

# Two new species of *Prolutamator* gen. nov. and a new species of *Pseudotharybis* (Copepoda: Calanoida: Aetideidae) from deep waters of the South Atlantic and Antarctic

ELENA L. MARKHASEVA<sup>1</sup> & KNUD SCHULZ<sup>2</sup>

<sup>1</sup>Russian Academy of Sciences, Zoological Institute; Universitetskaya nab. 1, 199034, St. Petersburg, Russia. E-mail: copepoda@zin.ru.

<sup>2</sup>DZMB-Senckenberg, Biozentrum Grindel und Zoologisches Museum, Martin-Luther-King-Platz 3, D-20146, Hamburg, Germany. E-mail: kschulz@zoologie.uni-hamburg.de.

**ABSTRACT.** – A new benthopelagic aetideid genus including two new species, *Prolutamator hadalis* and *P. minor*, and a new species of *Pseudotharybis*, *P. polaris*, are established from the South Atlantic and Southern Ocean at bathyal and abyssal depths close to the sea bed. *Prolutamator* gen. nov. is closely related to *Lutamator* BRADFORD, 1969, but differs by a derived setation of maxillule epipodite (5–6 setae), a more primitive setation of antenna (basis, first segments of endopod and exopod bear 2 setae each), characteristics of mandible (basis with 2–3 setae, endopod segment 2 with 5–6 setae), and in details of maxillule. *P. polaris* sp. nov. is distinguished from congeners by the shape of rostrum, maxillule with coxal endite having 4 setae, and short lateral spines of P1 exopod segments 1–2. Including *Prolutamator* and *Pseudotharybis*, the known benthopelagic fauna of the Southern Ocean at present contains seven aetideid genera.

**KEYWORDS:** Copepoda, Calanoida, Aetideidae, new genus, new species, deep sea, benthopelagic, South Atlantic, Antarctica.

## Introduction

Present-day recent records of the calanoid copepod family Aetideidae in the Southern Ocean, Atlantic, and Pacific reveal that their deep-water fauna is much more diverse than considered before by MARKHASEVA (1997). During the last decade the catalogue of aetideids dwelling in the vicinity of the sea bed was supplemented by several new species of *Bradyetes* FARRAN, 1905, *Comantenna* WILSON, 1924, *Lutamator* BRADFORD, 1969, *Paracomantenna* CAMPANER, 1978, *Pseudeuchaeta* SARS, 1905 (MARKHASEVA 1995, 1996; SCHULZ 2002; MARKHASEVA & SCHNACK-SCHIEL 2003; OHTSUKA et al. 2005; MARKHASEVA & SCHULZ 2006), and *Parabradycidius angelikae* SCHULZ & MARKHASEVA, 2000.

In this paper a new aetideid genus *Prolutamator* is established including two new species. Specimens were collected from deep waters of the Southern Ocean and South Atlantic (ANDEEP and DIVA projects). *Prolutamator hadalis* sp. nov. was found only in the abyss of the south-eastern Atlantic, while *P. minor* sp. nov. showed a wider

distribution both horizontally (from 16°S to 65°S) and vertically (755 m and from 2965–5415 m in depth). In addition, a new species of *Pseudotharybis* T. SCOTT, 1909 is described from the deep Southern Ocean.

## Material and Methods

Benthopelagic calanoid copepods of the new genus *Prolutamator* were collected by RV *Polarstern* and FS *Meteor* during ANDEEP II and III (in 2002 and 2005) and DIVA I (in 2000) using an epibenthic sledge with mesh size of 0.50 mm (BRANDT & BARTHEL 1995; BRENKE 2005). Collections were made at bathyal (755 m) and abyssal depths (2965–4975 m) of the Weddell Sea and adjacent areas and in the abyss (5395–5415 m) of the south-eastern Atlantic Ocean. *Pseudotharybis polaris* sp. nov. was obtained from depths of 3680–3683 m in the Southern Ocean. *Bradyidius* GIESBRECHT, 1897 is for the first time recorded from the Atlantic sector of the Antarctic (71°18'S 13°58'W, Sta. 074–6 of ANDEEP III expedition). Details of the cruises are given by BRANDT & HILBIG (2004), MARTINEZ ARBIZU & SCHMINKE (2005), and BRANDT et al. (2007). Collections were made in the benthic boundary layer c. 0.1–1.3 m above the bottom.

Specimens were fixed in 96% ethanol and later stained by adding a solution of chlorazol black E dissolved in 70% ethanol/30% water. Oral parts and swimming legs were dissected, mounted in glycerine and figures were drawn using a *camera lucida*.

The following abbreviations are used in the descriptions: P1–P4, swimming legs 1–4. Free segments of the antennule are designated by Arabic numerals, ancestral segments by Roman numerals. One seta and one aesthetask on a segment of the antennule are designated: 1s + 1ae; “1?” indicates that a setal element was broken so that its identity on the antennule could only be postulated from a scar at the location of its attachment.

PanMap software is used to show distribution of aetideid genera in the Atlantic Ocean <http://www.pangaea.de/Software/PanMap> (DIEPENBROEK, M; GROBE, H & SIEGER, R 2000).

Type material is deposited at the Zoological Museum Hamburg (ZMH), University of Hamburg, and the Zoological Institute (ZIN), Russian Academy of Sciences, St. Petersburg.

## Taxonomy

### Family Aetideidae GIESBRECHT, 1893

#### *Prolutamator* gen. nov.

**D i a g n o s i s.** – Female. Calanoida, Aetideidae. Cephalosome and pediger 1 more or less separate, pedigers 4 and 5 separate. Posterior corners of prosome comparatively short and rounded. Rostrum a poorly developed blunt plate. Urosome of 4 somites; genital double-somite symmetrical. Antennule of 24 articulated segments, first segment with 1 seta. Antenna endopod nearly as long as exopod, endopod segment 1 moderately wide in proximal part bearing 2 setae; basis and exopod segment 1 with 2 setae each. Mandibular basis with 2–3 setae, endopod segment 2 with 5–6 setae. Maxillule praecoxal endite with 9 terminal, 4 posterior and 1 anterior setae; coxal epipodite with 5–6 setae; distal basal endite with 5 setae; endopod with 14–15 setae. Maxilla endopod with 6 long and 2 short setae. Maxilliped proximal praecoxal endite with 1 seta, middle and distal endites with 2 and 3 setae, respectively; coxal endite without sensory element. P1 exopod segments 1–3 with lateral spine each. Segmentation of P1–P4 as typical of Aetideidae. P5 absent.

Male unknown.

Type species. – *Prolutamator hadalis* sp. nov., here designated.

Etymology. – The generic name is derived from the Greek *pro* meaning before and *Lutamator*, the name of the closely allied genus, and refers to the comparatively primitive morphology of the new genus with regard to *Lutamator*. Gender masculine.

Remarks. – Female specimens of *Prolutamator* gen. nov. share with *Lutamator* BRADFORD 1969 the following features: i) rostrum as a poorly developed blunt plate; ii) antenna exopod nearly as long as endopod; iii) mandible endopod segment 2 with fewer than 7 setae; iv) coxal endite of maxilliped syncoxa without sensory element; v) P5 absent. Except for the above mentioned characters (i-v) the genus *Lutamator* was defined by: i) antenna endopod segment 1 wider proximally than distally; ii) antenna exopod segment 1 with 1 seta; iii) number of setae on the praecoxal arthrite of maxillule reduced (11 setae). Its definition was considered tentative “until further species are discovered” (BRADFORD 1969: 491). The genus was redefined by ALVAREZ (1984) and two species, *Lutamator hurleyi* BRADFORD, 1969 and *L. elegans* ALVAREZ, 1984, were included. The redefinition in general follows the earlier definition, but unfortunately has a misleading sentence that lacks the correct name of the described limb, here included in bold: “Exopod of the antenna tapering distally with a short seta on the 1<sup>st</sup> joint, 2 setae (one short and the other longer and thinner) on the 2<sup>nd</sup> joint and 3 terminal setae on the 7<sup>th</sup> joint, this being long and thin and the 1<sup>st</sup> joint of the **mandibular** endopod without setae, the endopod reduced and two-jointed, with four fine terminal setae” (ALVAREZ 1984:99).

Males of *Lutamator* are still undiscovered.

