

# Revision of the Antarctic and sub-Antarctic species of the family Stegocephalidae (Crustacea: Amphipoda) with description of two new species

by Jørgen BERGE, Claude DE BROYER & Wim VADER

## Abstract

The Antarctic and sub-Antarctic elements of the family Stegocephalidae DANA, 1855 (Crustacea: Amphipoda) are revised, and a key to the species is presented. Two new species are described: *Andaniexis ollii* n.sp. and *Phippsiella watlingi* n.sp. The family is represented in the Southern Ocean by 19 species belonging to 11 genera, of which one is reported as new to the area.

**Key words:** Amphipoda, Stegocephalidae, Antarctic, Taxonomy, *Andaniexis ollii*, *Phippsiella watlingi*.

## Résumé

Les éléments antarctiques et subantarctiques de la famille Stegocephalidae DANA, 1855 (Crustacea: Amphipoda) sont revus et une clé des espèces est établie. Deux espèces nouvelles sont décrites: *Andaniexis ollii* n.sp. et *Phippsiella watlingi* n.sp. La famille est représentée dans l'océan Austral par 19 espèces appartenant à 11 genres, dont un est nouveau pour la région.

**Mots-clés:** Amphipoda, Stegocephalidae, Antarctique, Taxonomie, *Andaniexis ollii*, *Phippsiella watlingi*.

## Introduction

The family Stegocephalidae DANA, 1855 was, until 1980, represented in the Antarctic and sub-Antarctic by only 5 species, belonging to four genera: *Andaniotes linearis* K.H. BARNARD, 1932, *Phippsia vanhoeffeni* (SCHELLENBERG, 1926), *Phippsiella kergueleni* SCHELLENBERG, 1926, *P. rostrata* K.H. BARNARD, 1932 and *Stegosoladidus ingens* (CHEVREUX, 1906). Three additional species (*Euandania gigantea* (STEBBING, 1883), *Parandania boeckii* (STEBBING, 1888) & *Parandaniexis dewitti* WATLING & HOLMAN, 1980) were reported from the area by WATLING & HOLMAN (1980, 1981), and recently six more species (BERGE in press a & b and BERGE & VADER, 2000) were described in the genera *Andaniotes* STEBBING, 1897, *Phippsia* STEBBING, 1906, *Stegosoladidus* BARNARD & KARAMAN, 1987, and *Tetradeion* STEBBING, 1899. Of these four genera, only *Andaniotes* was previously known from the Southern Ocean. By the inclusion of *Euandania nonhiata* ANDRES, 1985 and the two species described herein (*Andaniexis ollii* n.sp. and *Phippsiella watlingi* n.sp.), 19 species are known from the area today, belonging to 11 different genera.

## Material and methods

The present study is based primarily upon material from the collections of the Royal Belgian Institute of Natural Sciences (IRSNB) and the Museum für Naturkunde in Berlin (Berlin), but additional material was also checked at the Natural History Museum in London (NHM) and borrowed from the Zoologisches Institut und Zoologisches Museum der Universität Hamburg, (ZMH), the Muséum National d'Histoire Naturelle (MNHN) in Paris, the Darling Marine Center (DMC) in Maine, USA, and the Museum of Victoria, Australia.

All dissected appendages were mounted in polyvinyl-lactophenol, stained with rose-bengal. These appendages were drawn using a Leica compound microscope equipped with a drawing-tube, while the habitus-drawings were made using a Leica dissecting microscope. Mature and immature females were distinguished from males by the presence of oostegites. All scales are 0,1 mm. Classification of setae and setae-groups follows BERGE in press b.

In accordance with the checklist of DE BROYER & JAZDZEWSKI (1993), "Southern Ocean" is used here in its wide sense, according to DEACON (1982, 1984) and includes the Antarctic and sub-Antarctic zoogeographical regions (HEDGPETH, 1970). In the distribution section, the Southern Ocean zoogeographical codes (E, W, G, S, M, An, Sa) have been utilised through the text and in Table 1 according to DE BROYER & JAZDZEWSKI (1993).

This taxonomic work takes place in the framework of a general revision of the Southern Ocean amphipod fauna, undertaken by the "Antarctic Amphipodologist Network" formed by H.G. ANDRES (Hamburg), D. BELLAN-SANTINI (Marseille), J. BERGE (Tromsø), C.O. COLEMAN (Berlin), K. CONLAN (Ottawa), C. DE BROYER (Brussels) (coordinator), E. HENDRYCKS (Ottawa), K. JAZDZEWSKI (Lodz), M. RAUSCHERT (Berlin), I. TAKEUCHI (Tokyo) and M.H. THURSTON (Southampton). All taxonomic and distributional data will be recorded in the "Antarctic Marine Biodiversity Reference Centre" devoted to amphipod crustaceans which is under development at the Royal Belgian Institute of Natural Sciences in Brussels ([www.naturalsciences.net/general/sections/amphi](http://www.naturalsciences.net/general/sections/amphi)).

Symbols: A1-2: Antenna 1-2; EP3: Epimeral plate 3; L: Labium; LBR: Labrum; LMND: Left mandible; MX1: Maxilla

1; MX2: Maxilla 2; MXP: Maxilliped; P1-7: Pereopods 1-7; PLP: palp; RMND: Right mandible; T: Telson; U1-3: Uropod 1-3.

### Taxonomy

Key to the 19 species known from the Antarctic and sub-Antarctic regions:

1. Pereopod 6 basis expanded, posterior margin convex (2)	
– Pereopod 6 basis weakly expanded, posterior margin straight or concave (14)	
– Pereopod 6 basis not expanded, about as broad as pereopod 5 basis (18)	
2. Uropod 3 rami obsolescent or absent	<i>Stegophippsiella pacis</i>
– Uropod 3 both rami well developed (3)	
3. Telson entire (4)	
– Telson cleft (8)	
4. Antennae subequal (5)	
– Antenna 2 elongate, longer than antenna 1	<i>Parandania boeckii</i>
5. Antennae 1 flagellum with 5 articles	<i>Andaniexis ollii</i> n.sp.
– Antenna 1 flagellum more than 10 articles (6)	
6. Antennae elongate	<i>Parandania boeckii</i> (juveniles)
– Antennae not elongate (7)	
7. Labrum symmetrical, both lobes strongly reduced	<i>Euandania gigantea</i>
– Labrum asymmetrical, right lobe large, left lobe strongly reduced	<i>Euandania nonhiata</i>
8. Rostrum weakly developed (9)	
– Rostrum large and distinct	<i>Phippsiella rostrata</i>
9. Coxa 1 anterior margin convex (10)	
– Coxa 1 anterior margin with a deep invagination	<i>Phippsiella watlingi</i> n.sp.
10. Telson about as long as broad, not pointed (11)	
– Telson longer than broad, triangular and pointed	<i>Phippsiella kergueleni</i>
11. Antenna 1 flagellum article 1 shorter or about as long as peduncle (12)	
– Antenna 1 flagellum article 1 distinctly longer than peduncle (13)	
12. Coxae 1-3 broad and overlapping, coxa 4 posterior lobe exceeding pereon segment 6	<i>Stegosoladidus antarcticus</i>
– Coxae 1-3 narrow, not overlapping, coxa 4 posterior lobe not exceeding pereon segment 6	<i>Andaniotes linearis</i> (immature)
	<i>Andaniotes pseudolinearis</i>
	<i>Parandania boeckii</i>
13. Antenna 1 flagellum with 4 articles	
– Antenna 1 flagellum with more than 10 articles	
14. Uropod 3 outer ramus 2-articulate (15)	<i>Stegosoladidus ingens</i>
– Uropod 3 outer ramus 1-articulate	
15. Telson cleft (16)	
– Telson entire	<i>Andaniella integripes</i>
16. Pereopod 6 basis posteromedially with 2-3 long plumose setae (17)	
– Pereopod 6 basis posteromedially with a row of short robust setae	<i>Andaniotes linearis</i>
17. Coxae 1-3 broad and overlapping, maxilliped inner plate with 2 nodular setae	<i>Stegosoladidus debroyeri</i>
– Coxae 1-3 narrow, not overlapping, maxilliped inner plate with 4 nodular setae	<i>Andaniotes pooh</i>
18. Telson entire (19)	
– Telson cleft (20)	
19. Telson short, pereopod 4 subchelate, pereopod 7 well developed	<i>Parandaniexis dewitti</i>
– Telson long, pereopod 4 simple, pereopod 7 reduced	<i>Tetradeion crassum</i>
20. Epistomal plate large, conspicuous	<i>Phippsia unihamata</i>
– Epistomal plate absent	<i>Phippsia vanhoefferi</i>

*Andaniella* SARS, 1891

*Andaniella* SARS, 1891:210. - STEBBING, 1906: 93. -  
BARNARD & KARAMAN, 1991: 675.  
Type species: *Andania pectinata* SARS, 1883.  
Species: *Andaniella integripes* BELLAN-SANTINI &

LEDOYER, 1986; *A. pectinata* (SARS, 1883).

Species found in the area: *Andaniella integripes*.

Remarks: The type species is only recorded from the Arctic and the North Atlantic, whereas the second species, *A. integripes*, is restricted to the Southern Ocean.

*Andaniella integripes* BELLAN-SANTINI & LEDOYER, 1986

*Andaniella integripes* BELLAN-SANTINI & LEDOYER, 1986: 421.

Material: Holotype: 46°45.3'S, 37°56.6'E, 185-232m, *Marion Dufresne* st.25, 09.12.1996.

Distribution: Known only from the Marion and Prince Edward Islands, (S); 185-232m.

