

On Antarctic species of the genus *Munna* Krøyer, 1839 (Crustacea, Isopoda, Asellota, Munnidae)

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Abstract. — Based on type material from museums, on collections from the European "Polarstern" Expedition (EPOS) and from Polish expeditions to King George Island 16 poorly known and new antarctic and subantarctic species of the genus *Munna* are described. The new taxa were named *Munna arcacauda* n. sp., *Munna amphoricauda* n. sp., *Munna jazdzewskii* n. sp., *Munna longipoda* n. sp., *Munna spicata* n. sp. Some general remarks on the morphology of species of the genus *Munna* and a key for all species from the Southern Ocean are presented.

Résumé. — Sur des espèces antarctiques du genre *Munna* Krøyer, 1839 (Crustacea, Isopoda, Asellota, Munnidae). Seize espèces antarctiques et subantarctiques du genre *Munna*, nouvelles ou peu connues, sont décrites à partir de matériels-types déposés dans plusieurs muséums, de récoltes provenant de l'expédition européenne « Polarstern » (EPOS) et des expéditions polonaises à King George Island. Les cinq espèces nouvelles sont : *Munna arcacauda* n. sp., *Munna amphoricauda* n. sp., *Munna jazdzewskii* n. sp., *Munna longipoda*, n. sp. et *Munna spicata* n. sp. Quelques remarques générales sur la morphologie des espèces du genre *Munna* sont présentées et une clé de toutes celles qui proviennent de l'Océan Sud est proposée.

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INTRODUCTION

Species of the genus *Munna* are usually small and easily overlooked in samples of marine benthos. More than 70 valid species are known, probably only a fraction of the world oceans munnids. It seems that most species occur in the northboreal Pacific and in the Southern Ocean. In the course of ecological and faunistic studies on the Antarctic benthos munnids have often be collected, but until now it was not easy to discern between the 15 known Antarctic species. The present study is based on material collected for surveys of the benthic fauna by several Polish expeditions to King George Island and by the participants of the third leg of the EPOS-expedition with the German RV "Polarstern" to the Weddell Sea. We discovered 5 species new to science and took the opportunity to redescribe several of the already known species.

CHECKLIST OF ANTARCTIC AND SUBANTARCTIC SPECIES OF *Munna*

Asterisks (*) mark the species studied by us.
Patagonian/Magellanic species are not considered herein.

- * *Munna affinis* Nordenstam, 1933
- * *Munna antarctica* (Pfeffer, 1887)
- * *Munna bituberculata* Nordenstam, 1933
- Munna crozetensis* Kussakin & Vasina, 1982
- * *Munna cryophila* Vanhöffen, 1914
- * *Munna dentata* Vanhöffen, 1914
- * *Munna globicauda* Vanhöffen, 1914
- Munna instructa* Cléret, 1971
- Munna kerguelensis* Kussakin & Vasina, 1982
- Munna macquariensis* Hale, 1937
- * *Munna maculata* Beddard, 1886
- * *Munna neglecta* Monod, 1931
- * *Munna pallida* Beddard, 1886
- * *Munna psychrophila* Vanhöffen, 1914
- * *Munna studeri* Hilgendorf, 1893
- * *Munna arcacauda* n. sp.
- * *Munna amphoricauda* n. sp.
- * *Munna jazdzewskii* n. sp.
- * *Munna longipoda* n. sp.
- * *Munna spicata* n. sp.

KEY TO SPECIES OF *Munna* FROM ANTARCTICA AND ADJACENT ARCHIPELAGOS

Due to lack of detailed data the species *Munna crozetensis* could not be considered. NOTE : The characters used in the key are not necessarily diagnostic for the species (see descriptions).

In parenthesis : way backwards (try again).