The new genus *Prolutamator* differs from *Lutamator* in that antenna endopod segment 1 is only moderately wide proximally compared to distally (much wider in *Lutamator*, see BRADFORD 1969, ALVAREZ 1984). The following characters (all plesiomorphies) designate the new genus: i) antenna exopod segment 1 with 2 setae (vs. 1 seta in *Lutamator*);

**Table 1.** Selected character states of *Lutamator* and *Prolutamator* females.

Character	<i>Lutamator</i> (after Bradford 1969 and Alvarez 1984)	<i>“Lutamator” paradiseus</i> (after Ohtsuka et al. 2005)	<i>Prolutamator</i> gen.n.
Total length (mm)	5.15–5.20 mm	3.41–3.53 mm	2.25–2.90 mm
Antenna: width of endopod proximally	very wide	moderately wide	moderately wide
Antenna: <sup>1</sup> basis	1	2	2
endopod segment 1	1	2	2
proximal exopod segment 1	1	0	2
seta on penultimate exopod segment	absent	present	present
Mandible: basis	0	1	2–3
endopod segment 1	0	1	1
endopod segment 2	4	4	5–6
Maxillule: praecoxal arthrite	11–12	11	14
coxal endite	4–5	4	4
proximal basal endite	2–3	2	3
distal basal endite	4	4	5
Enp	11	11	14–15
Exp	11	11	11
epipodite	8	7	5–6
Maxilla: endopod	6	7	8
Maxilliped: praecoxal endites of syncoxa	0,2,3	1,2,3	1,2,3
coxal endite of syncoxa	3	4	3
penultimate endopod segment	2+1	3+1	3+1

<sup>1</sup> Here and below numbers of setae.

ii) mandible basis with 2–3 seta (seta absent in *Lutamator*); iii) mandible endopod segment 2 with 5–6 setae (vs. 4 setae in *Lutamator*); iv) maxillule praecoxal arthrite with 14 setae (vs. 11–12 setae in *Lutamator*), distal basal endite with 5 (vs. 4 setae in *Lutamator*) and endopod with 14–15 setae (vs. 11 setae in *Lutamator*). Further, the new genus *Prolutamator* is clearly distinguished from *Lutamator* by the derived setation of maxillule epipodite bearing 5–6 setae (vs. 8 setae in *Lutamator*).

Recently an emendation of the generic diagnosis of *Lutamator* was presented by OHTSUKA et al. (2005) and a third species, *L. paradiseus* OHTSUKA, BOXSHALL & SHIMOMURA, 2005, was added to the genus. However, the latter species does not fit the previous definitions by BRADFORD (1969) and ALVAREZ (1984), who diagnosed the genus as possessing antenna endopod segment 1 much wider proximally than distally (moderately wide in *L. paradiseus*); it also significantly differs from the two previous species of *Lutamator* in setation of oral parts (Table 1). *L. hurleyi* and *L. elegans* both share a single seta on antenna exopod segment 1 (seta absent in *L. paradiseus*), one seta each on antenna basis and endopod segment 1 (vs. 2 setae in *L. paradiseus*), and lack of a seta on the penultimate segment of antenna exopod (seta present in *L. paradiseus*). Further, in *L. hurleyi* and *L. elegans* the mandible basis and endopod segment 1 both lack a seta, while *L. paradiseus* bears 1 seta on each of these limbs. The setation of maxilliped syncoxa of *L. hurleyi* and *L. elegans* differs in that the proximal praecoxal endite of syncoxa lacks a seta (in *L. paradiseus* small seta present) and the coxal endite of syncoxa bears 3 setae (vs. 3 setae plus 1 long appendage present in *L. paradiseus*). To sum up, a significant number of morphological differences separate *L. paradiseus* from both *L. elegans* and *L. hurleyi* and in our view prevent *L. paradiseus* from being placed in the genus *Lutamator*.

*Prolutamator hadalis* sp. nov.

(Figs 1-4)

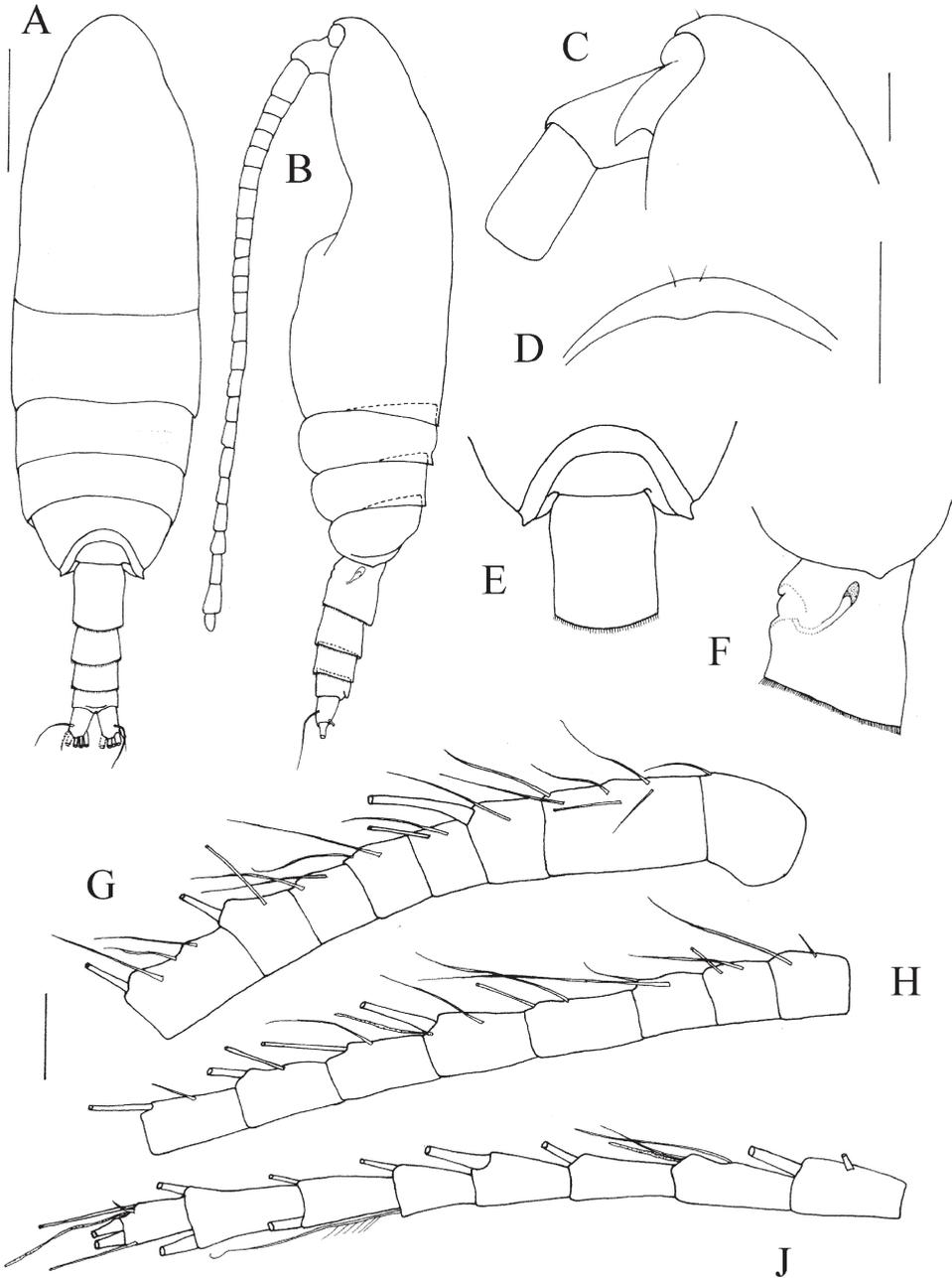
**Material examined.** – Holotype, adult female, dissected, body length 2.78 mm (ZMH K-41259). South-eastern Atlantic, 17°06' S 04°41' E, DIVA-I, station 344; 25 July 2000, above the sea bed at depth of 5415 m.

**Paratypes.** – 6 females, body length 2.70–2.90 mm (ZMH K-41260), collection data as for holotype; 12 females, body length 2.70–2.95 mm (ZIN 91090), 16°18' S 05°27' E, DIVA-I, station 348, 28.07.2000, above the sea bed at depth of 5390 m.