*Andaniexis* STEBBING, 1906

*Andania* BOECK, 1871: 128 (homonym, Lepidoptera).

*Andaniexis* STEBBING, 1906: 94 (new name). - BERGE & VADER, 1997a (part).

Type species: *Andania abyssi* BOECK, 1871, selected by BOECK, 1876.

Species: *Andaniexis abyssi* (BOECK, 1871); *A. andaniexis* BERGE & VADER, in press; *A. australis* K.H. BARNARD, 1932; *A. gracilis* BERGE & VADER, 1997; *A. lupus* BERGE & VADER, 1997; *A. mimonectes* RUFFO, 1975; *A. oculata* BIRSTEIN & VINOGRADOV, 1970; *A. ollii* n.sp.; *A. spinescens* (ALCOCK, 1894); *A. stylifer* BIRSTEIN & VINOGRADOV, 1960; *A. subabyssi* BIRSTEIN & VINOGRADOV, 1955; *A. tridentata* LEDOYER, 1986.

Species found in the area: *Andaniexis ollii* n.sp.

Remarks: This is the first record of any *Andaniexis* from the Southern Ocean.

*Andaniexis ollii* n.sp.  
(Figures 1-2)

Holotype: Female 9mm, Zoological Museum in Berlin, *Polarstern* ANT XIV/2, st.077, 61°18.60'S, 57°01.70'W, 1444m, 09.12.1996.

Paratype: Female 9mm, same locality.

Distribution: Known only from the type locality, north of South Shetland Islands, on the upper slope, (W).

Description: Rostrum very small.

Antennae short. Antenna 1 as long as antenna 2; flagellum 5-articulate; accessory flagellum article 2 absent. Antenna 2 peduncle (articles 3-5) shorter than flagellum; article 3 short, about as long as broad; article 4 shorter than article 5.

Epistome produced laterally; rectangular, with a long ridge on each side; epistomal plate (medial keel) produced into a small elongate medial ridge covering the entire epistome. Mouthparts not elongate or pointed.

Mandible incisor transverse; smooth; left lacinia mobilis present; reduced; laterally straight; not conical.

Maxilla 1 palp 2-articulate; oval; apex reaching above the apex of outer plate; outer plate distally rounded; ST in two parallel rows, first marginal and second submarginal; ST first row with 6 setae (ST1-5, ST7); ST 1 ordinary (similar to ST 2-4); ST 6 absent; gap between ST 5 and ST 7 present; ST A-C present; part of second row; inner plate without a well developed shoulder; setae pappose.

Maxilla 2 ordinary; outer plate setae with distal hooks absent; distal cleft absent; inner plate setae row A covering the entire margin; clearly separated from row B; row A setae pappose; row B setae proximally pappose; distally with cusps present; row C present; row D present; reduced, 1-3 long setae distally; slender.

Maxilliped palp 4-articulate; article 2 distally unproduced; dactylus distally simple (pointed); inner plate not exceeding base of palp article 2; 1 nodular seta; medial setae-row present; not reduced; transverse; setae pectinate; distal setae-row present; inner setae-row present; row reduced to one seta; outer plate outer setae-row present; submarginal; setae attached normally; setae long robust; straight; inner setae-row present; well developed; setae long robust; slender; appressed to outer setae-row; distal setae-group present; setae attached normally; setae long robust.

Labrum very short; lobes symmetrical; both lobes reduced. Labium distally broad and rounded; distal finger absent.

Coxal plates and basis on the pereopods smooth. Coxae 1-3 contiguous.

Pereopod 1 coxal plate not as deep as basis; propodus subovate.

Pereopod 2 longer and thinner than pereopod 1; ischium elongate, ratio length:breadth exceeding 1.5; ischium distal posterior margin plumose setae present; propodus subrectangular; palm absent.

Pereopod 4 coxa posteroventral lobe small, reaching about the base of the 6th pereon segment; basis anterior and posterior margins with long setae absent; plumose setae on distal anterior and posterior margins present; ischium plumose setae on posterior distal margin present.

Pereopod 6 basis posteriorly expanded; expansion conspicuous; rounded posteriorly; without setae.

Pereopod 7 basis anterior margin straight; distally rounded; medial row of setae present; setae short and robust; carpus present; dactylus present.

Oostegites on pereopods 2-5, gills on pereopods 2-7.

Pleonite 1-3 dorsally smooth.

Urosome: articulation between urosome segments 2 and 3 present. Uropod 1 peduncle

longer than rami; outer ramus as long as inner. Uropod 2 peduncle longer than rami; outer ramus as long as inner.

Uropod 3 peduncle at least as long as rami; outer ramus 2-articulate; outer ramus longer than inner.

Telson shorter than broad; shorter than peduncle uropod 3; submarginal setae on apex absent; entire; apically pointed.

Males: Unknown.

Etymology: Named after the collector of the species, Dr Ch. Oliver COLEMAN (Berlin).

Remarks: The present species is the first record ever of an *Andaniexis* species from the Southern Ocean. It shares many morphological features with *A. australis* K.H. BARNARD, 1932 (see BERGE *et al.*, in press for a re-description of *A. australis*), but the combination of only one nodular seta on the inner plate of the maxilliped, a distally broad coxa 4, pereopod 6 basis with long plumose setae absent, and a straight (versus concave) anterior margin of the basis of pereopod 7 is unique within the genus.

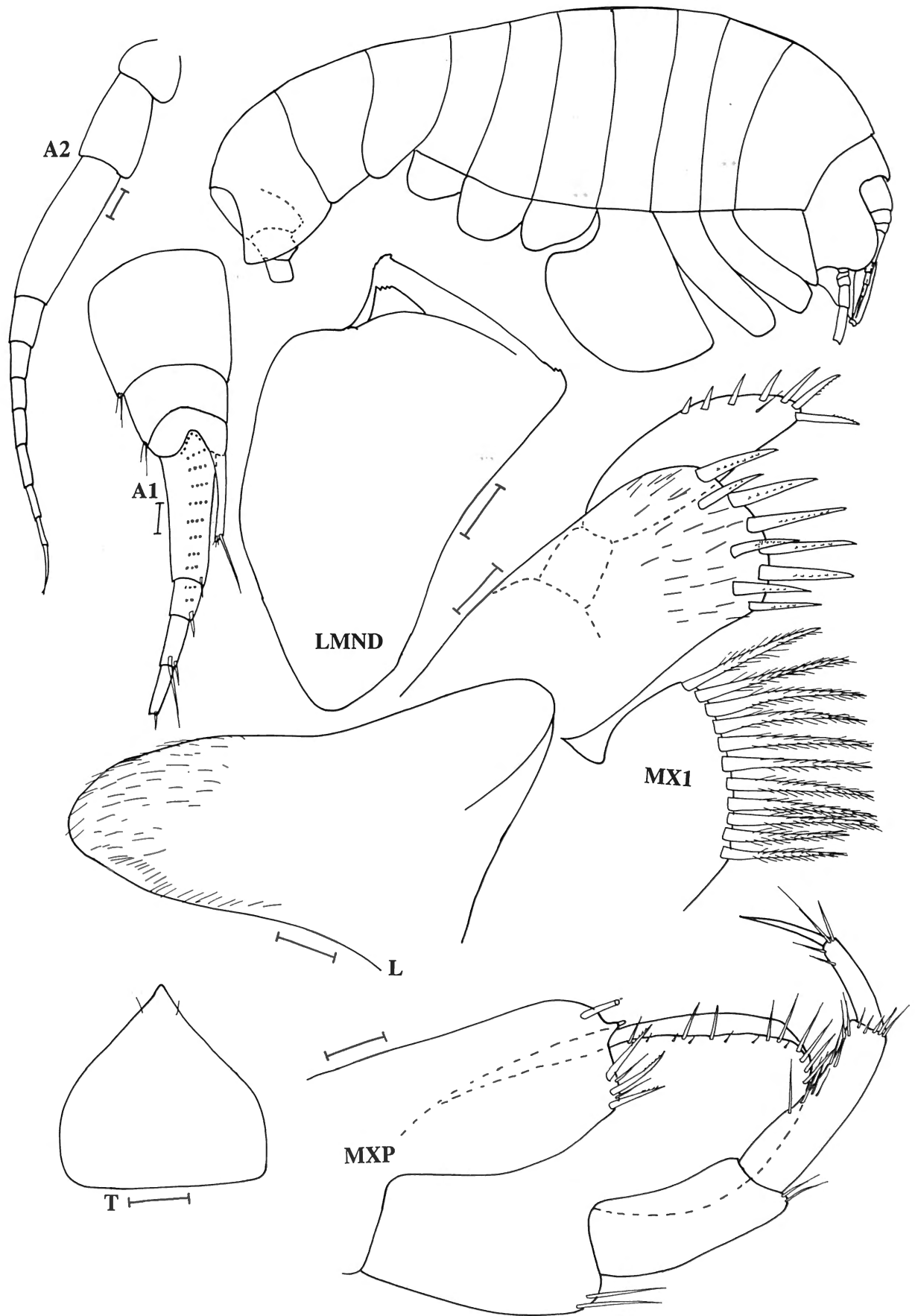


Fig. 1. – *Andaniexis olli* n.sp., Holotype, except T: Paratype.

