus	2164	40	2	662675	193588	294	4.5	RP	-
A. lupus	2172	43	4	662573	184877	437	0.6	RP	M
A. lupus	2410	561	9	625160	214410	1074	4.0	RP	S. Sl
A. lupus	2412	562	1	624486	213317	1170	4.2	Ds	Sl
A. lupus	2415	563	1	630018	210054	819	5.4	RP	-
A. lupus	2692	724	3	642660	281550	1162	3.7	RP	-
A. lupus	2697	726	4	641020	274310	1042	4.2	RP	-
A. lupus	2697	726	3	641020	274310	1042	4.2	RP	-
A. lupus	2700	727	5	640560	275000	1105	3.8	Ds	S.Sl.g
A. lupus	2701	727	4	640550	274970	1121	3.8	RP	-
A. lupus	2704	728	19	635050	274280	1295	3.8	RP	-
A. lupus	2707	729	4	635530	281680	1407	3.7	RP	S.Sl
A. lupus	2212	969	6	640903	235846	256	7.0	Ds	fS
Andaniopsis nordlandica	2401	558	19	630740	225390	520	6.7	RP	-
A. nordlandica	2418	564	20	630993	211208	256	7.1	RP	-
A. nordlandica	2424	566	23	631027	200954	495	6.5	RP	C
A. nordlandica	2427	567	2	630990	200369	778	5.5	RP	S. Sl
A. nordlandica	2469	585	2	630990	213160	450	6.7	RP	-
A. nordlandica	2472	586	3	630670	213760	666	6.1	RP	-
A. nordlandica	2213	969	1	640903	235846	256	7.0	Ds	fS
A. nordlandica	2215	969	3	640930	235828	260	7.0	RP	-
A. nordlandica	2273	990	1	630838	245900	313	7.0	RP	-
Phippsia gibbosa	2435	570	1	631380	193170	965	5.5	RP	S. Sl
Phippsia roemeri	2324	4	1	634500	101100	554	-	Ds	Sl. 4 st
P. roemeri	2325	4	5	634500	101100	555	-	RP	-
P. roemeri	2330	6	2	630500	112000	453	-	RP	S
P. roemeri	2501	9	1	662524	255032	630	–0.4	Ds	S. st
P. roemeri	2090	13	10	671334	174894	539	–0.3	RP	-
P. roemeri	2091	14	51	671138	174644	405	–0.3	RP	-
P. roemeri	2093	14	18	671185	174530	407	–0.3	Ds	S. M
P. roemeri	2516	15	3	663685	252269	680	–0.5	Ds	S
P. roemeri	2518	16	1	663694	253359	749	–0.5	Ds	Sg
P. roemeri	2360	20	1	641700	104900	391	-	RP	S. Sl
P. roemeri	2362	21	2	642900	102600	495	-	RP	-
P. roemeri	2364	22	3	643500	100300	605	-	RP	S. Sl
P. roemeri	2367	23	1	643800	094300	719	-	RP	-
P. roemeri	2122	24	2	671069	193362	346	0.2	Ds	-
P. roemeri	2124	24	2	671102	193385	347	0.2	RP	-
P. roemeri	2132	29	3	664465	185530	492	0.1	RP	-
P. roemeri	2134	29	3	664446	185493	504	0.1	Ds	Mg
P. roemeri	2136	30	8	664356	185720	417	0.6	RP	
Phippsiella bioice	2334	8	1	624300	124300	803	-	RP	-
P. bioice	2337	9	3	622700	125500	1099	-	RP	S. Sl
P. bioice	2410	561	1	625160	214410	1074	4.0	RP	S. Sl
P. bioice	2415	563	1	630018	210054	819	5.4	RP	-

Appendix 2 continued.