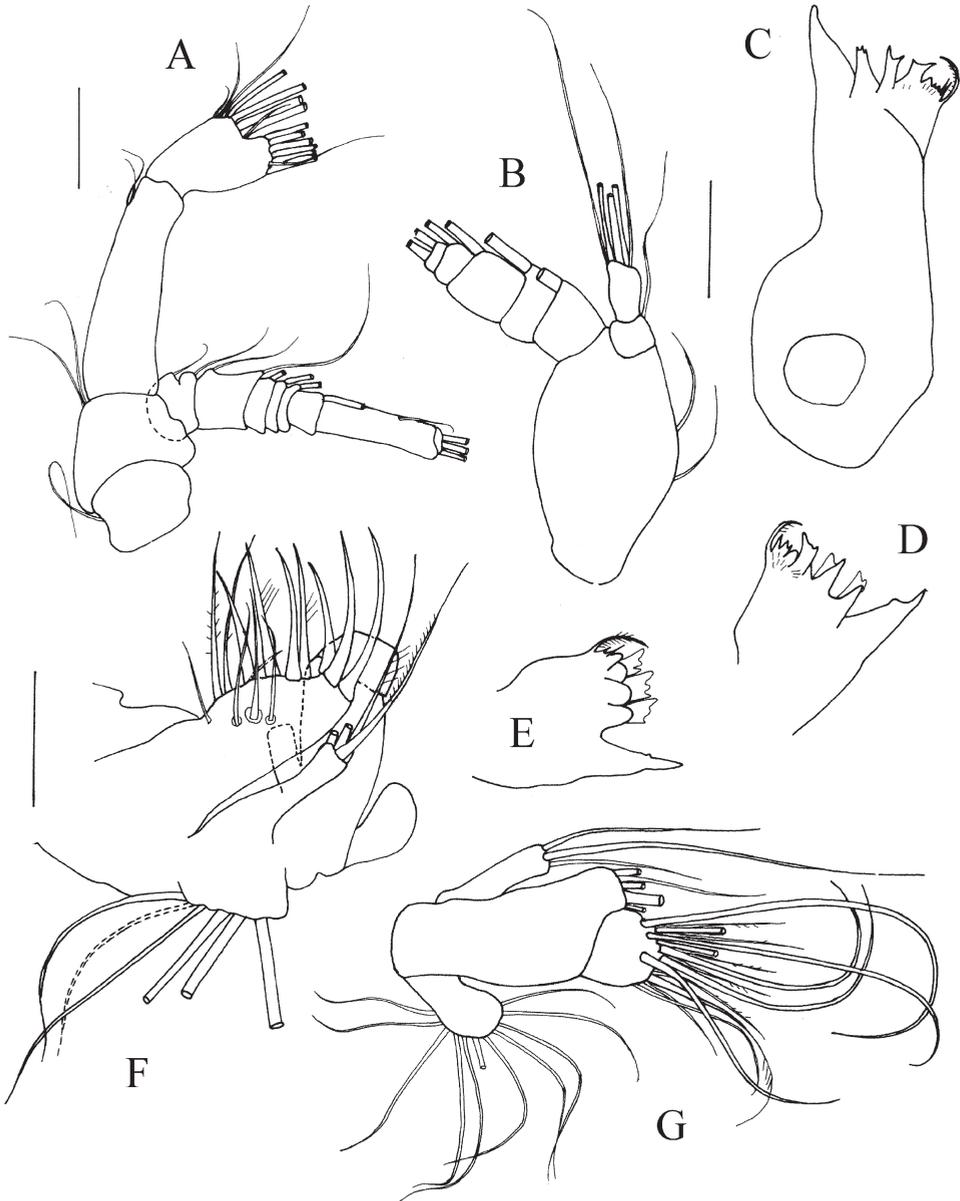
**Additional material.** – 5 females (in bad shape) from type locality and 1 female DIVA-I, station 340 (Table 2).

**Etymology.** – The species epithet is derived from the Greek *hades* meaning unseen and refers to the extraordinary depth of the species' habitat within the Atlantic Ocean.

**Description.** – Adult female, total length 2.70–2.90 mm; prosome 2.9–3.5 times longer than urosome. Rostrum a poorly developed blunt plate lacking filaments (Fig. 1D). Cephalosome and pediger 1 and pedigers 4 and 5 separate; posterior corners of prosome as short rounded lobes with small distal knob in lateral view (Fig. 1B, F), lobes slightly diverging in dorsal view (Fig. 1A, E). Caudal rami with 4 terminal setae, 1 ventral and 1 subterminal setae (Fig. 1B).



**Fig. 1.** *Prolutamator hadalis* gen. et sp. nov. Female, holotype. **A**, habitus, dorsal; **B**, habitus, lateral view; **C**, rostrum, lateral view; **D**, rostrum, ventral view; **E**, posterior prosome and genital double-somite, dorsal view; **F**, posterior prosome and genital double-somite, lateral view; **G**, antennule, segments I (first) to X–XI (8th); **H**, antennule, segments XII (9th)–XIX (16th); **J**, antennule, segments XX (17th) to XXVIII (24th). Scales: **A**, **B**: 0.5 mm; remaining figures, 0.1 mm.



**Fig. 2.** *Prolutamator hadalis* gen. et sp. nov. Female, holotype. **A**, antenna; **B**, mandibular palp; **C–E**, mandibular gnathobase (different views); **F**, maxillule, setation figured for coxal epipodite, coxal endite and praecoxal arthrite; **G**, maxillule, basal endites, endopod and exopod. Scales: 0.1 mm.

Antennules (Fig. 1G–J) moderately differing in length among specimens: as long as prosome or reaching to posterior margin of fourth urosomite; of 24 free segments, armature as follows: I–1s, II–IV–6s, V to IX–2s each, X–XI–4s, XII to XV–2s each, XVI–2s + 1 ae, XVII–XX–2s each, XXI–2s + 1ae, XXII to XXIII–1s each, XXIV to XXVI–2s each, XXVII–XXVIII–5s + 1ae.

Antenna (Fig. 2A), coxa with 1 seta, basis with 2 setae, exopod 8-segmented with 2, 2, 1, 1, 1, 1, 1 and 3 setae; exopod as long as endopod; first endopodal segment with 2 setae, second with 8 and 7 setae.

Mandible (Fig. 2B–E), gnathobase with 4 large and 4 small teeth plus dorsal seta; basis with 2 setae, exopod 5-segmented and about two times longer than endopod, with 1, 1, 1, 1 and 2 setae; endopod segment 1 with 1 seta, segment 2 with 5–6 setae.

Maxillule (Fig. 2F–G), praecoxal endite with 9 terminal, 4 posterior and 1 small anterior setae; coxal endite with 4 setae; proximal basal endite with 3 setae; distal basal endite with 5 setae, 1 a long and strong seta; endopod segments fused with 15 setae including 8 long and strong and 7 short and slender setae; exopod with 11 setae; coxal epipodite with 6 setae.

Maxilla (Fig. 3A–B), praecoxal and coxal endites with 3 setae each; proximal basal endite with 3 setae, of these 1 thicker and more sclerotized, spine-like; distal basal endite plus endopod with 8 setae: 6 long and 2 small; praecoxal and coxal endites furnished with short surface spinules.

Maxilliped (Fig. 3C–D), syncoxa with 1 small seta on proximal praecoxal endite, 2 setae on middle endite, 3 setae and rows of surface spinules on distal praecoxal endite; coxal endite with 3 setae; basis with 3 medial and 2 distal setae. Endopod 5-segmented, with 4, 4, 3, 3+1, and 4 setae.

P1 (Fig. 4A), coxa without seta, basis with small distolateral seta and medial distal seta smoothly curved; endopod 1-segmented bearing lateral lobe ornamented with denticles and patch of denticles on anterior surface. Exopod segments 1, 2 and 3 with 1 lateral spine each; spines of exopod segments 1 and 2 reaching close to midlength of following spine. Spines of exopod segments 1 and 2 densely pubescent on inner margin.

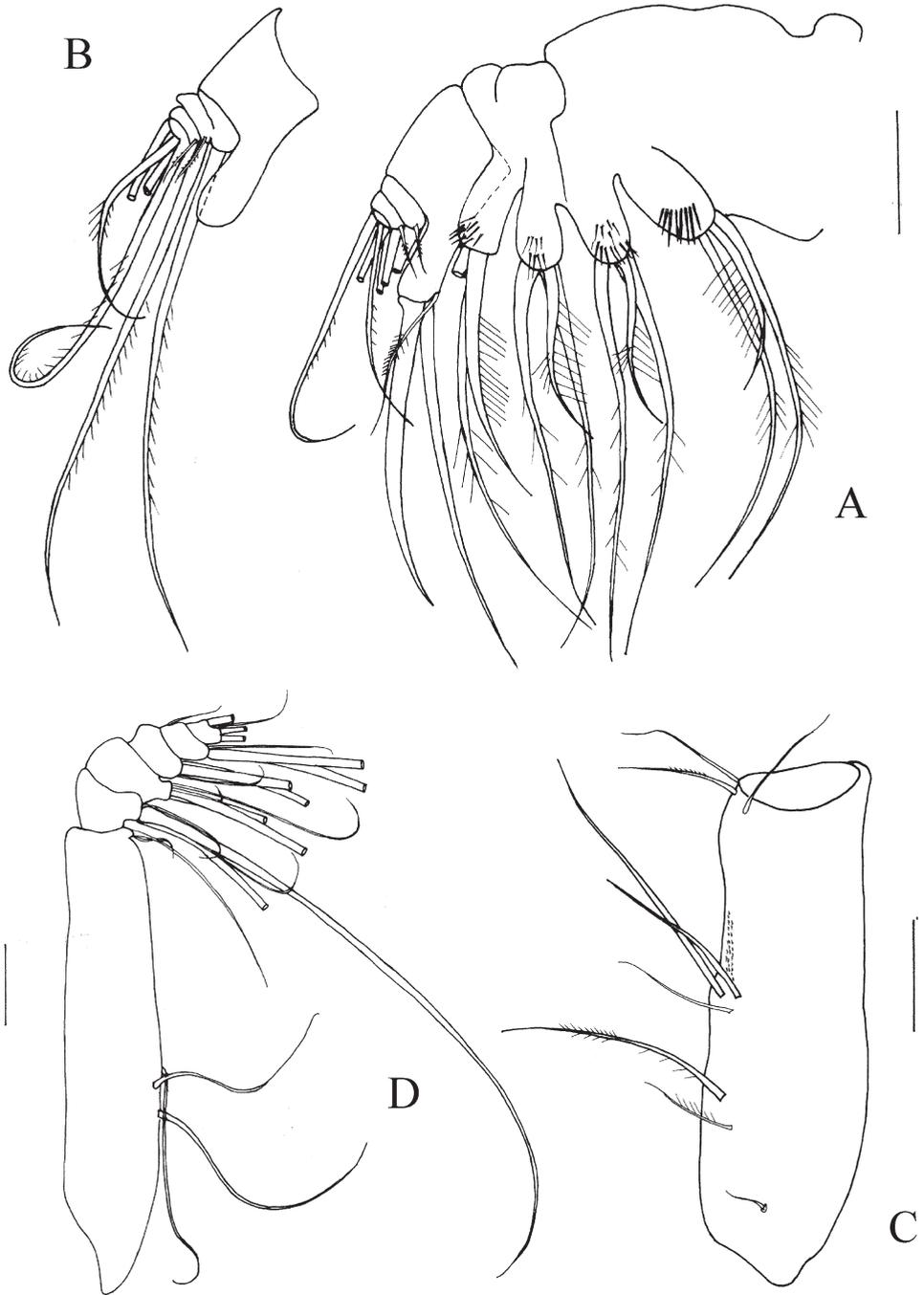
P2 (Fig. 4B), coxa with medial seta; basis without seta; endopod 2-segmented; exopod 3-segmented; lengths of outer spines as figured.