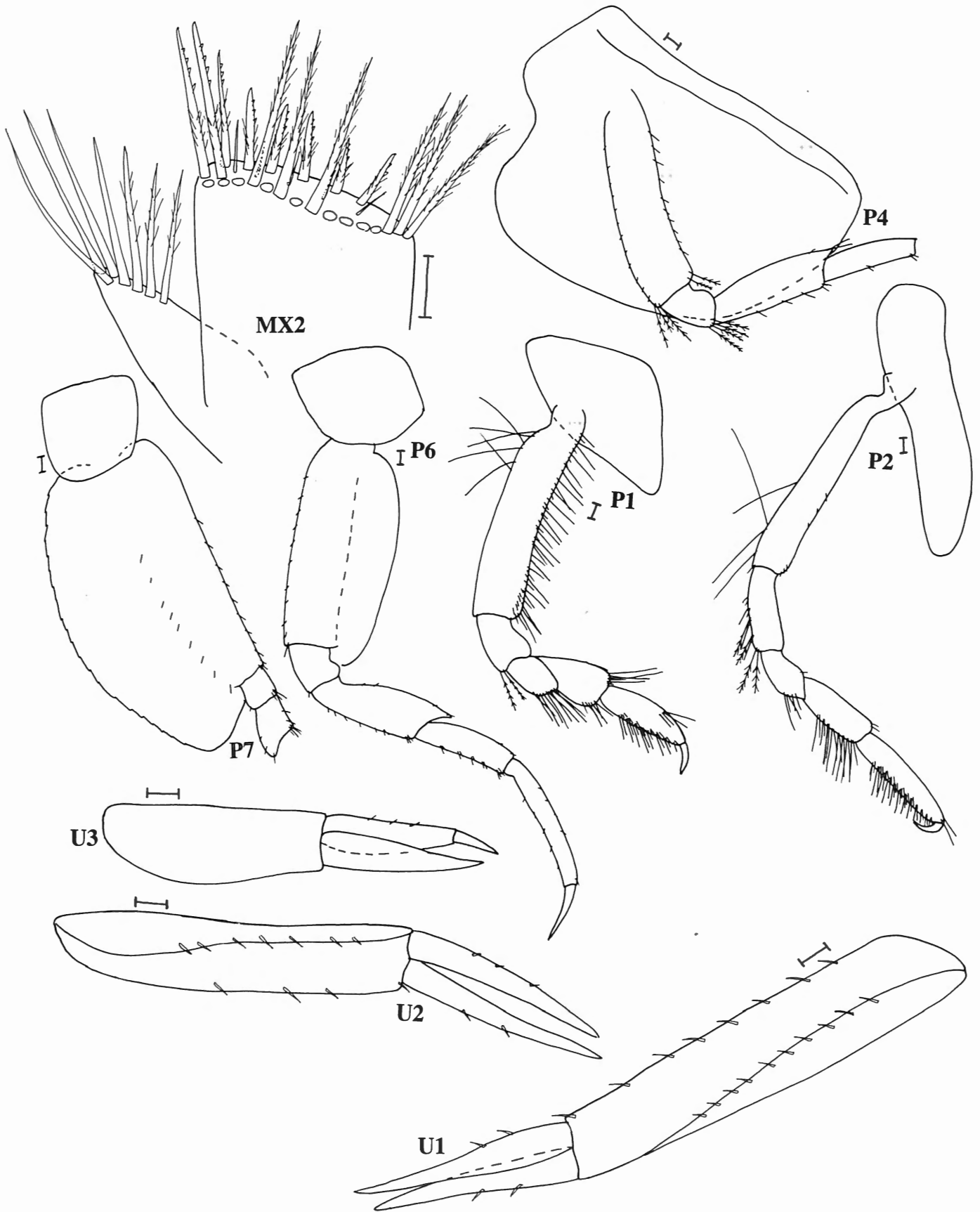


Fig. 2. – *Andaniexis olli* n.sp., Holotype, except U1-3: Paratype.

*Andaniotes* STEBBING, 1897

*Andaniotes* STEBBING, 1897: 30. - BERGE in press a (revision).

Type species: *Anonyx corpulentus* THOMSON, 1882.

Species: *A. abyssorum* (STEBBING, 1888); *A. bagabag* LOWRY & STODDART, 1995; *A. corpulentus* (THOMSON, 1882); *A. karkar* LOWRY & STODDART, 1995; *A. linearis* K.H. BARNARD, 1930; *A. lowryi* BERGE, in press a; *A. pooh* BERGE, in press a; *A. poorei* BERGE, in press a; *A. pseudolinearis* BERGE, in press a; *A. wallaroo* BARNARD, 1972; *A. wollongong* BERGE, in press a.

Species found in the area: *Andaniotes linearis* K.H. BARNARD, 1932; *A. pooh* BERGE, in press a; *A. pseudolinearis* BERGE, in press a.

Remarks: The genus was recently revised by BERGE in press a, the three species found in the area will thus not be any further described herein.

*Andaniotes linearis* K.H. BARNARD, 1932

*Andaniotes linearis* K.H. BARNARD 1932: 80. - ? NICHOLLS 1938: 41. - WATLING & HOLMAN 1981: 221. - BERGE in press a.

*Andaniotes corpulenta* CHEVREUX 1906: 22.

*Andaniotes corpulentus* WATLING & HOLMAN 1981: 219. - ? SCHELLENBERG 1931: 51.

## Material examined

Type material (at NHM, London): 17 specimens, from *Discovery* stations 39, 42, 144, 148, 149, 156, 175 and 190, South Georgia and South Shetland Islands, 90-236m.

DMC, Maine: *Islas Orcadas*: - 1 specimen, Cruise 575, st. 89, 54°44.2'S, 37°11.2'W, 225-265m, 07.06.1975; 8 specimens, Cruise 575, st. 90, 54°50'S, 37°23'W, 223-337m; 11 specimens, Cruise 575, st. 91, 55°00'S, 37°42'W, 494-501m; 7 specimens, Cruise 575, st. 95, 54°11.08'S, 37°41.01'W, 68-80m, 09.06.1975; 18 specimens, Cruise 876, st. 108, 60°25.9'S, 46°23.6'W, 152-159m, 16.02.1976. *Eltanin*: - 12 specimens, Cruise 9, st. 684, 54°55'S, 38°05'W, 595-677m, 3 specimens, Cruise 9, st. 740, 56°06'S, 66°19'W, 384-494m; 10 specimens, Cruise 22, st. 1593, 54°43'S, 56°37'W, 339-357m, 14.03.1966.

Zoological Museum, Berlin: *Polarstern* ANT XIV/2 - 11 specimens, st. 20, 61°22'S, 56°7'W, 316m; 15 specimens, st. 24, 61°5'S, 55°56'W, 174m; 2 specimens, st. 31, 60°54'S, 55°45'W, 235m; 1 specimen, st. 78, 60°57'S, 55°33'W, 80m; 1 specimen, st. 130, 61°13'S, 55°58'W, 146m; 1 specimen, st. 162, 61°46'S, 57°30'W, 322m. Berlin A30 - 2 specimens, 62°38'S, 55°45'W, 277m.

Museum of Victoria: J38731: 1 specimen, 66°55.51'S, 62°32.72'E, 113m; J38732: 4 specimens, 66°53.69'S, 63°06.34'E, 367m; J38734: 1 specimen, 67°05.03'S, 68°58.80'E, 204m; J45339: 1 specimen, 67°01.3'S, 70°07.6'E, 339m; J45340: 1 specimen, 67°01.3'S, 70°07.6'E, 339m.

MNHN, Paris: 5105, 1 specimen, Port Charcot (det. Chevreux

1906: *Andaniotes corpulentus*).

IRSNB, Brussels: WED 96 (*Polarstern* ANT XIII/3): 10 specimens, st. 11 GSN4, 73°22'S, 21°10'W, 333-338m, 13-02-1996 (3 specimens found in the sponge *Mycale acerata*); 5 specimens, st. 15 GSN8, 73°42'S, 22°30'W, 428-446m, 15-02-1996. WED 89 (*Polarstern* ANT VII/4): 1 immature, st. 245 AGT9, 74°40'S, 29°42'W, 483-484m, 2-02-1989; 3 specimens, st. 271 AGT15, 73°17'S, 21°00'W, 352-399m, 12-02-1989.

Distribution: circum-Antarctic, (E+W+G+?M); 68-677m.

*Andaniotes pooh* BERGE, in press

*Andaniotes pooh* BERGE, in press a.

## Material examined

Type material: Holotype: DMC, Maine: Female, 50°52'S, 166°42'E, 135-139m. Paratype: DMC, Maine: Male, 56°19'S, 158°29'E, 833-842m.

Additional material: DMC, Maine: 2 females, 52°17'S, 160°40'E, 659-798m.

Distribution: Known from three different stations, all in the sub-Antarctic region, in the surroundings of Auckland and Macquarie Islands, (S); 135-842m.

*Andaniotes pseudolinearis* BERGE, in press

*Andaniotes pseudolinearis* BERGE, in press a.

## Material examined

Holotype: Female A, IRSNB, Brussels, WED 96 (*Polarstern* ANT XIII/3), st. 16 GSN9, 73°53'S, 22°26'W, 242-246m, 15-02-1996. Paratypes: 2 females, IRSNB, Brussels, WED 96 (*Polarstern* ANT XIII/3), same locality.

Additional material:

Berlin AIII/44, 4 specimens, 72°53.10'S, 19°29.33'W, 421-429m.

Victoria - J38733, 2 females, 66°53.69'S, 63°06.34'E, 367m; J45338, 1 male, 67°10.9'S, 69°14.8'E, 307m.