Species	Smpl. no.	Stn no.	Speci-mens	Lat. N	Long. W	Depth	Temp. °C	Gear	Sediment
P. bioice	2429	568	1	630700	195660	1072	4.8	Ds	S. Sl
P. bioice	2430	568	14	630790	195720	1016	4.8	RP	-
P. bioice	2707	729	2	635530	281680	1407	3.7	RP	S.Sl
Phippsiella similis	2332	7	1	625500	121400	550	-	RP	S
P. similis	2352	17	1	634700	114900	350	-	RP	-
P. similis	2161	39	5	661725	200633	130	5.3	Ds	Sg
P. similis	2692	724	1	642660	281550	1162	3.7	RP	-
P. similis	2700	727	1	640560	275000	1105	3.8	Ds	S.Sl.g
P. similis	2701	727	3	640550	274970	1121	3.8	RP	-
P. similis	2719	735	4	642570	262420	300	5.6	Ds	Sl
P. similis	2720	735	2	642580	262420	304	5.6	RP	-
P. similis	2219	971	1	641257	251678	265	6.4	RP	-
Stegocephalina biofar	2323	3	2	635500	100500	623	-	RP	-
S. biofar	2324	4	2	634500	101100	554	-	Ds	Sl. 4 st
S. biofar	2501	9	1	662524	255032	630	–0.4	Ds	S. s
S. biofar	2107	18	1	675014	193329	905	–0.6	RP	S. M
S. biofar	2117	22	1	672832	193179	405	–0.3	Ds	-
S. biofar	2132	29	3	664465	185530	492	0.1	RP	-
S. biofar	2136	30	2	664356	185720	417	0.6	RP	-
Stegocephalina idae	2346	15	7	632300	123800	501	-	RP	S
S. idae	2697	726	2	641020	274310	1042	4.2	RP	-
Stegocephaloides auratus	2332	7	1	625500	121400	550	-	RP	S
S. auratus	2352	17	4	634700	114900	350	-	RP	-
S. auratus	2401	558	10	630740	225390	520	6.7	RP	-
S. auratus	2403	559	4	630290	214960	838	5.5	RP	S
S. auratus	2410	561	1	625160	214410	1074	4.0	RP	S. Sl
S. auratus	2417	564	1	630990	211180	259	7.1	Ds	S. Sl
S. auratus	2418	564	1	630993	211108	256	7.1	RP	-
S. auratus	2423	566	1	631040	200900	600	6.5	Ds	S. Sl
S. auratus	2424	566	58	631027	200954	495	6.5	RP	C
S. auratus	2427	567	28	630990	200369	778	5.5	RP	S. Sl
S. auratus	2435	570	1	631380	193170	965	5.5	RP	S. Sl
S. auratus	2441	572	2	632017	194960	228	6.9	RP	S
S. auratus	2454	580	1	632010	211020	152	7.2	RP	-
S. auratus	2463	583	1	632540	213989	133	7.1	Ds	Sg
S. auratus	2469	585	8	630990	213160	450	6.7	RP	-
S. auratus	2472	586	42	630670	213760	666	6.1	RP	-
S. auratus	2475	587	8	630420	213490	842	5.5	RP	S. Sl
S. auratus	2692	724	1	642660	281550	1162	3.7	RP	-
S. auratus	2720	735	3	642580	262420	304	5.6	RP	-
S. auratus	2213	969	1	640903	235846	256	7.0	Ds	fS
S. auratus	2219	971	3	641257	251678	265	6.4	RP	-
S. auratus	2221	972	2	635501	251639	240	6.5	RP	-
S. auratus	2226	973	5	634488	245623	426	5.9	RP	-
S. auratus	2237	977	2	632710	244075	296	6.9	RP	-
S. auratus	2273	990	2	630838	245900	313	7.0	RP	-
S. auratus	2308	1004	6	631502	224737	263	7.1	RP	M.S
S. auratus	2311	1005	8	633468	224196	206	7.3	RP	-
Stegocephaloides barnardi	2403	559	1	630290	214960	838	5.5	RP	S
S. barnardi	2406	560	22	625920	214700	934	4.6	RP	-
S. barnardi	2427	567	16	630990	200369	778	5.5	RP	S. Sl
S. barnardi	2429	568	1	630700	195660	1072	4.8	Ds	S. Sl
S. barnardi	2430	568	8	630790	195720	1016	4.8	RP	-
S. barnardi	2475	587	3	630420	213490	842	5.5	RP	S. Sl
S. barnardi	2697	726	13	641020	274310	1042	4.2	RP	-
S. barnardi	2701	727	2	640550	274970	1121	3.8	RP	-

Appendix 2 continued.