P3–P4 (Fig. 4C–D), coxa with medial seta, basis without seta; both endopod and exopod 3-segmented.

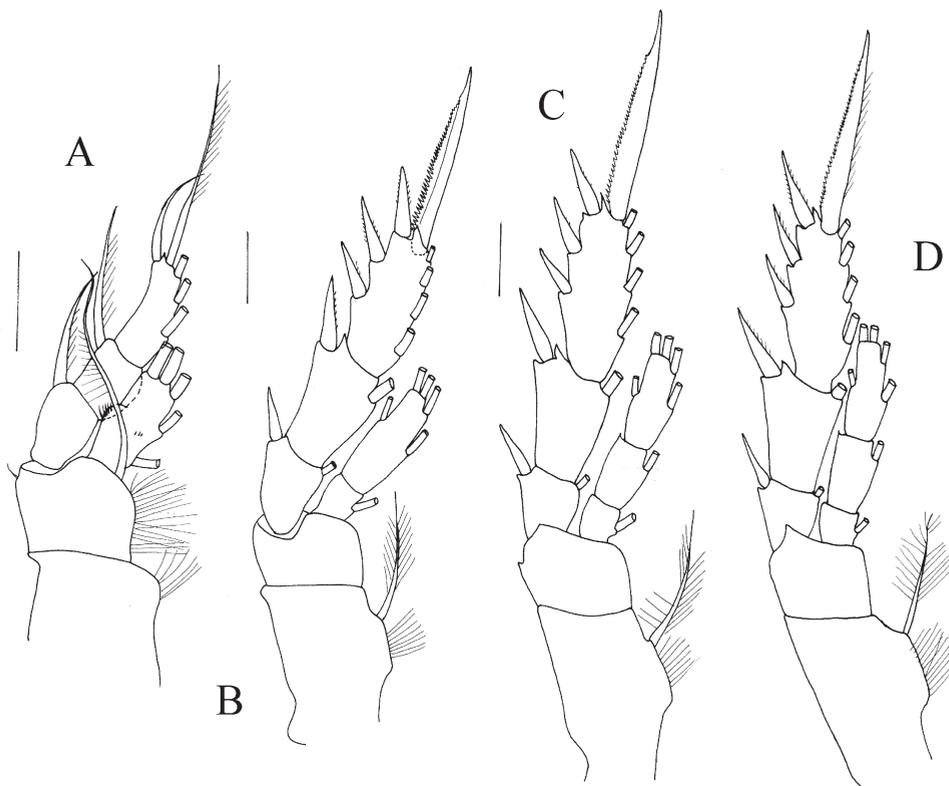
Male unknown.

**Table 2.** Locality data of *Prolutamator* spp.

Expedition	Station	Date	Localities	Depth (m)	Species
DIVA-I	340	22 July 2000	18°18'S 04°41'E	5395	<i>P. minor</i> , <i>P. hadalis</i>
	344	25 July 2000	17°06'S 04°41'E	5415	<i>P. minor</i> , <i>P. hadalis</i>
	348	28 July 2000	16°18'S 05°27'E	5390	<i>P. minor</i> , <i>P. hadalis</i>
ANDEEP-II	135-4	11 March 2002	65°09'S 43°01'W	4679–4678	<i>P. minor</i>
	136-4	13 March 2002	64°02'S 39°06'W	4748–4743	<i>P. minor</i>
	137-4	14–15 March 2002	63°44'S 33°48'W	4975	<i>P. minor</i>
	140-9	22 March 2002	58°16'S 24°54'W	3005–2965	<i>P. minor</i>
	143-1	25 March 2002	58°44'S 25°10'W	755	<i>P. minor</i>
ANDEEP-III	016-10	01 January 2005	41°08'S 09°56'E	4725–4469	<i>P. minor</i>



**Fig. 3.** *Prolutamator hadalis* gen. et sp. nov. Female, holotype. **A**, maxilla; **B**, maxilla, endopod and distal basal endite; **C**, maxilliped, syncoxa; **D**, maxilliped, basis and endopod. Scales: 0.1 mm.



**Fig. 4.** *Prolutamator hadalis* gen. et sp. nov. Female, holotype. **A**, P1; **B**, P2; **C**, P3; **D**, P4. Scales: 0.1 mm.

*Prolutamator minor* sp. nov.

(Figs 5-8)

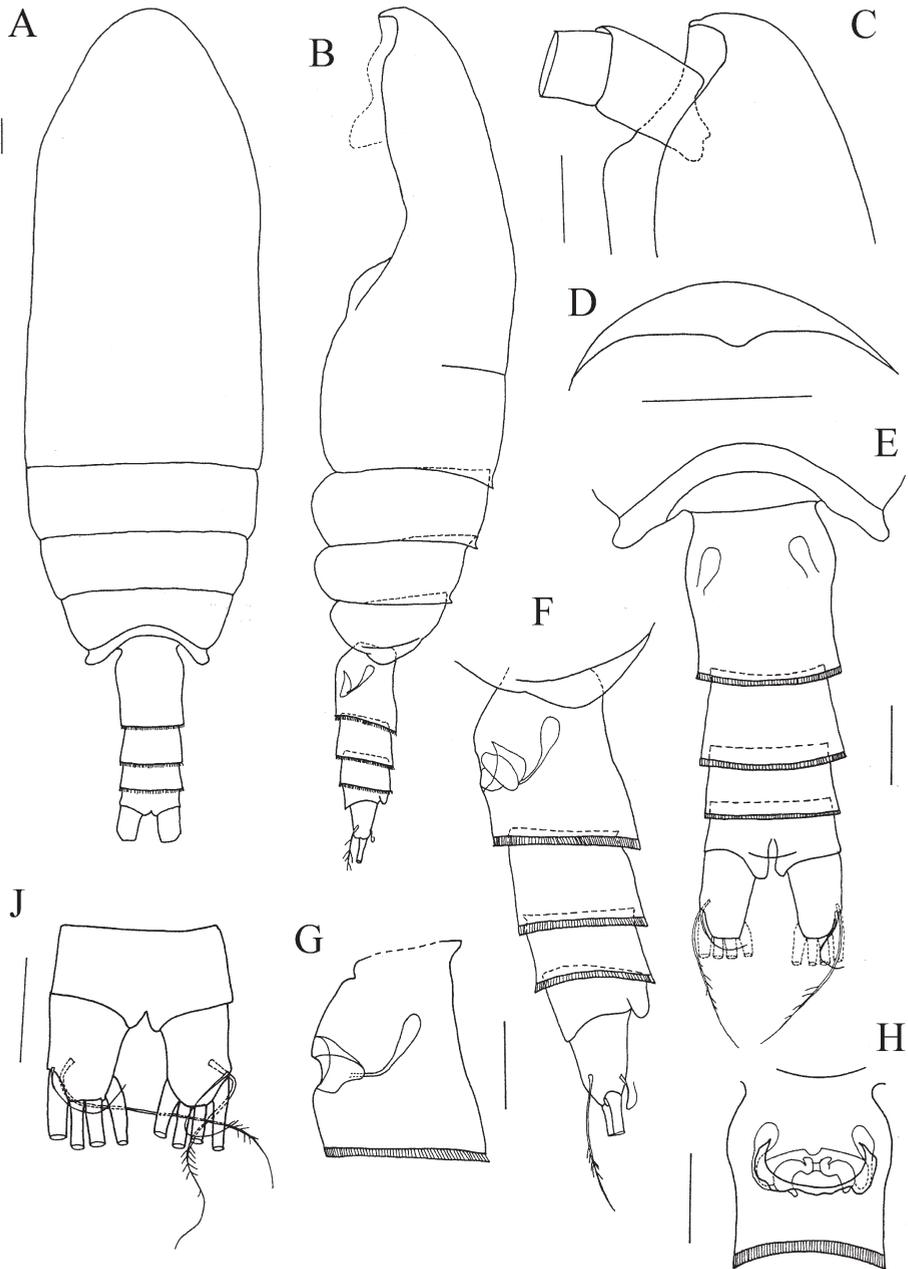
**Material examined.** – Holotype, adult female, undissected, body length 2.25 mm (ZMH K-41173). Weddell Sea, 65°09'S 43°01'W, ANDEEP-II, station 135-4; 11 March 2002, above the sea bed at depth of 4678–4679 m.