IRSNB, Brussels: WED 96 (*Polarstern* ANT XIII/3): 1 female, st. 11 GSN4, 73°22'S, 21°10'W, 333-338m, 13-02-1996; 3 specimens (1 male, 2 females), st. 16 GSN9, 73°53'S, 22°26'W, 242-246m, 15-02-1996. WED 89 (*Polarstern* ANT VII/4): 1 male, st. 272 AGT16, 73°27'S, 21°34'W, 406-409m, 13-02-1996; 1 female, st. 275 AGT19, 71°40'S, 12°35'W, 303-330m, 15-02-1996. EABN 67: 3 specimens, st. 236, 70°19'S, 24°14'E, 200m, 3-02-1967. EAB 61: 2 specimens, st. 134, 70°20'S, 24°13'E, 240m, 11-01-1961; 2 specimens, st. 136, 70°20'S, 24°13'E, 240m, 13-01-1961; 1 specimen, st. 199, 70°20'S, 24°13'E, 240m, 01-1961.

Distribution: Restricted to the east Antarctic, 66-73°S, (E); 200-429 m.

*Euandania* STEBBING, 1899

*Euandania* STEBBING, 1899: 206.

Type species: *Andania gigantea* STEBBING, 1883.

Species: *Euandania gigantea* (STEBBING, 1883); *E. nonhiata* ANDRES, 1985. Both are found in the area.

*Euandania gigantea* (STEBBING, 1883)

*Andania gigantea* STEBBING, 1883: 206. - STEBBING, 1888: 730.

*Euandania gigantea* STEBBING, 1899: 206. - K.H. BARNARD, 1932: 80. - WATLING & HOLMAN, 1981: 223. - LOWRY & BULLOCK, 1976: 135 (extensive synonymical bibliography).

Not *Euandania gigantea* BERGE & VADER, 1997c: 349.

**Material examined**

Type material: NHM 1889.5.15.39 Syntype 60mm, *HMS Challenger* st 146, 46°46'S, 45°31'E, near Marion Island, 1375fms (~2500m): Syntype 40mm, *HMS Challenger* st 147, 46°16'S, 48°27'E, east of Marion Island, 1600fms (~2900m).

Distribution: West and sub-Antarctic, north and south Atlantic, south Pacific and Indian Oceans (An+Sa++), meso- to bathypelagic.

Remarks: Telson is cleft in the type specimens, but WATLING & HOLMAN (1981) reported from Antarctic specimens that telson was almost entire in one immature specimen. It has, however, not been possible to examine material other than the two syntypes in order to verify this morphological variation. See also remarks under *nonhiata*.

*Euandania nonhiata* ANDRES, 1985  
(Figure 3)

*Euandania nonhiata* ANDRES, 1985.

**Material examined**

Type material: Holotype female, >50mm, ZMH K 32934, 63°25'S, 64°36'W, 0-835m; Paratype: immature 20mm, ZMH K 32935, same locality.

Additional material: DMC, Maine: Female (partly destroyed), ~25mm, *Eltanin* Cruise 5, st. 259, 62°00'-62°14'S, 68°01'-68°14'W, 2615m, 17.10.1962; Immature (partly destroyed), ~20mm, *Eltanin* Cruise 5, st. 279, 67°17'-67°23'S, 74°54'-74°43'W, 681m, 23.10.1962.

Distribution: Found only in the western Antarctic sub-region, (W); meso- to bathypelagic (0-2615m).

Remarks: The present species was described mainly on the telson which is not deeply cleft, as figured for *gigantea* (see STEBBING, 1888: pl. 35 and WATLING & HOLMAN, 1981: 224). However, WATLING & HOLMAN (1981) showed that

telson in *gigantea* appears to be a morphologically variable character, as they found one juvenile that possessed an almost entire telson. The same variation is also reported for *Parandania boeckii* (see below). The only character that seems to separate the two taxa, is the labrum: short and symmetrical (as in *Andaniexis*) for *gigantea*, and strongly asymmetrical for *nonhiata* (see figure).

Of the two *Euandania* species, *E. nonhiata* is endemic to the western Antarctic sub-region, whereas *E. gigantea* seems to have a more global distribution (but not reported in the High Antarctic).

*Parandania* STEBBING, 1899

*Parandania* STEBBING, 1899: 206.

Type species: *Andania boeckii* STEBBING, 1888, monotypic.

*Parandania boeckii* (STEBBING, 1888)

*Andania boeckii* STEBBING, 1888: 735.

*Parandania boeckii* STEBBING, 1899: 206. - 1906:95 - J.L. BARNARD, 1961: 57 - GURJANOVA, 1962:382. - THURSTON 1976: 374. - LOWRY & BULLOCK, 1976: 135 (extensive synonymical bibliography); COLEMAN 1990: 1575. - MOORE 1992: 923. - DE BROYER & JAZDZEWSKI 1993: 90 (additional bibliography).

*Euandania gigantea* BERGE & VADER 1997c: 349.

**Material examined**

Type material: Holotype NHM 1889.5.15.41, 08°37'S, 34°28'W, 675 fms (~1235m).

Additional material: BIOFAR: immature 12mm, st. 417, 62°16.56'N, 10°58.13'W, 894m (identified as *Euandania gigantea* in BERGE & VADER 1997:349).

ZMH, Hamburg: two immature females 10-12mm, *Polarstern* Ark X-1, st. 31-006, 74°56.86'N, 11°07.00'W, 2681m, 13-07-1994.

NHM, London: Discovery st. 8, 9, 71, 72, 76, 78, 85, 101, 107, 114, 151, 208, 239, 253, 256; 287 & 298 (see K.H. Barnard 1932:77); NHM 1909.1.29.32-33. 2 immature specimens, Indian Ocean, 750-900fms (~1365-1638m); NHM 1968.62. 2 specimens (~12mm), South Africa; NHM 1938.1.3.26. 1 immature 15mm, Arabian Sea, 2665m.

Berlin 22751, 1 specimen 25mm, 41°S, 39°W, 190-202m.

Australian Museum P 50233, 121 specimens, 16°37.81'S, 146°23.08'E, 1000m.

IRSNB, Brussels: 1 female ~50mm, P.A.M.R.E. I, st.42, 61°58.61'-62°07.7'S, 56°16.7'-56°12.3'W, 580-0m, 07-02-1976.

DMC, Maine: 7 specimens (immature, 5-8mm), *Eltanin* Cruise 5, st. 259, 62°00'-62°14'S, 68°01'-68°14'W, 2615m, 17.10.1962; 5 specimens (immature, 4-9mm), *Eltanin* Cruise 5, st. 279, 67°17'-67°23'S, 74°54'-74°43'W, 681m, 23.10.1962; 6 specimens, *Eltanin* Cruise 9, st. 738, 53°12'-53°21'S, 37°54'-38°13'W, 778-0m, 13.09.1963; 2 specimens, *Eltanin* Cruise 9, st. 683, 55°13'-55°03'S, 38°20'-38°46'W, 1867-0m, 25.08.1963; 19 specimens, *Eltanin*

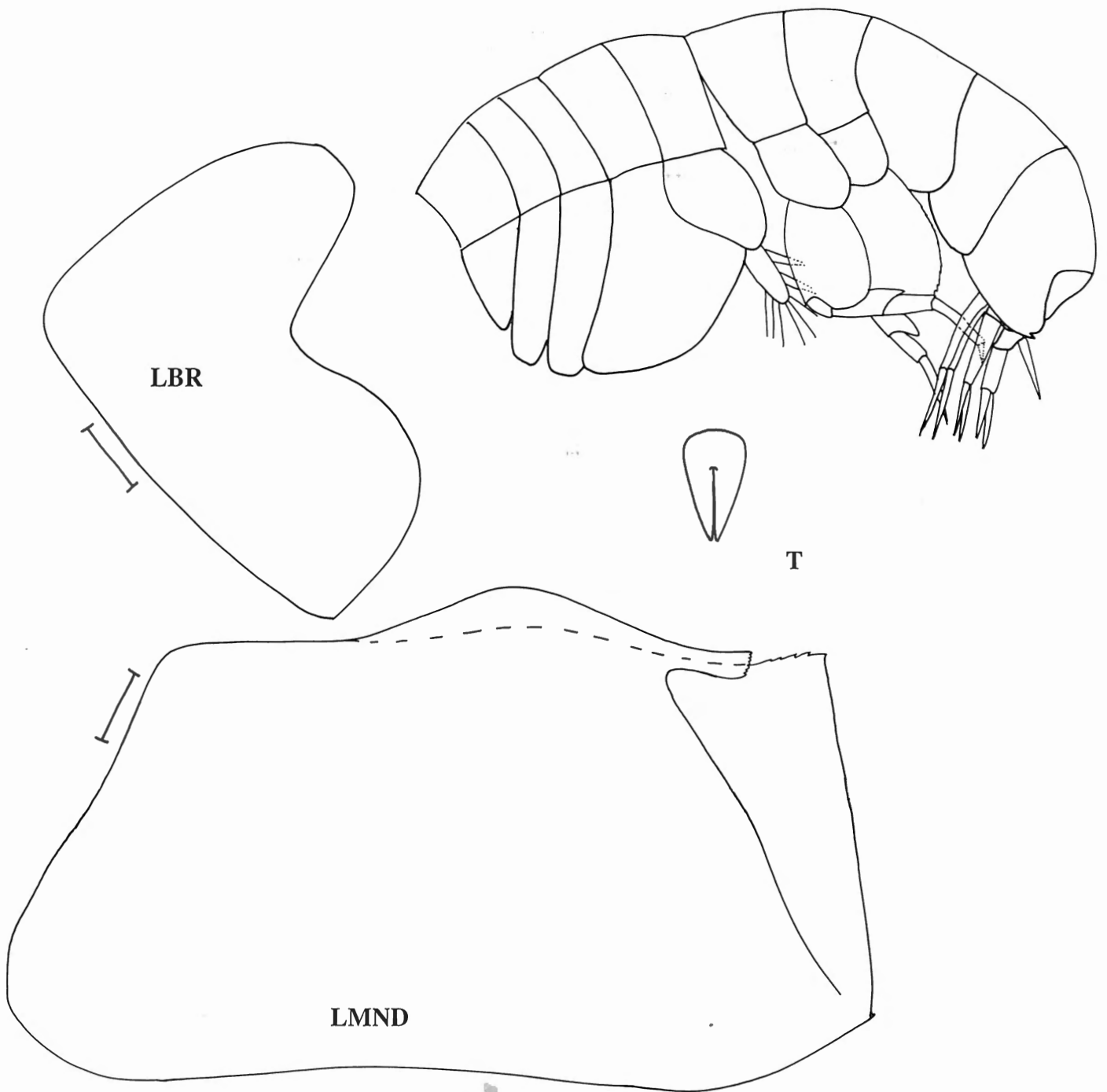


Fig. 3. – Habitus & T: *Phippsiella kergueleni*, Holotype; LBR & LMND: *Euandania nonhiata*, Female ~25mm, Eltanin Cruise no. 5, st.no. 259 (see text).