- 1 — Eyes sessile, not bulging laterally ; pereonites 1-4 of similar width (fig. 1) 3
- 2(1) — Eyes more or less stalked, bulging laterally, pereonites 2 and 3 at least slightly wider than pereonites 1 and 4 5
- 3(1) — Eyes large, occupying posterior half of lateral cephalothorax (fig. 1) *M. pallida*
- 4(3) — Eyes smaller ; endemic to Macquarie Island..... *M. macquariensis*
- 5(2) — Eyestalk slender, anteriorly directed (figs 4, 7), pereonites 1-3 and pleotelson dorsally with strong spinelike setae *M. spicata* n. sp.
- 6(5) — Eyestalks different ; no large spines on pereonites 2, 3..... 7
- 7(6) — Pleotelson inflated, about as long as pereon (fig. 10) 9
- 8(7) — Pleotelson smaller 13
- 9(7) — Coxae with spine-like setae 11
- 10(9) — Coxae only with some slender setae (fig. 10) *M. amphoricauda* n. sp.
- 11(9) — Pleotelson oval (fig. 12) *M. globicauda*
- 12(11) — Pleotelson with a caudolateral edge (fig. 14) *M. arcacauda* n. sp.
- 13(8) — Pleotelson dorsally with caudally protruding acute apex *M. studeri*

14(13) — Coxae 5-7 each with lateral point (in dorsal view) (fig. 18, 24).....	16
15(14) — Coxae rounded (in dorsal view) or with spines.....	20
16(14) — Coxal points also present on coxae 1-4 (fig. 18, 24).....	<i>M. antarctica</i>
17(14) — Coxae 1-4 without points	18
18(17) — Supraocular spine long, acute (fig. 25, 29).....	<i>M. bituberculata</i>
19(17) — Supraocular spine blunt	<i>M. affinis</i>
20(15) — Small species (1-1.2 mm) with serrated lateral margins of pleotelson.....	<i>M. dentata</i>
21(20) — Pleotelson margins not serrated	22
22(21) — Rostral margin with deep medial notch [characters unfortunately not well documented].....	<i>M. instructa</i>
23(22) — Female operculum (Plp 2) ventrally with large spine-like setae	25
24(23) — Spine-like setae on female Plp 2 absent	29
25(23) — Supraocular spines large, hooked; body dorsally with dark chromatophores (fig. 33)	<i>M. maculata</i>
26(25) — Supraocular spines inconspicuous.....	27
27(26) — Eyes very large, dark, pleotelson dorsally with long setae (fig. 34, 38).....	<i>M. longipoda</i> n. sp.
28(27) — Eyes normal, pleotelson dorsally with short hair-like setae (fig. 42, 47) ...	<i>M. jazdzewskii</i> n. sp.
29(24) — Female first tergite lateral parts bent caudally (fig. 53).....	<i>M. neglecta</i>
30(29) — Male Plp 1 apex nearly straight, neither concave nor with prominent lateral horns (fig. 57, 61).....	<i>M. psychrophila</i>
31(30) — Male Plp 1 apical margin laterally concave.....	<i>M. cryophila</i>
32(31) — Male Plp 1 with caudally directed lateral horns	<i>M. kerguelensis</i>

MATERIAL

Specimens discussed in the following were collected during Polish expeditions to King George Island, where samples were mostly taken from the Admiralty Bay.

Further specimens are part of the large collection of benthic invertebrates yielded by the EPOS-expedition of RV "Polarstern" (EPOS = European Polarstern Studies; see report of ARNTZ *et al.*, 1990). Samples were collected with the following gear: AGT = Agassiz trawl; DG = different types of dredges; GSN = bottom trawl; HN = hand nets; MG = multiboxcorer; OTH = other (SCUBA samples, or collected from beach, etc.); VVG = Van Veen Grab.

Type material was obtained from the following institutions: Muséum national d'Histoire naturelle, Paris (MNHN Paris), Museum für Naturkunde in Berlin (MN Berlin), Naturhistoriska Riksmuseet Stockholm (NR Stockholm), The Natural History Museum London (NHM London), Zoologisches Museum Hamburg (ZM Hamburg). In this context we are especially indebted to Ms. Danielle DEFAYE, Ms. Joan ELLIS, Prof. Dr. H.E. GRUNER, Prof. Dr. G. HARTMANN and Dr. Lennard SANDBERG.