**Paratypes.** – 10 females, body length 2.25–2.35 mm, 7 females (ZMH K-41174a,b), and 3 females (ZIN 91086), 3 specimens dissected (appendages on 3 slides), collection data as for holotype.

**Additional material.** – 1 female (in bad shape) from type locality; 8 females, DIVA-I, stations 340 and 344; 22 females, ANDEEP-II, stations 136-4, 137-4, 140-9, 143-1 and 016-10 (Table 2).

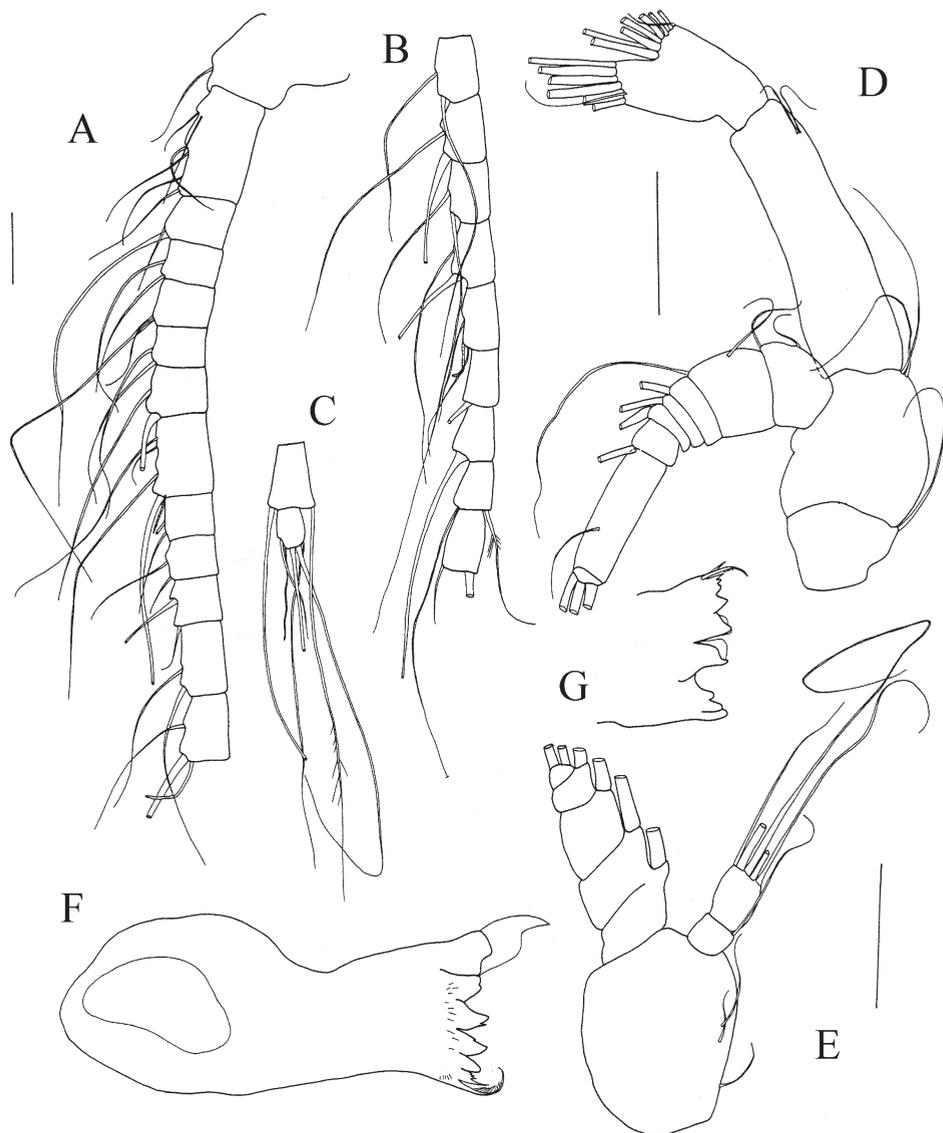
**Etymology.** – The specific name is derived from the Latin *minor* meaning smaller and refers to the small size of the species compared to the type species.

**Description.** – Adult female, total length 2.25–2.35 mm; prosome 3.0–3.6 times longer than urosome. Rostrum a poorly developed blunt plate lacking filaments (Fig. 5C–D). Cephalosome and pediger 1 incompletely separate, pedigers 4 and 5 separate (Fig. 5A–B); posterior corners of prosome as short rounded lobes in lateral view (Fig. 5B, F), obtuse-triangular and slightly diverging in dorsal view (Fig. 5A, E). Caudal rami with 4 terminal setae, 1 ventral and 1 subterminal setae (Fig. 5J).



**Fig. 5.** *Prolutamator minor* gen. et sp. nov. Female, paratype. **A**, habitus, dorsal; **B**, habitus, lateral view; **C**, rostrum, lateral view; **D**, rostrum, ventral view; **E**, posterior prosome and urosome, dorsal view; **F**, posterior prosome and urosome, lateral view; **G**, genital-double somite, lateral view; **H**, genital double-somite, ventral view; **J**, caudal rami, dorsal view. Scales: 0.1 mm.

Antennule (Fig. 6A–C), variable in length, as long as prosome or reaching to posterior margin of fourth urosomite; of 24 free segments, armature as follows: I–1s, II–IV–6s, V to IX–2s each, X–XI–4s + 1ae, XII to XV–2s each, XVI–2s + 1ae, XVII–XX–2s each,



**Fig. 6.** *Prolutamator minor* gen. et sp. nov. Female, paratype. **A**, antennule, segments I (first) to XVI (13th); **B**, antennule, segments XVII (14th) to XXV (22nd); **C**, antennule, segments XXVI (23th) to XXVII–XXVIII (24th); **D**, antenna; **E**, mandibular palp; **F**, **G**, mandibular gnathobase. Scales: 0.1 mm.

XXI–2s + 1ae, XXII to XXIII–1s each, XXIV to XXVI–2s each, XXVII–XXVIII–4s + 1ae.

Antenna (Fig. 6D), coxa with 1 seta, basis with 2 setae, exopod 8-segmented with 2, 2, 1, 1, 1, 1, 1 and 3 setae; exopod as long as endopod; first endopodal segment with 2 setae, second with 8 and 7 setae.

Mandible (Fig. 6E–G), gnathobase with 5 large and 3 small teeth plus dorsal seta; basis with 3 setae, exopod of 5 segments with 1, 1, 1, 1 and 2 setae, about 2 times longer



**Fig. 7.** *Prolutamator minor* gen. et sp. nov. Female, paratype. **A**, maxillule, basal endites, endopod and exopod; **B**, praecoaxal arthrite, coxal endite and epipodite; **C**, maxilla, praecoaxal and coxal endites; **D**, maxilla, distal basal endite; **E**, maxilla, endopod; **F**, maxilliped, syncoxa; **G**, maxilliped, basis and endopod. Scales: 0.1 mm.

than endopod; endopod segment 1 with 1 seta, segment 2 with 5 setae.

Maxillule (Fig. 7A–B), praecoxal endite with 9 terminal, 4 posterior and 1 small anterior setae; coxal endite with 4 setae; proximal basal endite with 3 setae; distal basal endite with 5 setae, 1 long and strong; endopod segments fused with 15 setae, 8 long and strong plus 7 thin, short; exopod with 11 setae; coxal epipodite with 5 setae.

Maxilla (Fig. 7C–E), praecoxal and coxal endites with 3 setae each; proximal basal endite with 3 setae, 1 thicker and more sclerotized, spine-like; distal basal endite plus endopod with 8 setae: 6 long and 2 small setae. Praecoxal and coxal endites supplied with short surface spinules.

Maxilliped (Fig. 7F–G), syncoxa with 1 seta on proximal praecoxal endite, 2 setae on middle endite, 3 setae and rows of surface spinules on distal praecoxal endite; coxal endite with 3 setae; basis with 3 medial and 2 distal setae. Endopod 5-segmented, with 4, 4, 3, 3+1, and 4 setae.