Cruise 5, st. 313, 58°00'- 57°49'S, 70°40'- 70°46'W, 802m, 04.11.1962.

Distribution: Cosmopolitan, but not reported from the Mediterranean, (An+Sa++); Meso- to bathypelagic (0-3700m).

Remarks: BARNARD's (1932:78) figures of this species are quite different from both the original descriptions by STEBBING (1888: pl. 36) and the figures by BARNARD (1961: fig 27), mainly by the longer and more rectangular fourth coxal plate and a conspicuously pointed and produced posteroventral corner of the third epimeral plate. These differences, in addition to a much broader inner plate of the second maxilla, appear to be representative for most specimens collected in the Southern Ocean, and could thus be interpreted as differential characteristics between a southern and a northern species. However, a few of the most southern specimens (e.g. P.A.M.R.E., see above), appear intermediate between these two forms. Thus, *P. boeckii* is herein treated as a single taxon, although it could in reality be a complex of several species. As for *Euandania gigantea*, telson varies from entire (type) to deeply cleft.

The single specimen collected in the Biofar programme (Biofar st. 417, see BERGE & VADER, 1997c: 349), was infected with the ellipsoidal parasite *Thalassomyces marsupii* Kane, 1964. This is the first record of this parasite from any stegocephalid species, but it has previously been found on hosts in three other gammaridean families (see VADER & KANE, 1968 and WING, 1975): Eusiridae (5 species within the two genera *Eusirus* and *Rhachotropis*), Hyperiididae (4 *Parathemisto* spp) and the lysianassid *Cyphocaris challengerii* STEBBING, 1888. As is the case for *P. boeckii*, all previously recorded hosts are swimming species.

#### *Parandaniexis* SCHELLENBERG, 1926

*Parandaniexis* SCHELLENBERG, 1926: 197.

Type species: *Parandaniexis mirabilis* SCHELLENBERG, 1929.

Species: *Parandaniexis dewitti* WATLING & HOLMAN, 1980; *P. inermis* LEDOYER, 1986; *P. mirabilis* SCHELLENBERG, 1929.

Species found in the area: *Parandaniexis dewitti*.

#### *Parandaniexis dewitti* WATLING & HOLMAN, 1980

*Parandaniexis dewitti* WATLING & HOLMAN, 1980: 651.

Material of the present species has not been available for examination.

Distribution: Known only from its type locality: 57°00.4'S, 26°10.1'W, near South Sandwich Islands, (W); 2740-2757m.

#### *Phippsia* STEBBING, 1906

*Aspidopleurus* SARS, 1895 (homonym).

*Phippsia* STEBBING, 1906: 89. - BERGE & VADER, 2000: 150 (revision).

Type species: *Stegocephalus gibbosus* SARS, 1883.

Species: *Phippsia angustipalpa* BERGE & VADER, 2000, *P. dampieri* BERGE & VADER, 2000, *P. gibbosa* (SARS, 1883), *P. roemeri* SCHELLENBERG, 1925, *P. unihamata* BERGE & VADER, 2000, and *P. vanhoeffeni* (SCHELLENBERG, 1926). Species found in the area: *Phippsia unihamata* and *P. vanhoeffeni*.

Remarks: BERGE & VADER (2000) reported this genus from Antarctica for the first time, although one of the two species (*vanhoeffeni*) was described from the East Antarctic by SCHELLENBERG in 1926 (but under the genus *Stegocephaloides*, which, after the transfer of *vanhoeffeni* by BERGE & VADER (2000), is not represented in the area).

The genus was recently revised by BERGE & VADER (2000), the two species found in the area will thus not be any further described or discussed herein.

#### *Phippsia unihamata* BERGE & VADER, 2000

*Phippsia unihamata* BERGE & VADER, 2000: 158.

#### Material

Holotype: Berlin A 25, female 7mm, 72°25.40'S, 16°26.63'W, 198-260m.

Additional material: Berlin A III/41, female 6mm, 72°27.28'S, 17°32.94'W, 455-473m; Berlin A III/44, immature, 3mm, 72°53.10'S, 19°29.33'W, 421-429m; NHM (unregistered) female, 6mm, 66°S, 49°E.

Distribution: East Antarctic (Eastern Weddell Sea and off Enderby Land), (E); 198-473m.

#### *Phippsia vanhoeffeni* (SCHELLENBERG, 1926)

*Stegocephaloides vanhoeffeni* SCHELLENBERG, 1926a: 299. - K.H. BARNARD, 1930: 328.

*Stegocephalopsis vanhoeffeni* BARNARD & KARAMAN, 1991: 681.

*Phippsia vanhoeffeni* BERGE & VADER, 2000: 166.

Material examined: Syntype female 6mm, Berlin 20388, East Antarctic, Gauss Station, Wilhelm II Coast, 385m; Victoria - J 24057, 4 males and females, 4-5mm, 38°21.90'S, 149°20.00'E, 1000m (Australia, Victoria, south of Point Hicks), 23.07.1986.

Distribution: Known from the type locality (Eastern Antarctica) and from one station off South Australia, (E+).

*Phippsiella* SCHELLENBERG, 1925

*Phippsiella* SCHELLENBERG, 1925: 200. - BERGE & VADER, 1997b.

Type species: *Stegocephalus similis* SARS, 1883.

Species: *Phippsiella abyssicola* OLDEVIG, 1959; *P. bioice* BERGE & VADER, 1997b; *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, 1883); *P. viscaina* J.L. BARNARD, 1967; *P. watlingi* n.sp.

Species found in the area: *Phippsiella kergueleni*, *P. rostrata* and *P. watlingi*.

*Phippsiella kergueleni* SCHELLENBERG, 1926  
(Figure 3)

*Phippsiella kergueleni* SCHELLENBERG, 1926b: 28.

**Material**

Holotype: Berlin K 20654, female 12mm, Kerguelen Islands, 18m, *Gazelle* 02.12.1874.

Distribution: The holotype is the only known specimen, (S).

Description: The holotype (examined) is damaged, with the head missing. Hence, as the present species has not previously been described or figured in any detail, it is herein partly figured but not described.

Remarks: The morphology of this species is not well known, but from the morphology of coxa 4 and pereopod 6 (Fig. 3), it appears to be a "true" *Phippsiella*.

*Phippsiella rostrata* K.H. BARNARD, 1932

*Phippsiella rostrata* K.H. BARNARD, 1932: 76. - BERGE *et al.*, in press.

**Material**

Type material: NHM 1936.11.2.585-587, *Discovery* St. 158 (see K.H. BARNARD, 1932), 1 male and 2 females (17-18 mm).

Distribution: Known only from the type locality, South Georgia, (G).

Remarks: For a detailed redescription of the present species, see BERGE *et al.*, in press.

*Phippsiella watlingi* n.sp.  
(Figures 4-5)

Holotype: Female, 11mm, IRSNB: WED89 (*Polarstern* ANT VII/4) St. 252 AGT12, 1153m, 74°28'S, 29°42'W, 06.02.1989.

Distribution: Only the holotype is known, from the upper slope of the Eastern Weddell Sea, (E).

Description: Rostrum very small.

Antennae short. Antenna 1 shorter than antenna 2; flagellum 7-articulate; accessory flagellum article 2 absent. Antenna 2 peduncle (articles 3-5) longer than flagellum; article 3 short, about as long as broad; article 4 longer than article 5.

Epistome curved (convex) and smooth; epistomal plate (medial keel) not produced.

Mouthparts not elongate or pointed.

Mandible incisor lateral; toothed; left lacinia mobilis present; powerful; laterally expanded; not conical.

Maxilla 1 palp 1-articulate; rectangular; apex not reaching above the apex of outer plate; outer plate distally rectangular; ST in a pseudocrown; ST first row with 6 setae (ST1-5, ST7); ST 6 absent; gap between ST 5 and ST 7 present; ST A present; located distally, part of first row; ST B present; part of second row; ST C present; inner plate without a well developed shoulder; setae pappocuspitate.

Maxilla 2 gaping and geniculate; outer plate setae with distal hooks present; distal cleft absent; inner plate setae row A covering about two thirds of the margin; clearly separated from row B; row A setae pappopectinate; row B setae proximally pappose; distally with cusps present; row C absent; row D present; expanded, row elongated towards and beyond row A; with many small cusps distally.