Type specimens of new species were deposited in the MNHN (Paris) and the MN (Berlin).

"OC"-numbers refer to Polish collections deposited at the University of Lodz (if not stated otherwise).

SOME GENERAL REMARKS ON THE MORPHOLOGY OF SPECIES OF THE GENUS *Munna*

All species of *Munna* are rather similar in several characters of body form and antenna. Though the variability within the genus is large and we do not attempt to reconstruct a ground pattern for the genus some features should be mentioned.

Munna species at first sight may look like small spiders due to their very long legs. These can be 1.5 times longer than the body. Lateral parts of pereonites 5-7 are always directed posteriorly. The cephalothorax is usually wider than long (often more than twice), with laterally protruding eyes. Many species, though not all, have distinctly stalked eye. The insertions of the antennae form a deep sinuosity in the frontal cephalic margin, between the "rostral margin" and the eye. The "rostral margin" marks the insertion of the clypeus and usually bears slender setae and thicker spine-like setae. The broad frontal lobe of the dorsal cephalothorax, situated between the antennae is called in the following "pseudorostrum". The lateral lobe that bears the eye usually has a frontal laterally curved spine-like projection (called in the following "ocular spine"), laterally supporting the antenna 1. Antenna 1 of very characteristic form: articles 1 and 2 broad, next two articles short and slender, forming the deflecting area of the appendage, followed by a varying number of long articles (minimum: 2); the last article is the shortest; usually only 1 aesthetasc on each of the two last articles, rarely a third aesthetasc, on first two articles 1-3 feather-like bristles. The first 3 articles are homologous to the antennular peduncle of other isopods. Antenna 2 much longer than antenna 1; last two peduncular articles longest (8-10 times as long as broad), but frequently lost in fixed material; articles 1-4 slightly broader than 5-6, about as long as broad, peduncular article 3 slightly longer, on 3 and 4 (and sometimes previous ones) few setae and sensory-spines, flagellum multiarticulated. On all appendages and on other surfaces occur slender setae of varying length and spine-like setae (cuspidate setae of WATLING, 1989), which typically show distally an additional sensory hair (complex spines or sensory spines described by BRANDT, 1988).

The mouthparts show little variations, intraspecific variability concerning e.g. number of setae complicate the search for species specific characters. Characteristic for almost all species of *Munna* studied by us is a mandibular palp with 3 terminal setae accompanied by a tiny sensillum. A similar sensillum is also seen distally on the second palpal article, where usually 2 plumose setae insert, article 2 and 3 usually bear several groups of small setulated scales on one side, on articles 1 and 2 few simple setae occur. Lacinia mobilis of left mandible always larger than on right mandible, where it seems very similar to spines from "spine row". The mandibular "spine row" is always composed of 4 serrated spine-like setae. Molar dentated, masticatory surface oval, concave, with a group of many small setae on distal side and few setae on proximal margin. Pars incisor consist of 4-5 blunt teeth. Mx1 outer endite longer and twice as broad as inner one, bearing apically 12-13 spines of varying shape and length (shortest 3 times shorter than longest), partly serrated, sometimes setulated. Inner endite usually tapering distally, curved, with four spines, two proximal longest, usually densely setulated, third shorter and sparsely setulated, distal one shortest and smooth. Lateral margins of both endites and sometimes medial margin of outer endite with thin setation.

Mx2 outer and medial endite similar in shape, both bearing apically 3 setulated and one shorter combed spine. Inner endite twice as broad as two previous ones, with complicated setation on distal part consisting of 2-3 long, plumose setae on medial margin, 2-3 serrated spines and a varying number of long, slightly setulated setae apically, nearer to the lateral margin, furthermore several single small setae on medial margin, on ventral surface and sometimes on lateral margin.