P1 (Fig. 8A), coxa without seta, basis with small distolateral seta, medial distal seta smoothly curved; endopod 1-segmented, with lateral lobe poorly or moderately developed and ornamented or not with patch of denticles on anterior surface. Exopod

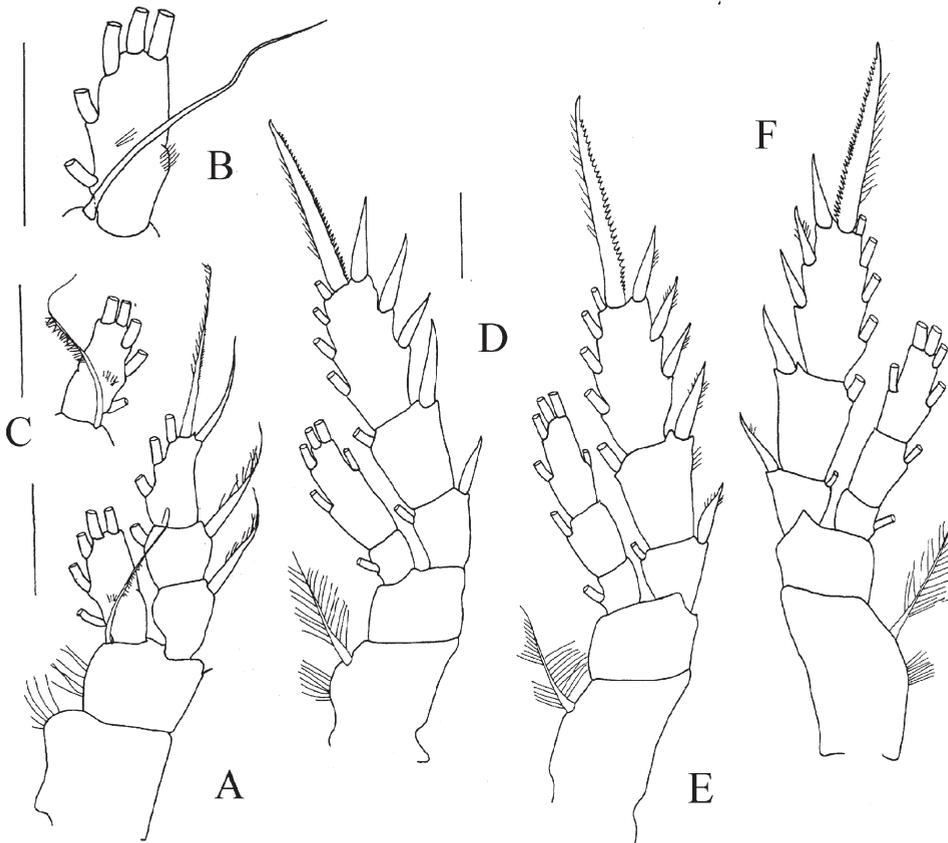


Fig. 8. *Prolutamator minor* gen. et sp. nov. Female. A, P1; B–C, P1, endopod; D, P2; E, P3; F, P4. A, C–F, paratype, B, holotype. Scales: 0.1 mm.

segments 1, 2, and 3 with 1 lateral spine each; spine of exopod segment 1 reaching close to midlength of following spine; that of segment 2 extending to one third of following spine. Spines of exopod segments 1 and 2 densely pubescent on inner surface.

P2 (Fig. 8D), coxa with medial seta; basis without seta; endopod 2-segmented; exopod 3-segmented. Lengths of outer spines as figured.

P3–P4 (Fig. 8E–F), coxa with medial seta; basis without seta; both endopod and exopod 3-segmented.

Male unknown.

**R e m a r k s.** – *P. minor* is distinguished from *P. hadalis* by: i) smaller size; ii) posterior corners as short rounded lobes lacking a small knob in lateral view; iii) mandible basis with 3 setae (vs. 2 setae in *P. hadalis*), and iv) maxillule coxal epipodite with 5 setae (vs. 6 setae in *P. hadalis*). Specimens of *P. minor* demonstrate a marked variability in the shape and morphology of P1 endopod. The lateral lobe of right or left leg may be furnished with spinules and if so, the spinule-bearing lobe then is stronger developed. Also the medial distal seta of the basis can be curved in different degree (Fig. 8B–C).

*Pseudotharybis* T. SCOTT, 1909

*Pseudotharybis polaris* sp. nov.

(Figs 9–11)

**M a t e r i a l e x a m i n e d.** – Holotype, adult female, dissected (appendages on 2 slides), body length 5.40 mm (ZMH K–41165). Southern Ocean, 59°40'S 57°35'W, ANDEEP-II, station 042–2; 27 January 2002; above the sea bed at depth of 3680–3683 m.

**E t y m o l o g y.** – The species epithet is derived from the Latin *polaris* meaning from polar waters and refers to the species' record in high polar waters.

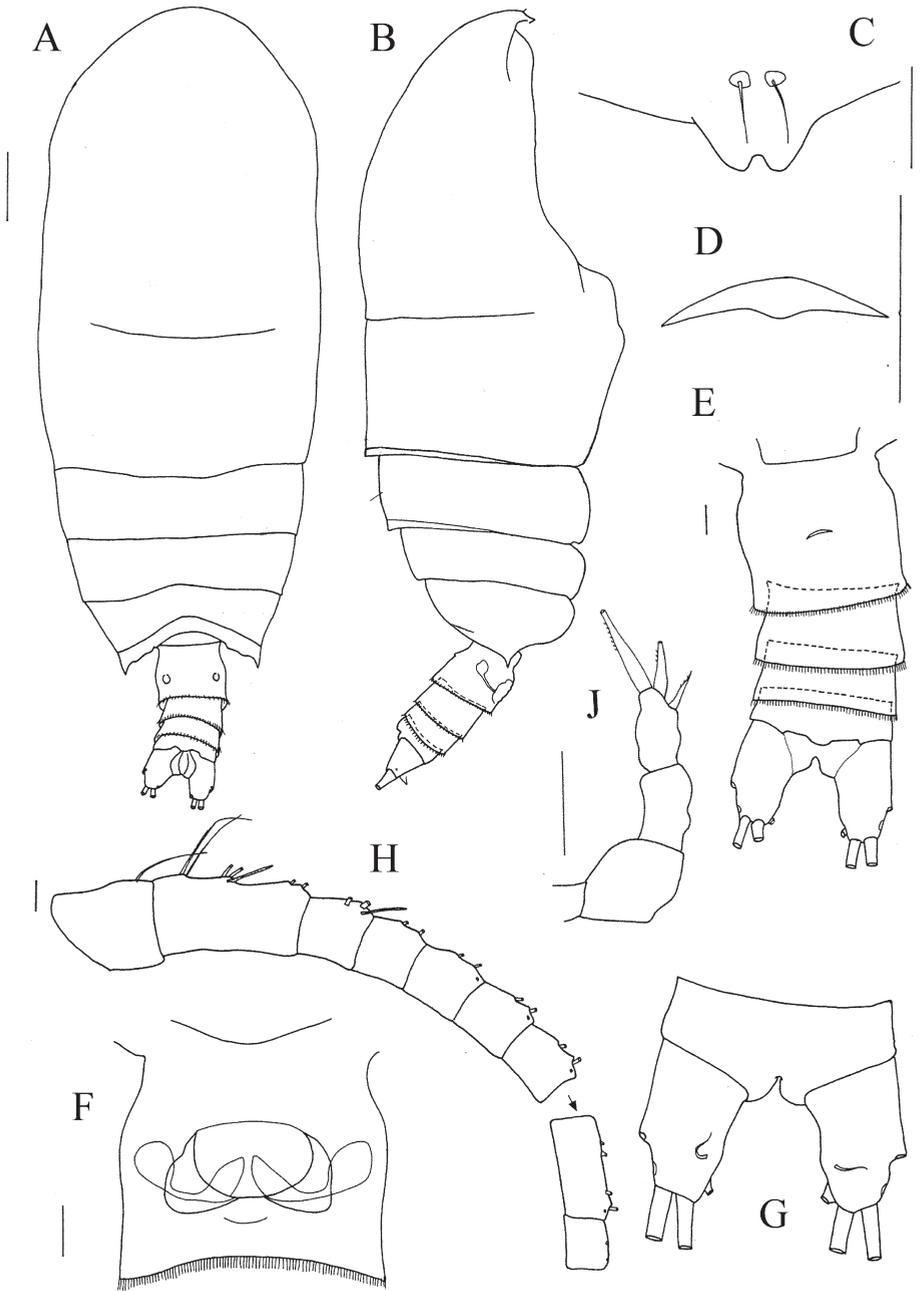
**D e s c r i p t i o n.** – Adult female, total length 5.40 mm; prosome 3.9 times longer than urosome. Rostrum a plate subdivided distally into two obtusely rounded short lobes (Fig. 9C–D). Cephalosome and pediger 1 and pedigers 4 and 5 incompletely separate (Fig. 9A–B); posterior corners as short points not diverging in dorsal view (Fig. 9A). Caudal rami with 4 terminal setae (1 broken), 1 ventral and 1 subterminal seta broken (Fig. 9E).

Antennule broken on both sides (Fig. 9H), only 9 free segments retained, armature as follows: I–1s, II–IV–6s + 1ae, V–2s + 1ae, VI–2s, VII–IX–2s + 1?, X–XI–4s + 1?, XII–2?.