Maxilliped palp 4-articulate; article 2 distal inner margin weakly produced; dactylus distally simple (pointed); inner plate not exceeding base of palp article 2; 2 nodular setae; medial setae-row present; not reduced; transverse; setae pectinate; distal setae-row present; inner setae-row present; row not reduced, more than two setae; outer plate outer setae-row present; marginal; setae attached in a deep hollow; setae short; strongly curved upwards (hooks); inner setae-row present; well developed; setae long robust; pappose; parallel but not appressed to outer setae-row; distal setae-group present; setae attached in a deep hollow; setae long simple. Labrum about as long as broad; lobes symmetrical; both lobes not reduced.

Labium distally narrowing.

Coxal plates and basis of the pereopods covered with setae; setae simple. Coxae 1-3 contiguous.

Pereopod 1 coxal plate not as deep as basis; propodus subovate.

Pereopod 2 longer and thinner than pereopod 1; ischium elongate, ratio length:breadth exceeding 1.5; ischium distal posterior margin plumose setae present; propodus subovate; palm absent.

Pereopod 4 coxa posteroventral lobe small, reaching about the base of the 6th pereon segment; basis anterior margin with long setae absent; posterior margin with long setae present; plumose setae on distal anterior and posterior margins present; ischium plumose setae on posterior distal margin present.

Pereopod 6 basis posteriorly expanded; expansion conspicuous; rounded posteriorly; with a row of long plumose setae present.

Pereopod 7 basis anterior margin straight; posterodistal lobe rounded; medial row of setae present; setae short and robust; carpus present; dactylus present.

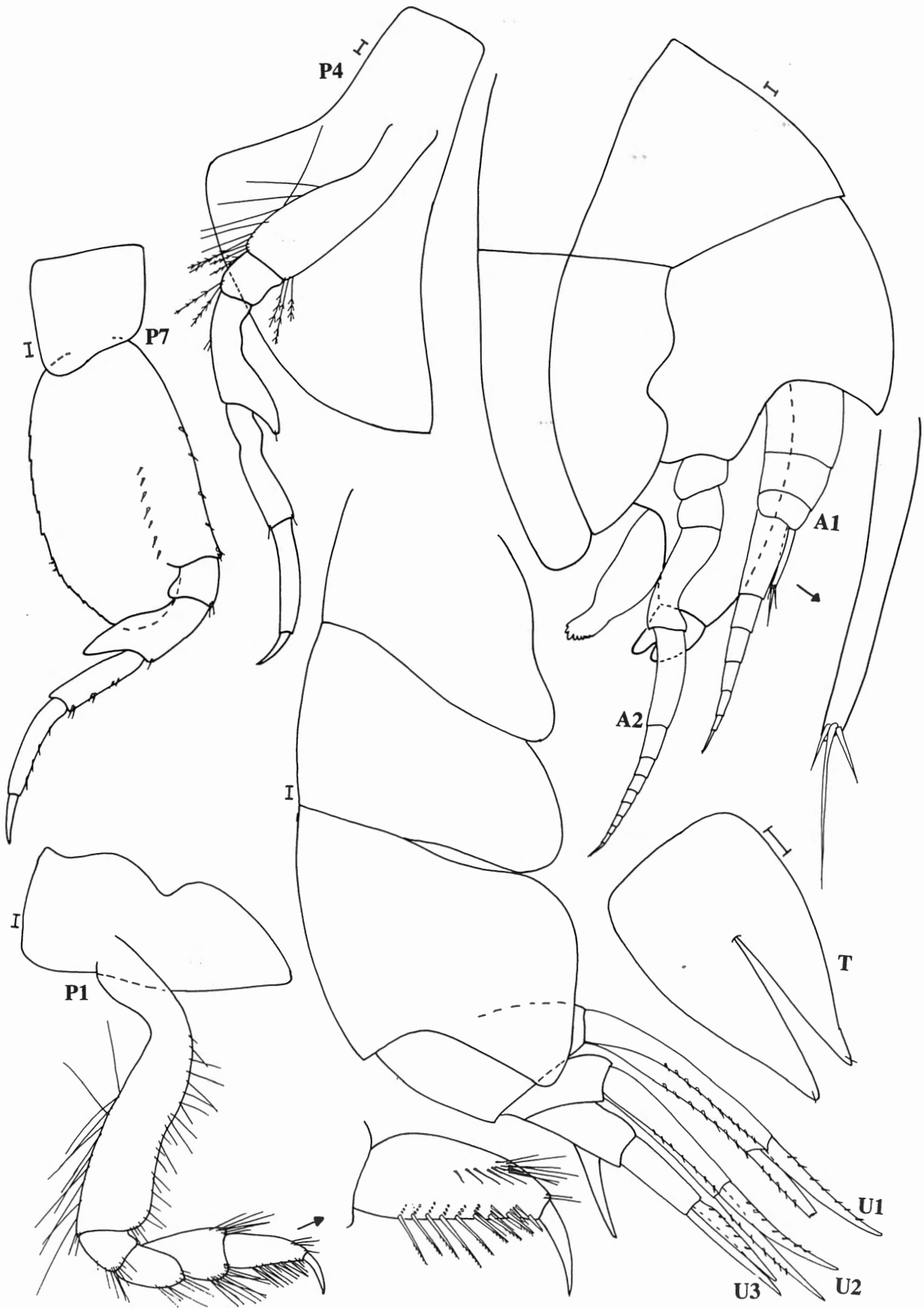


Fig. 4. – *Phippsiella watlingi* n.sp., Holotype.

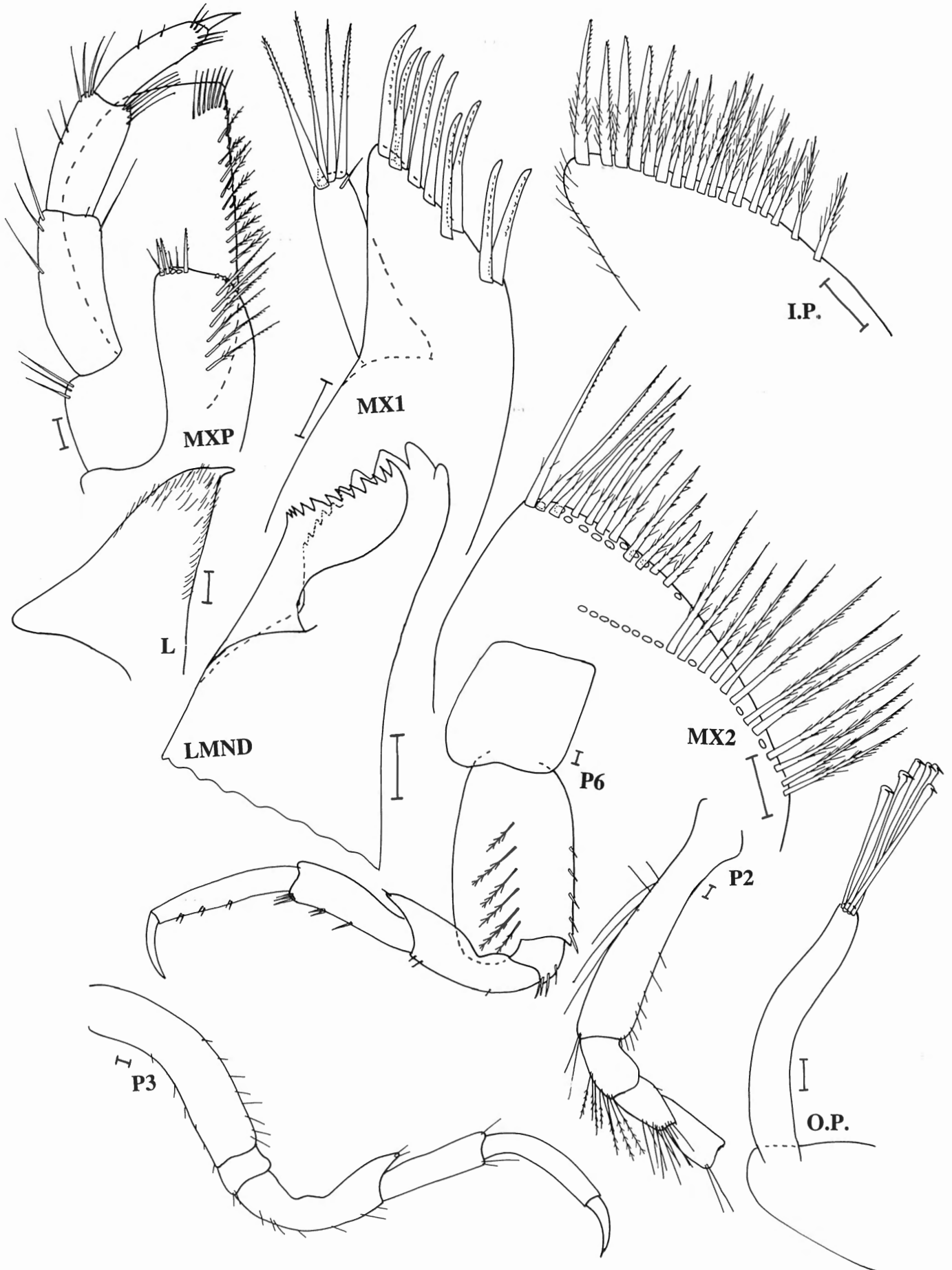


Fig. 5. – *Phippsiella watlingi* n.sp., Holotype.

Oostegites on pereopods 2-5, gills on pereopods 2-7.  
Pleonite 1-3 dorsally smooth.

Urosome: articulation between urosome segments 2 and 3 present. Uropod 1 peduncle longer than rami; outer ramus longer than inner. Uropod 2 peduncle longer than rami. Uropod 3 peduncle longer than half the length of rami; outer ramus shorter than inner; 1-articulate.