The maxillipedal endite has apically a complicated setation, with two rows (dorsal and apical) of short feather-like setae and ventral row of very thin, often nearly invisible scale-like setae (resembling similar setae on the P1 of serolid isopods). The maxillipedal palp always

consists of 5 articles showing little variation in shape, the number of setae varies intraspecifically; the last article usually bears 3-6 apical setae, 2 of which are distinctly broader and annulate. Article 1 shortest, 2 longest and broadest, trapezoidal, 3, 4, and 5 slightly shorter than second, each twice as narrow as previous one. Epipodite oval.

The first pereopod is sexually dimorphic, growing from moult to moult in maturing males, reaching sometimes an extraordinary width and length. These features are useful to identify species, but in small or immature specimens the morphology of the P1 is always very similar: the trapezoidal carpus bears on the ventral margin some simple setae and sensory spines, the number varying with age, usually 2 long sensory spines on the distal ventral edge; the propodus is long-oval and bears only 2 central sensory spines on the palm and some additional simple setae. The number of spines increases with age.

In P2-P7 basis and merus usually comparatively short, ischium slightly longer, carpus and propodus always the longest articles, in P2-P3 similar in length, in next legs propodus distinctly (sometimes two times) longer and in all pereopods twice narrower than carpus. Dactylus with two claws, one of these shorter. On each article a varying number of setae. Sensory spines on carpus and propodus very frequent, variously arranged; usually 2-3 on disto-medial edge of merus and 1-5 on lateral margin of ischium. Furthermore 2-3 feather-like bristle located on basis and one on distal part of propodus. Pleopods vary little; especially the male Plp1 often has a species-specific shape, but sometimes there are also characteristic sensory spines on Plp2 of both sexes. Plp3 and Plp4 with two articulate exopod surpassing tip of endopod. Endopod of Plp3 bearing 3 and exopod of Plp4 2 long plumose setae (swimming). Plp5 uniramous, oval, without setation. Urp — endopod reduced to a single setae, exopod cylindrical, twice as long as broad, usually with two groups of setae — one laterally and one apically. Anus not covered by pleopods.

A last remark: we decided to keep the written descriptions short, they should complement the information contained in the figures.

List of abbreviations used in text and figures

A1, 2 = antenna 1, 2; (F) = female; Hph = hypopharynx (lower lip); Labr = labrum (upper lip); lMd = left mandible; (M) = male; Md = mandible; Mx1, 2 = maxilla 1, 2; Opc = operculum (female Plp2); P1-7 = pereopods 1-7; Plp1-5 = pleopods 1-5; Plt = pleotelson; rMd = right mandible; Urp = uropods.

1. *Munna pallida* Beddard, 1886

(Figs. 1-3)

MATERIAL: Sample OC-500 VVG (Admiralty Bay, central part, 156 m) (1 immature female 4 mm).

DISTRIBUTION: New locality: South Shetland Islands, King George Island, Admiralty Bay. Further records: Falkland Islands, Kerguelen, and Crozet Island, Vestfold Hills, Rauer Islands (NORDENSTAM, 1933, TUCKER & BURTON, 1987).