Species	Smpl. no.	Stn no.	Speci-mens	Lat. N	Long. W	Depth	Temp. °C	Gear	Sediment
S. barnardi	2704	728	4	635050	274280	1295	3.8	RP	-
S. barnardi	2707	729	1	635530	281680	1407	3.7	RP	S.Sl
Stegocephaloides wagini	2330	6	1	630500	112000	453	-	RP	S
S. wagini	2332	7	5	625500	121400	550	-	RP	S
S. wagini	2342	12	1	625100	131600	846	-	Ds	g. st
S. wagini	2091	14	3	671138	174644	405	–0.3	RP	-
S. wagini	2516	15	4	663685	252269	680	–0.5	Ds	S
S. wagini	2518	16	1	663694	253359	749	–0.5	Ds	Sg
S. wagini	2107	18	1	675014	193329	905	–0.6	RP	S. M
S. wagini	2108	19	2	674552	192902	749	–0.5	RP	-
S. wagini	2110	19	3	674571	192951	762	–0.5	Ds	M.g.st
S. wagini	2367	23	26	643800	094300	719	-	RP	-
S. wagini	2132	29	2	664465	185530	492	0.1	RP	-
S. wagini	2410	561	4	625160	214410	1074	4.0	RP	S. Sl
S. wagini	2698	726	1	641050	274260	1038	4.2	Ds	-
S. wagini	2707	729	5	635530	281680	1407	3.7	RP	S.Sl
Stegocephalopsis ampulla	2360	20	1	641700	104900	391	-	RP	S. Sl
Stegocephalus inflatus	2317	1	4	640700	090300	996	-	RP	-
S. inflatus	2319	2	3	640100	093700	776	-	RP	-
S. inflatus	2323	3	3	635500	100500	623	-	RP	-
S. inflatus	2325	4	2	634500	101100	555	-	RP	-
S. inflatus	2330	6	2	630500	112000	453	-	RP	S
S. inflatus	2332	7	1	625500	121400	550	-	RP	S
S. inflatus	2497	7	1	661375	261116	538	0.5	Ds	-
S. inflatus	2501	9	1	662524	255032	630	–0.4	Ds	st. S
S. inflatus	2093	14	1	671185	174530	407	–0.3	Ds	M. S
S. inflatus	2094	15	7	670203	173418	303	1.7	Ds	-
S. inflatus	2516	15	7	663685	252269	680	–0.5	Ds	S
S. inflatus	2349	16	1	633700	121700	-	-	RP	-
S. inflatus	2352	17	4	634700	114900	350	-	RP	-
S. inflatus	2355	18	3	635400	113500	317	-	Ds	Sg. st
S. inflatus	2356	18	9	635500	113700	327	-	RP	S
S. inflatus	2108	19	2	674552	192902	749	–0.5	RP	-
S. inflatus	2358	19	1	641000	113200	318	-	RP	-
S. inflatus	2524	19	1	665690	235973	213	5.6	Ds	Sg. st
S. inflatus	2113	20	1	674345	192820	603	–0.5	RP	-
S. inflatus	2360	20	6	641700	104900	391	-	RP	S. Sl
S. inflatus	2362	21	10	642900	102600	495	-	RP	-
S. inflatus	2364	22	4	643500	100300	605	-	RP	S. Sl
S. inflatus	2366	23	1	643900	094700	675	-	DS	g. st
S. inflatus	2367	23	18	643800	094300	719	-	RP	-
S. inflatus	2128	27	1	665902	184997	203	2.7	RP	-
S. inflatus	2132	29	2	664465	185530	492	0.1	RP	-
S. inflatus	2135	30	1	664437	185732	418	0.6	Ds	Mg
S. inflatus	2136	30	1	664356	185720	417	0.6	RP	
S. inflatus	2147	35	1	664471	200617	300	3.0	Ds	M.S
S. inflatus	2149	35	3	664493	200516	293	3.0	RP	
S. inflatus	2379	35	1	641900	122900	310	-	T	g.st
S. inflatus	2697	726	2	641020	274310	1042	4.2	RP	-

Appendix 3: The known occurrences of the Atlantic stegocephalid species. Area-description: I: Mediterranean; II: Bay of Biscay; III: British Isles; IV: Skagerrak and Norwegian coast north to and including Trondheimsfjorden; V: Norwegian coast north of Trondheimsfjorden; VI: Faroe Islands; VII: Iceland; VIII: Spitsbergen; IX: Russian Arctic and Barents Sea; X: Canadian Basin; XI: East of Greenland including Jan Mayen; XII: Baffin Bay and Davis Strait; XIII: Newfoundland and New England. Symbols: ++ presence confirmed by examination of material; + presence reported in the literature. *Metandania islandica* Stephensen, 1925 is considered to be synonymous with *Andaniotes corpulentus* (Thomson, 1882).

Species ↓ Area →	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	COMMENTS
Andaniella pectinata				+	++	++	++	+	+		+	+	+	
Andaniexis abyssi				++	++									
A. eilae							++							
A. gracilis												++		
A. lupus					++	++	++	++	++					
A. mimonectes	+	++												
Andaniopsis nordlandica				+	++		++							
Andaniotes corpulentus							++							
Euandania gigantea						++								Cosmopolitan marine
Parandania boecki														Cosmopolitan marine
Parandaniexis mirabilis														Cosmopolitan marine in latitudes below 45°
Phippsia gibbosa				+	++		++							First report outside the Norwegian coast
P. roemeri						++	++	+			+			
Phippsiella abyssicola											++			North Greenland Sea
P. bioice							++							
P. longicornis											+			
P. minima							+					+		
P. nipoma														Cosmopolitan in latitudes below 60°
P. pseudophippsia	++													
P. similis				++	++	++	++	+				+	+	
Stegocephalina biofar						++	++				++			
Stegocephalina idae							++							
S. ingolfi							+							
Stegocephaloides auratus				+	++	++	++							
S. barnardi							++							
S. christianiensis	+	+	++	++										
S. wagini						++	++		++					
Stegocephalopsis ampulla								+	++	+	+	+		Circumpolar
Stegocephalus inflatus			+	++	++	++	++	++	+	+	+	+	+	