Telson longer than broad; longer than peduncle uropod 3; submarginal setae on apex of each lobe present; cleft; apically pointed.

Males: Unknown.

**Etymology:** Named after Prof. Les WATLING (Maine).

**Remarks:** The present species appears to be highly derived with many autapomorphic characters, judging from the peculiar shape of antenna 2, coxa 1 and of the merus of pereopods 3-6: all of which are character states that separate the present species from all its congeners (and also from all other stegocephalid species!). In addition to these characters, coxa 4 is very deep compared to its breadth.

#### *Steghippsiella* BELLAN-SANTINI & LEDOYER, 1974

*Steghippsiella* BELLAN-SANTINI & LEDOYER, 1974: 694.

Type species: *Steghippsiella pacis* BELLAN-SANTINI & LEDOYER, 1974. Monotypic.

Species found in the area: *Steghippsiella pacis*.

**Remarks:** See below.

#### *Steghippsiella pacis* BELLAN-SANTINI & LEDOYER, 1974

*Steghippsiella pacis* BELLAN-SANTINI & LEDOYER, 1974: 696.

Material of the present species has unfortunately not been available for examination.

**Distribution:** Known only from the Kerguelen Islands, (S); 1-50 m.

#### *Stegosoladidus* BARNARD & KARAMAN, 1987

*Stegosoladidus* BARNARD & KARAMAN, 1987: 869. - BERGE in press b (revision).

Type species: *Andaniotes simplex* K.H. BARNARD, 1930  
Species: *S. antarcticus* BERGE in press b, *S. complex* BERGE in press b, *S. debroyeri* BERGE in press b, *S. ingens* (CHEVREUX, 1906), *S. simplex* (K.H. BARNARD, 1930).  
Species found in the area: *Stegosoladidus antarcticus*, *S. debroyeri* and *S. ingens*.

**Remarks:** BERGE (in press b) reported this genus from Antarctica for the first time.

#### *Stegosoladidus antarcticus* BERGE, in press

*Stegosoladidus antarcticus* BERGE, in press b.

#### Material

Holotype: Berlin A25, female, 72°25.40'S, 16°26.63'W, 198-260m.

Paratypes: 3 immature females, Berlin A25, same locality.  
Additional material: IRSNB, Brussels: WED 96 (*Polarstern* ANT XIII/3), 8 specimens, st.11 GSN4, 73°22'S, 21°10'W, 333-338m, 13-02-1996.

**Distribution:** Eastern Weddell Sea, (E); 198-338m.

**Remarks:** See BERGE (in press b) for description and comments on the present species.

#### *Stegosoladidus debroyeri* BERGE, in press

*Stegosoladidus debroyeri* BERGE, in press b.

#### Material

Type material: Holotype: Berlin A25, immature female, 72°25.40'S, 16°26.63'W, 198-260m. Paratypes: Berlin A25, 2 specimens, same locality.

Additional material: IRSNB, Brussels: WED 96 (*Polarstern* ANT XIII/3), 14 specimens, st. 6 AGT1, 71°31'S, 13°34'W, 254-261m, 8-02-1996.

**Distribution:** Known only from the shelf of the Eastern Weddell Sea, (E); 198-261m.

**Remarks:** See BERGE (in press b) for description and comments on the present species.

#### *Stegosoladidus ingens* CHEVREUX, 1906

*Andaniotes ingens* CHEVREUX, 1906.

*Stegosoladidus ingens* BERGE, in press b.

#### Material examined

Type material: (MNHN, Paris), 2 specimens, *Français* 15.03.1904, Charcot harbour, 20-40m.

Additional material: DMC, Maine: M XIV, 1 female, 67°24'S, 179°54'W, 223-232m;  
Berlin A III/44, 1 immature male, 72°53.10'S, 19°29.33'W, 421-429m; Berlin A 30, 1 female, 62°38'S, 55°45'W, 277m.  
Victoria: J45341, 1 immature male, 67°20'S, 70°21'E, 165m; Victoria: J38735: 1 immature male, 66°48'S, 70°24'E, 795m; Victoria: J38737: 1 female, 68°54.88'S, 76°37.03'E, 667m; Victoria: J38736: 2 females, 68°56.69'S, 73°36.78'E, 786m.

Species	A.	N.A.	S.A.	South. Oc.	Med.	N.P.	S.P.	Ind.
<i>Andaniella integripes</i>				S			x	x
<i>Andaniella pectinata</i>	x	x						
<i>Andaniexis abyssii</i>		x						
<i>Andaniexis australis</i>			x					
<i>Andaniexis eilae</i>		x						
<i>Andaniexis gracilis</i>		x						
<i>Andaniexis lupus</i>	x	x						
<i>Andaniexis mimonectes</i>					x			
<i>Andaniexis oculus</i>						x		
<i>Andaniexis olli</i>				W				
<i>Andaniexis spinescens</i>								x
<i>Andaniexis stylifer</i>							x	
<i>Andaniexis subabyssi</i>						x		
<i>Andaniexis tridentata</i>								x
<i>Andaniopsis nordlandica</i>	x	x						
<i>Andaniotes abyssorum</i>							x	
<i>Andaniotes bagabug</i>							x	
<i>Andaniotes corpulentus</i>							x	
<i>Andaniotes islandica</i>		x						
<i>Andaniotes karkar</i>							x	
<i>Andaniotes linearis</i>			x	E+W+G				
<i>Andaniotes lowryi</i>							x	
<i>Andaniotes pooh</i>				S			x	
<i>Andaniotes poorei</i>							x	
<i>Andaniotes pseudolinearis</i>				E				
<i>Andaniotes wallaroo</i>							x	
<i>Andaniotes wollongong</i>							x	
<i>Bathystegocephalus globosus</i>								x
<i>Euandania gigantea</i>		x	x	An+Sa				
<i>Euandania nonhiata</i>				W				
<i>Glorandaniotes fissicaudata</i>								x
<i>Glorandaniotes spongicola</i>								x
<i>Parandania boeckii</i>		x	x	An+Sa		x	x	
<i>Parandaniexis dewitti</i>				W				
<i>Parandaniexis inermis</i>								x
<i>Parandaniexis mirabilis</i>							x	
<i>Phippsia angustipalpa</i>							x	
<i>Phippsia dampieri</i>								x
<i>Phippsia gibbosa</i>		x						
<i>Phippsia roemeri</i>		x						
<i>Phippsia unihamata</i>				E				
<i>Phippsia vanhoeffeni</i>				E			x	
<i>Phippsiella abyssicola</i>	x	x						
<i>Phippsiella bioice</i>		x						
<i>Phippsiella cascadiensis</i>						x		

Species	A.	N.A.	S.A.	South. Oc.	Med.	N.P.	S.P.	Ind.
<i>Phippsiella kergueleni</i>				S				
<i>Phippsiella longicornis</i>						x		
<i>Phippsiella minima</i>		x						
<i>Phippsiella nipoma</i>			x				x	
<i>Phippsiella pajarella</i>						x		
<i>Phippsiella pseudophippsia</i>					x			
<i>Phippsiella rostrata</i>				G				
<i>Phippsiella similis</i>	x	x						
<i>Phippsiella viscaina</i>						x		
<i>Phippsiella watlingi</i>				E				
<i>Stegocephalexia penelope</i>						x		
<i>Stegocephalina biofar</i>	x	x						
<i>Stegocephalina idae</i>		x						
<i>Stegocephalina ingolfi</i>		x						
<i>Stegocephalina katalia</i>			x					
<i>Stegocephaloides attingens</i>			x					
<i>Stegocephaloides auratus</i>	x	x						
<i>Stegocephaloides australis</i>			x					
<i>Stegocephaloides barnardi</i>		x			x			
<i>Stegocephaloides camoti</i>						x		
<i>Stegocephaloides christianiensis</i>		x						
<i>Stegocephaloides wagini</i>	x	x						
<i>Stegocephalopsis ampulla</i>	x	x				x		
<i>Stegocephalopsis latus</i>							x	
<i>Stegocephalopsis mamilidacta</i>						x		
<i>Stegocephalopsis pacifica</i>						x		
<i>Stegocephalus bering</i>	x					x		
<i>Stegocephalus hancocki</i>						x		
<i>Stegocephalus inflatus</i>	x	x						
<i>Stegophippsiella pacis</i>				S				
<i>Stegosoladidus antarcticus</i>				E				
<i>Stegosoladidus complex</i>							x	
<i>Stegosoladidus debroyeri</i>				E				
<i>Stegosoladidus ingens</i>				E+W				
<i>Stegosoladidus simplex</i>							x	
<i>Steleuthera maremboca</i>							x	
<i>Tetradeion crassum</i>				S+M			x	
<i>Tetradeion quatro</i>							x	

Table 1. World distribution of all known stegocephalid species. Abbreviations: A.- Arctic, N.A.- North Atlantic, S.A.- South Atlantic, South. Oc.- Southern Ocean (Antarctic and sub-Antarctic regions) with zoogeographical codes according to De Broyer & Jazdzewski 1993, Med.- Mediterranean, N.P.- North Pacific, S.P.- South Pacific, Ind.- Indian Ocean. (?) indicates uncertain identification.

IRSNB, Brussels: EABN 65, 1 specimen, st. 219, 70°18'S, 23°58'E, 216m, 31-01-1965.

Distribution: circum-Antarctic, (E+W); 165-786m.

Remarks: See BERGE (in press b) for description and comments on the present species.

#### *Tetradeion* STEBBING, 1899

*Tetradeion* STEBBING, 1899:207. - BERGE & VADER, 2000:170 (revision).