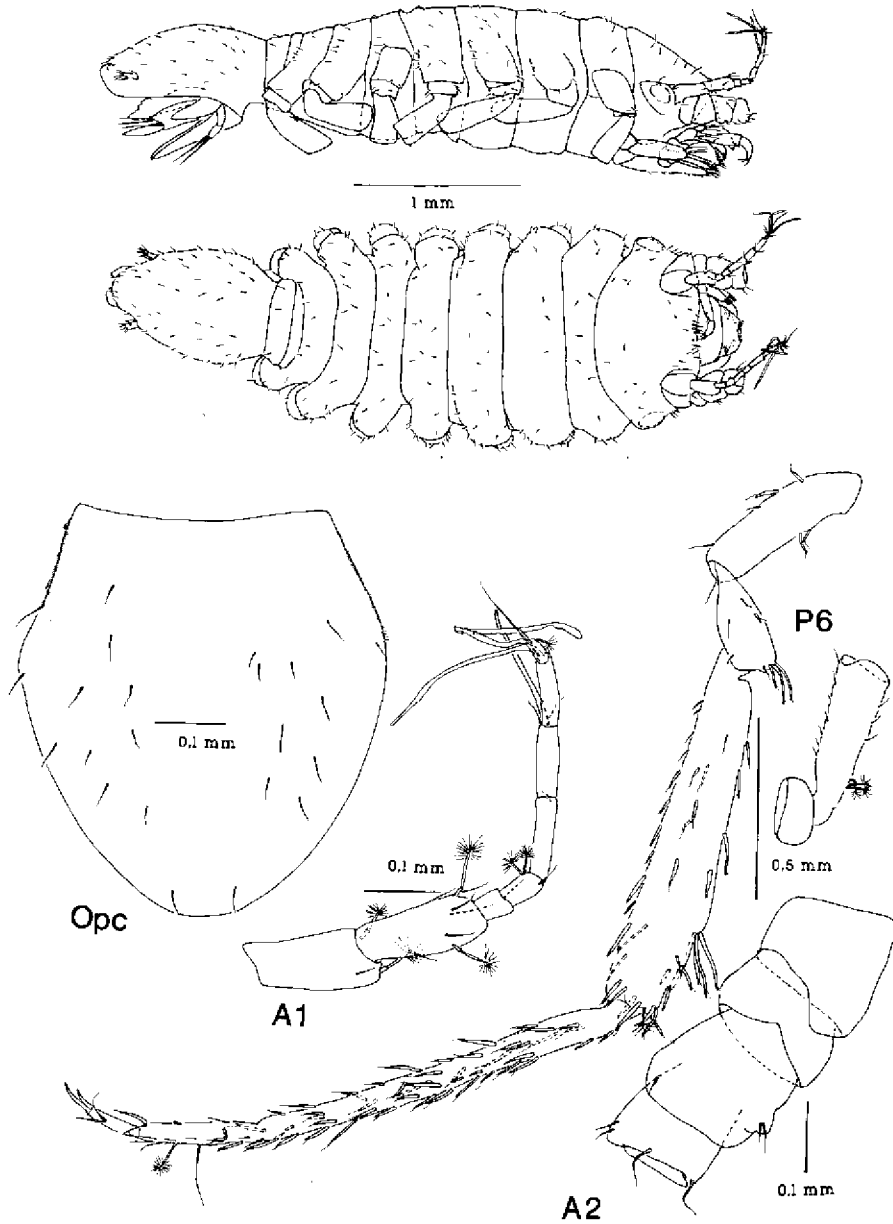


FIG. 1. — *Munna pallida* Beddard, 1883 : dorsal and lateral view of immature female of 4 mm length ; A1, A2, P6 and Opc of this same specimen.

REDESCRIPTION

Female

Body (fig. 1) not strongly convex dorsally, in dorsal view long oval relatively slender. Eyes not stalked, eyelobes very short. Ocular spine triangular, pointed, not curved laterally, with few small setae on lateral margins. Pseudorostrum nearly $1/2$ as long as cephalothorax and slightly less than $1/2$ of its width. Rostral margin straight, bearing few sensory spines and setae.

Pereonites 2 and 3 longest, first medially $1/2$ as long as next two ones, but laterally of similar length. Pereonite 4 somewhat shorter than 2 and 3. Pereonites 5-7 about $3/4$ as long as pereonite 4. Coxae 2-7 visible in dorsal views rounded. Second free pleonite slightly shorter than last three segments of pereon, first $1/2$ as long as second one. Pleotelson little more than $1/4$ of length of the body. On dorsal surface of cephalothorax, pereon, and pleotelson few short setae dispersed nearly evenly. On each coxa few short setae.