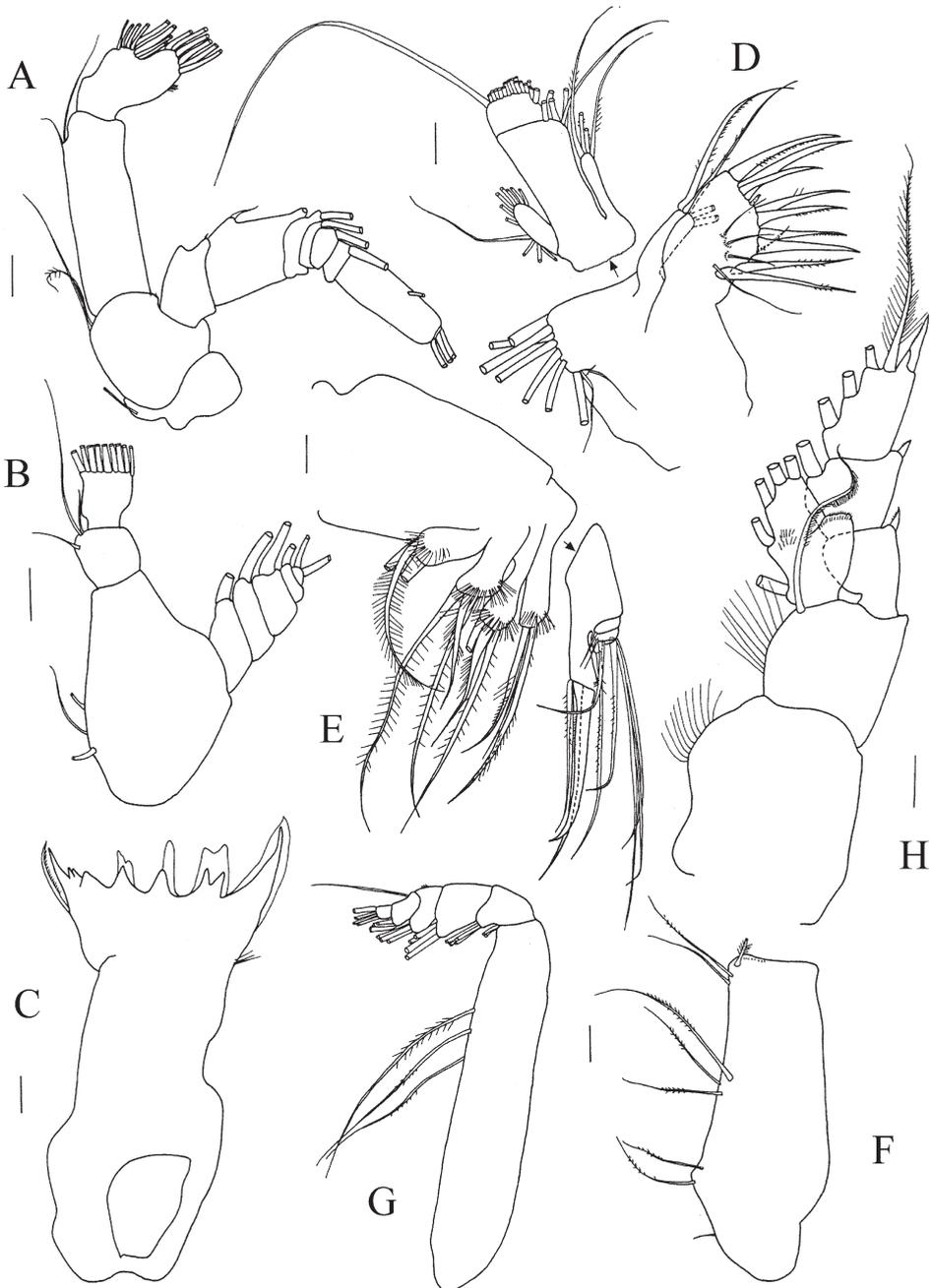
Antenna (Fig. 10A), coxa with 1 seta (broken), basis with 2 setae, exopod with 1, 2 (1 broken), 1, 1, 1, 1 and 3 setae; exopod 1.2 times as long as endopod; first endopodal segment with 2 setae, second with 8 and 6 setae.

Mandible (Fig. 10B–C), gnathobase with 8 teeth plus dorsal seta; basis with 3 setae (2 broken), exopod 5-segmented, about as long as endopod, with 1, 1, 1, 1 and 2 setae; endopod segment 1 with 3 setae, segment 2 with 9 setae.

Maxillule (Fig. 10D), praecoxal arthrite with 9 terminal, 4 posterior, 1 small setae and small attenuation; coxal endite with 4 setae; proximal basal endite with 4 setae; distal



**Fig. 9.** *Pseudotharybis polaris* sp. nov. Female, holotype. **A**, habitus, dorsal; **B**, habitus, lateral view; **C**, rostrum, dorsal view; **D**, rostrum, ventral view; **E**, urosome, dorsal view; **F**, genital double-somite, ventral view; **G**, anal somite and caudal rami, ventral view; **H**, antennule, 1–9<sup>th</sup> free (I–XI ancestral) segments; **J**, P5, right. Scales: **A–B**: 0.5 mm, **C–J**: Scales: 0.1 mm.



**Fig. 10.** *Pseudotharybis polaris* sp. nov. Female, holotype. **A**, antenna; **B**, mandibular palp; **C**, mandibular gnathobase; **D**, maxillule; **E**, maxilla; **F**, maxilliped, syncoxa; **G**, maxilliped, basis and endopod; **H**, P1. Scales: 0.1 mm.

basal endite with 5 setae; endopod segments fused with 16 setae; exopod with 11 setae; coxal epipodite with 9 setae.

Maxilla (Fig. 10E), praecoxal and coxal endites with 3 setae each; proximal basal

endite with 3 setae, of these 1 thicker and more sclerotized, spine-like; distal basal endite plus endopod with 8 setae: 6 long and 2 small setae. Praecoaxal and coxal endites ornamented with short surface spinules.

Maxilliped (Fig. 10 F–G), syncoxa with 1 seta on proximal praecoaxal endite, 2 setae on middle endite, 3 setae on distal praecoaxal endite; coxal endite with 3 setae (1 broken); basis with 3 medial and 2 distal setae; endopod 5-segmented, with 4, 4, 3, 3+1 and 4 setae.

P1 (Fig. 10H), coxa without seta, basis with medial distal seta curved; endopod 1-segmented with lateral lobe well developed, ornamented with denticles, and patch of denticles on anterior surface. Exopod segments 1, 2 and 3 with 1 lateral spine each; spines of exopod segments 1 and 2 short, about one third length of lateral spine of exopod segment 3.

P2 (Fig. 11A), coxa with medial seta; basis without seta; endopod 2-segmented, segment 2 ornamented with spinules on posterior surface; exopod 3-segmented, terminal spine nearly as long as exopod segment 3.

P3 (Fig. 11B), coxa with medial seta, basis without seta; both endopod and exopod

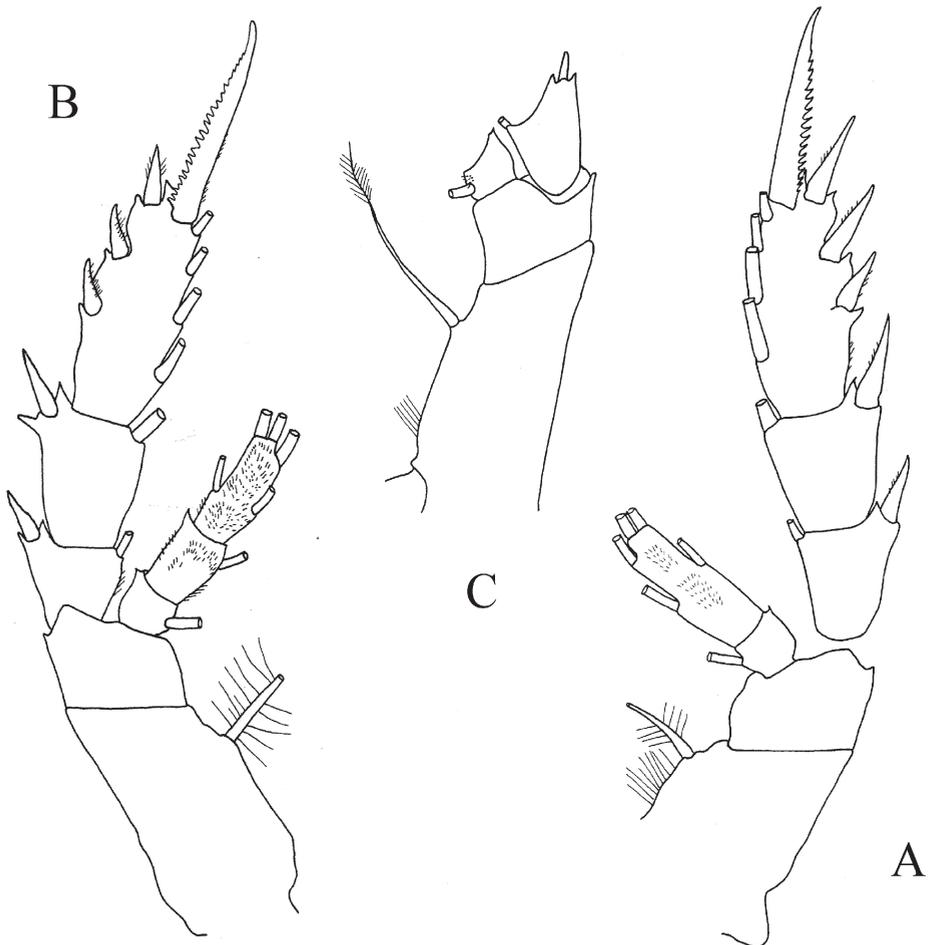


Fig. 11. *Pseudotharybis polaris* sp. nov. Female, holotype. A, P2; B, P3; C, P4. Scales: 0.1 mm.