Type species: *Cyproidea crassa* CHILTON, 1883.

Species: *Tetradeion crassum* (CHILTON, 1883), *T. quatro* BERGE & VADER, 2000.

Species found in the area: *Tetradeion crassum*.

Remarks: BERGE & VADER (2000) reported this genus from the sub-Antarctic for the first time.

#### *Tetradeion crassum* (CHILTON, 1883)

*Cyproidea crassa* CHILTON, 1883.

*Tetradeion crassum* STEBBING, 1899. - BERGE & VADER, 2000: 171.

#### Material examined

NHM 1930.8.1.95-104: 15 specimens 2.5-3.5mm, *Terra Nova* 1910, New Zealand, st. 135, North Cape, 3m, night (see K.H. BARNARD, 1930: 329).

DMC, Maine: female 2mm, *Eltanin* Cruise 16, st. 1425, 50°52'S, 166°42'E, 135-139m, 09.02.1965; immature 2mm, *Eltanin* Cruise 22, st. 1593, 54°43'S, 56°37'W, 339-357m, 14.03.1966.

Distribution: Sub-Antarctic region (SE of Auckland Island and east to Burdwood Bank) plus New Zealand, (S+); 0-357m.

Remarks: See BERGE & VADER (in press a) for descriptions and comments.

#### Discussion

The family Stegocephalidae DANA, 1855 is represented in the Antarctic region (in its strict sense, i.e. south of the Antarctic Convergence or Polar Front, corresponding to the zoogeographic codes E, W and G, see Table 1) by 14 species in 8 genera. World wide, there are today 83 described species belonging to 20 genera, giving a percentage representation in the Antarctic at the specific and generic level of approximately 17% and 40%, respectively. Of these 14 species 10 species (72% of the species present), and no genera (!), are endemic to the Antarctic. By comparison, an endemism rate of 78.5% at the specific level and 26.8% at the generic level was calculated by DE BROYER & JAZDZEWSKI (1996) for the whole Antarctic fauna of gammaridean amphipods. On the

other hand, WATLING & THURSTON (1989) found that the corresponding endemism values for the amphipod family Iphimediidae reached 90% at the species level and 70% at the generic level, and proposed the Antarctica as an evolutionary incubator for the family Iphimediidae, suggesting that a radiation of species occurred there when the Antarctic started to cool about 38 ma.

Among Stegocephalidae, at the generic level, there is still a high degree of uncertainty about the phylogenetical relationships, and hence also the classification. But, based on the classification used today, there are only three genera of very restricted distribution (i.e. endemic to any of the eight geographical zones used in Table 1) in the entire family. All these three are monotypic genera, described from either one or two specimens, and will hence automatically appear as endemic to any of the zones. The low degree of Antarctic endemism (as defined above) on the generic level may therefore not be so surprising and conspicuous as it may look at first glance. But also at the species level, the degree of endemism in the Antarctic is not conspicuously high, considering that 79% of the stegocephalid species are restricted to only one of the eight geographical zones in Table 1. Thus, the degree of endemism to the Antarctic is actually somewhat smaller than the average in the family in other regions.

Thus, considering only the family Stegocephalidae, there is little support for a hypothesis about the Antarctica as an evolutionary incubator. The data on the distribution of stegocephalid species and genera (see Table 1 and below) seem to suggest that the family has its origin elsewhere, and that the Antarctic region has been the subject of several, and independent, invasions.

Table 1 gives an overview of all known stegocephalid species (both previously described species, and new species in press), with the distribution separated into 8 different sectors: Arctic, North Atlantic, South Atlantic, Southern Ocean, Mediterranean, North Pacific, South Pacific and Indian Ocean.

#### Acknowledgements

The present study is based primarily on borrowed material and would not have been possible without the generous help from the following colleagues: Prof. BOXSHALL (NHM), Prof. BRANDT (ZMH), Dr DEFAYE (MNHN), Dr COLEMAN (Berlin), Prof. POORE (Melbourne) and Prof. WATLING (DMC).

J. BERGE was supported by a grant from NFR, project number 119084/410. C. DE BROYER was supported by grant A4/DD/BO2 within the "OSTC Belgian Antarctic Research Programme - Phase IV".

#### References

- ANDRES, H. G., 1985. Die Gammaridea (Crustacea: Amphipoda) der Deutschen Antarktis-Expeditionen 1975/76 und 1977/78. 4. Acanthonotozomatidae, Paramphithoidae und Stegocephalidae. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut*, 82: 119-153.



- BARNARD, J. L., 1961. Gammaridean Amphipoda from depths of 400 to 6000 meters. *Galathea Report*, 5: 23-128.
- BARNARD, K. H., 1930. Amphipoda. *British Antarctic ("Terra Nova") Expedition 1910 Natural History Reports Zoology*, 8(4): 307-454.
- BARNARD, K. H., 1932. Amphipoda. *Discovery Reports*, 5: 1-326.
- BELLAN-SANTINI, D & M. LEDOYER, 1974. Gammariens (Crustacea-Amphipoda) des Iles Kerguelen et Crozet. *Tethys*, 5: 635-707.
- BERGE, J., in press a. Revision of the Amphipod (Crustacea: Stegocephalidae) genera *Andaniotes* and *Metandania*. *Journal of Natural History*.
- BERGE, J., in press b. Revision of *Stegosoladidus* (Crustacea: Amphipoda); redescription of two species and description of 3 new species. *Journal of Natural History*.
- BERGE, J. & W. VADER, 1997a. Atlantic and Mediterranean species of the genus *Andaniexis* Stebbing (Amphipoda: Stegocephalidae). *Journal of Natural History*, 31: 1429-1455.
- BERGE, J. & W. VADER, 1997b. North Atlantic and Mediterranean species of the genus *Phippsiella* Schellenberg (Amphipoda: Stegocephalidae). *Journal of Natural History*, 31: 1501-1532.
- BERGE, J. & W. VADER, 1997c. Stegocephalid (Crustacea, Amphipoda) species collected in the BIOFAR and BIOICE programmes. *Sarsia*, 82: 347-370.
- BERGE, J. & W. VADER, 2000. Revision of the Stegocephalid (Crustacea: Amphipoda) genera *Phippsia* and *Tetradeion*, with description of 4 new species. *Memoirs of the Museum of Victoria*, 58(1): 149-178.
- BERGE, J., W. VADER & A. GALAN, in press. Type material of Stegocephalidae (Crustacea: Amphipoda) from the collections of the Natural History Museum, London: Redescription of 6 species and description of 7 new species. *The Bulletin of the Natural History Museum*.
- DEACON, G.E.R., 1982. Physical and biological zonation in the Southern Ocean. *Deep-Sea Research*, 29: 1-15.
- DEACON, G.E.R., 1984. The Antarctic circumpolar ocean. Cambridge University Press. 180pp.
- DE BROYER, C. & JAZDZEWSKI, K., 1993. Contribution to the marine biodiversity inventory. A checklist of the Amphipoda (Crustacea) of the Southern Ocean. *Documents de Travail de l'Institut royal des Sciences naturelles de Belgique*, 73: 1-154.
- DE BROYER, C. & JAZDZEWSKI, K., 1996. Biodiversity of the Southern Ocean: Towards a new synthesis for the Amphipoda (Crustacea). *Bolletino del Museo Civico di Storia Naturale Verona* (1993), 20: 547-568.
- HEDGPETH, J.W., 1970. Marine biogeography of the Antarctic regions. In: HOLDGATE, M.W.(ed.). *Antarctic Ecology*. Academic Press, New York 1: 97-104.
- SARS, G.O., 1891. Amphipoda. Part IX. Ampeliscidae (concluded), Stegocephalidae. *An Account of the Crustacea of Norway, with short descriptions and figures of all the species*, 1: 185-212, pls. 65-72. Cammermeyer, Christiania, Norway.
- SCHELLENBERG, A., 1926a. Die Gammariden der Deutschen Südpolar-Expedition 1901-1903. *Deutsche Südpolar-Expedition*, 18: 1-414.
- SCHELLENBERG, A., 1926b. Die Gammariden der Deutschen Tiefsee-Expedition. *Deutsche Tiefsee-Expedition 1898-1899*, 23: 194-243.
- STEBBING, T. R. R., 1897. Amphipoda from the Copenhagen Museum and other sources. *Transactions of the Linnean Society of London, Zoology*, 7: 25-45.
- STEBBING, T. R. R., 1899. Revision of Amphipoda. *Annals and Magazine of Natural History Series 7*, 3: 350.
- STEBBING, T.R.R. 1906. Amphipoda I. Gammaridea. *Das Tierreich*, 21: 1-806.
- WATLING, L. & H. HOLMAN, 1980. New Amphipoda from the Southern Ocean, with partial revisions of the Acanthonotozomatidae and Paramphithoidae. *Proceedings of the Biological Society of Washington*, 93(3): 609-654.
- WATLING, L. & H. HOLMAN, 1981. Additional Acanthonotozomatid, Paramphithoid, and Stegocephalid amphipoda from the Southern Ocean. *Proceedings of the Biological Society of Washington*, 94(1): 181-227.

Jørgen BERGE & Wim VADER

Tromsø Museum, Department of Zoology

University of Tromsø

9037 Tromsø, Norway

E-mail: HYPERLINK mailto:joergenb@imv.uit.no

joergenb@imv.uit.no

Claude DE BROYER

Institut Royal des Sciences Naturelles de Belgique

Département des Invertébrés

rue Vautier 29

B-1000 Brussels, Belgium

E-mail: debroyer@kbinirsnb.be