A1 (fig. 1) consisting of 8 articles, on each of first 3 articles two feather-like bristles, 3 aesthetascs on last 3 articles.

A2 (fig. 1) flagellum and 2 last peduncular articles lost in our material, peduncular articles 3 and 4 bearing few setae.

Md (fig. 2) palpal articles 1 and 3 similar in length, second somewhat longer, on first two simple setae and few cuticular scales, on second only 2 setae on one side and distally two plumose setae and one tiny sensillum. Lacinia mobilis of rMd serrated, like setae in setal row. Molar with 4 setae on proximal margin and group of small setae on opposite side, incisor with 5 tooth. Lacinia mobilis of IMd solid, bearing 4 teeth; on molar long setae on proximal margin absent.

Mx1 (fig. 2) outer endite bearing 12 partly serrated spines, its lateral margin with three groups of very small setae, on medial margin few setae on its central part and group of longer setae distally. Similar long setae on lateral margin of inner endite, in addition to 4 apical spines. Mx2 (Fig. 2) on endite 2 plumose and 3 serrated setae. On distal margin and ventral surface group of 8 long setulated setae.

Mxp (fig. 2) on endite ventral row consisting of 5 scale-like setae, apical row with 8 and dorsal with 7 setae. More proximally on medial margin 2 long plumose setae and 3 coupling hooks at height of second palpal articles. Third palpal article with disto-medial edge rounded, protruding medially, free distal margin of this article straight.

Of pereopods only P6 present in our material; its basis and ischium similar in length, merus shorter. Ischium bearing 4, merus 3 sensory spines. On merus and propodus sensory spines on all surfaces, furthermore on carpus concentrated in two groups, one distally and second subdistally on lateral margin (fig. 1).

Opc (fig. 1) oval, with setae almost only on ventral surface, on proximal parts of lateral margins rows of small cuticular hairs visible.

Plp3 (fig. 3) endopod with three plumose setae distinctly surpassing tip of exopod, second article of exopod with three setae located near lateral margin. Plp4 (fig. 3) with the