3-segmented; posterior surface of endopod segments 2 and 3 ornamented with spinules.

P4 (fig. 11C), coxa with medial seta, basis without seta, both exopod and endopod broken distal to segment 1.

P5 (Fig. 9J), uniramous, 3-segmented; right segment 3 (exopod) with 3 spines, terminal spine longest; tips of terminal and subterminal spines broken; left leg in poor condition: all 3 spines of exopod segment 3 broken.

Male unknown.

**Remarks.** – The genus *Pseudotharybis* T. SCOTT, 1909 includes *P. brevispinus* (BRADFORD, 1969), *P. dentatus* (BRADFORD, 1969), *P. robustus* (BRADFORD, 1969), and *P. zetlandicus* T. SCOTT, 1909. The new species *P. polaris* is distinguished from its congeners by: i) the shape of rostrum bearing a plate with two obtusely rounded lobes terminally (vs. two pointed in other species); ii) maxillule coxal endite with 4 setae (vs. 3 or 5 setae in congeners); iii) maxillule praecoxal arthrite with 14 setae and 1 small attenuation (vs. attenuation absent in congeners), and iv) very short lateral spines of P1 exopod segments 1–2 (vs. lateral spine on exopod segment 2 comparatively long and exceeding mid-length of terminal segment in congeners).

Contrary to females of *Pseudotharybis* the diagnostic characters of males remain rather poorly defined. Not any additional male specimen of *P. dentatus* and *P. robustus* has been found since both these species were described; however, the taxonomic affiliation of the latter species remains questionable: “The male described... may not be *P. robustus*, as many of the limbs are not whole...” (BRADFORD 1969: 479). Later, BRADFORD (1976) proposed *Aetideopsis magna* GRICE & HULSEMANN, 1970 (described after the male) to belong in *Pseudotharybis* as well. However, *A. magna* shares some characters with the male of *Parabradydium angelikae* SCHULZ & MARKHASEVA, 2000 ((e.g. the antenna exopod is shorter than the endopod (longer in *Pseudotharybis* males), and setation and morphology of the maxilla (unknown for *Pseudotharybis* males) is very similar to *P. angelikae* and there are 3 setae present on the distal praecoxal endite of maxilliped syncoxa (these setae are absent in males of *Pseudotharybis*)). Thus, until new morphological data of *A. magna* are reported its taxonomic affiliation remains unsettled.

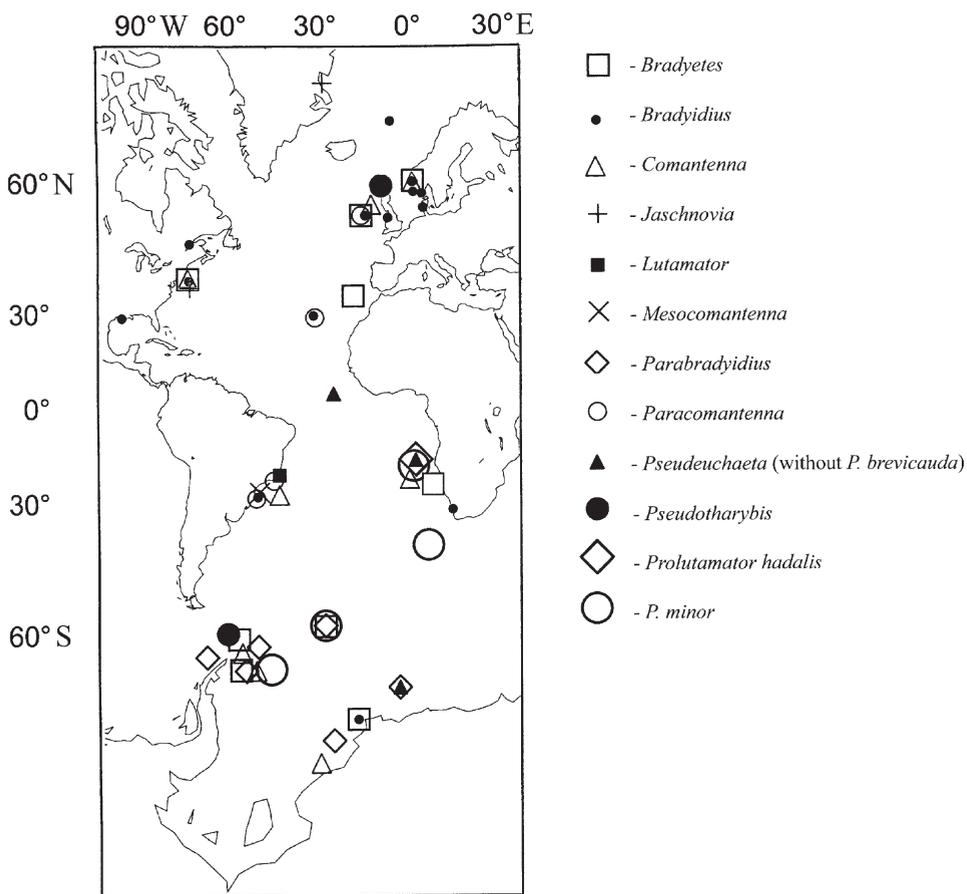
## Discussion

Until recently, the benthopelagic aetideid fauna of the Southern Ocean was very poorly known. Collections made during the last decade, mostly aboard RV *Polarstern*, in vicinity of the sea bed of Weddell Sea and adjacent areas showed that there exists a true benthopelagic fauna of Aetideidae in the deep Southern Ocean that contains at least the genera *Parabradydium*, *Comantenna*, *Bradyetes*, and near-bottom species of *Pseudeuchaeta* (SCHULZ & MARKHASEVA 2000; SCHULZ 2002; MARKHASEVA & SCHULZ 2006). Additional aetideids dwelling above the seafloor in Antarctic deep waters, i.e. *Prolutamator* gen. et spp. nov. and *Pseudotharybis polaris* sp. nov., are described in this paper. Considering the present day records, the aetideid benthopelagic fauna of the Southern Ocean contains at least seven true benthopelagic genera (Fig. 12) including ten species (*Bradyetes curvicornis* MARKHASEVA & SCHULZ, 2006, *B. weddellanus*

MARKHASEVA & SCHULZ, 2006, *B. cf. inermis*, *Bradyidius* sp., *Comantenna gesinae* SCHULZ, 2002, *Comantenna* sp., *Parabrydidius angelikae*, *Prolutamator hadalis* gen. et sp. nov., *P. minor* gen. et sp. nov., *Pseudeuchaeta acuticornis* MARKHASEVA & SCHULZ, 2006, and *Pseudotharybis polaris* sp. nov.).

The aetideid benthopelagic fauna of the South Atlantic is poorly known as well. Near-bottom Aetideidae have only been recorded by ALVAREZ (1984, 1986) and CAMPANER (1978) from the western part of the Atlantic. In the eastern part, however, the only record of a benthopelagic aetideid species was that of *Bradyidius hirsutus* BRADFORD, 1976 from the Mgzana estuary, South Africa. Collections from the eastern South Atlantic made aboard FS *Meteor* (in 2000) enabled us to compile the first list of benthopelagic Aetideidae from this region, that includes *Prolutamator hadalis* sp. nov., *P. minor* sp. nov. and new species of the genera *Comantenna*, *Bradyetes*, and *Pseudeuchaeta* that await future description (Fig. 12).

With regard to the composition of species, Antarctic and Atlantic near-bottom aetideid faunas demonstrate virtually no similarities and have only a single species, *P. minor*



**Fig. 12.** Geographical distribution of benthopelagic Aetideidae in the Atlantic Ocean including Polar regions (MARKHASEVA, 1996, 1997; MARKHASEVA & SCHNACK-SCHIEL 2003; MARKHASEVA & SCHULZ 2006; SCHULZ 2002; SCHULZ & MARKHASEVA 2000, and unpublished original data).

sp. nov., in common. However, concerning the presence of genera, both faunas appear rather similar. The Antarctic aetideids comprise seven genera, the North Atlantic seven genera and the South Atlantic fauna includes eight genera. Except for *Parabrydium*, the remaining six aetideid genera of the Antarctic near-bottom fauna are found in the Atlantic and four of these, viz. *Comantenna*, *Bradydium*, *Bradyetes* and *Pseudeuchaeta*, are common to all above mentioned faunistic regions. Comparison of the Antarctic and the North Atlantic faunas shows that only *Pseudotharybis* is common to both, but there are no records of *Jaschnovia* MARKHASEVA, 1980 and *Paracomantenna* CAMPANER, 1978 from the Antarctic. The new genus *Prolutamator* occurs in both Antarctic and South Atlantic regions, however, there are no records of *Lutamator*, *Mesocomantenna* ALVAREZ, 1986, and *Paracomantenna* from the Antarctic.

All near-bottom aetideid genera discussed here inhabit deep waters in the Southern Ocean (755 to 4679 m), except for the shallow water species *Comantenna gesinae* and their distributional ranges demonstrate faunistic links between shallow and deep water of the Atlantic Ocean. However, since the near-bottom fauna of the calanoid copepod family Aetideidae is presently insufficiently well known worldwide it is not useful to speculate whether this fauna originated in deep or shallow waters.

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