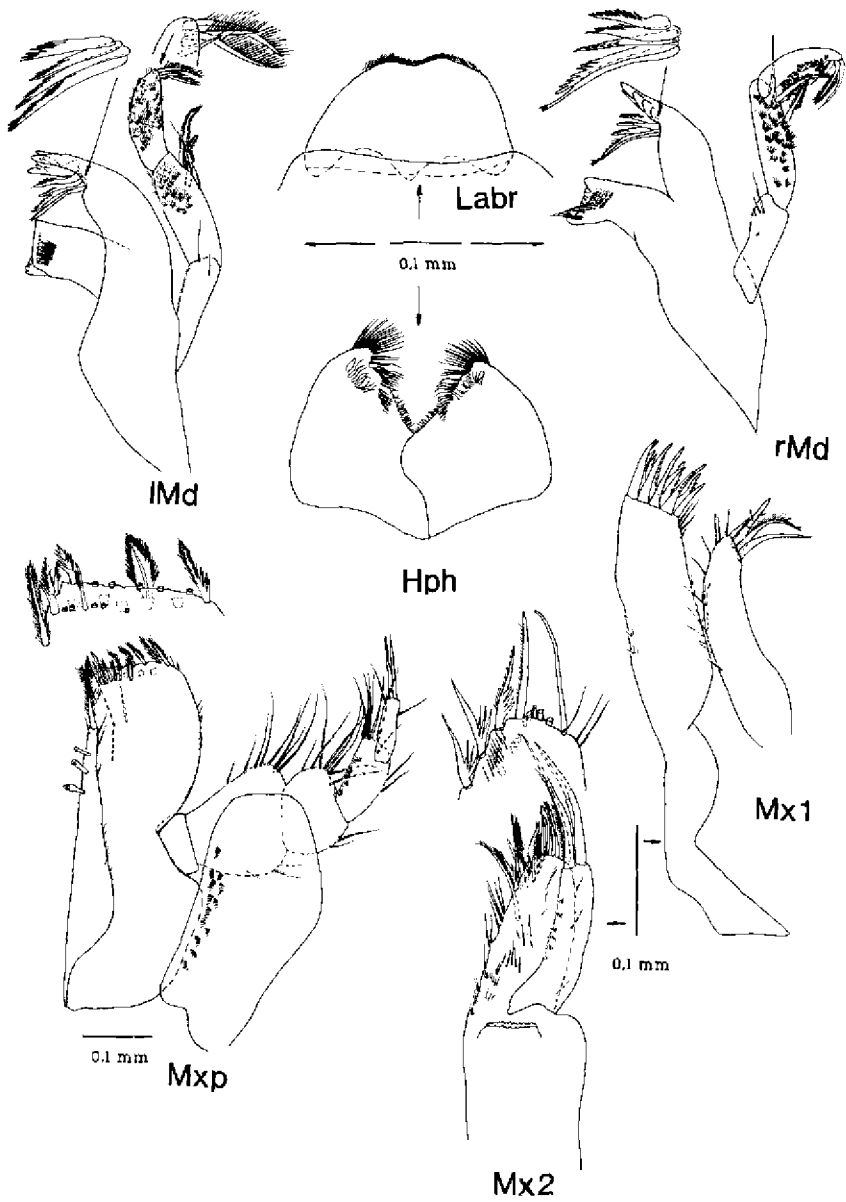


FIG. 2. — *Munnia pallida* Beddard, 1883 : mouthparts of immature female of 4 mm length.

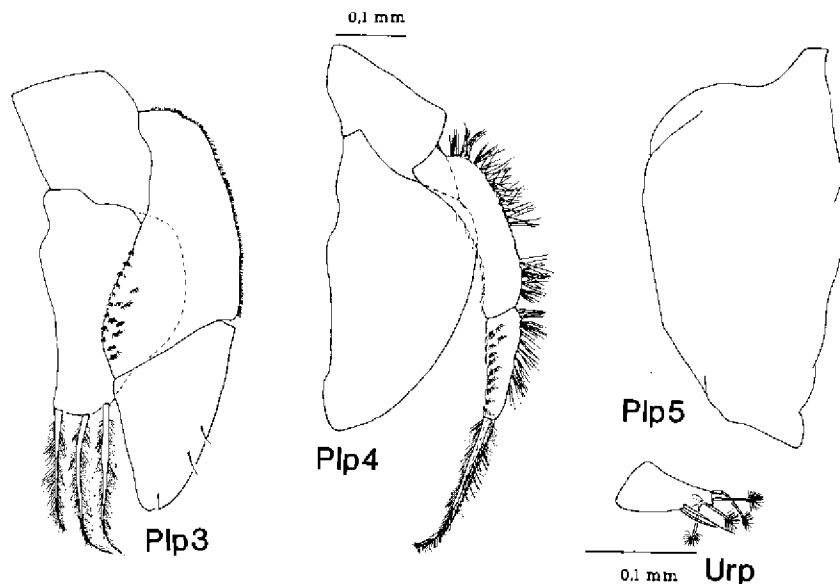


FIG. 3. — *Munna pallida* Beddard, 1883 : Plp3, 4, 5 and Urp of immature female of 4 mm length.

characteristic shape of species of the genus *Munna*, furthermore bearing row of small setulated scales on medial margin on first exopod article. Urp (fig. 3) with two setae laterally and 4 feather-like bristle apically.

REMARKS : In our material we found only one female of *M. pallida* almost without legs, unfortunately without first pereopods, which makes our determination more problematic. However, the unique shape of the body and particularly the very characteristic cephalothorax with sessile eyes, not known from other Antarctic species, resembles the description presented by NORDENSTAM (1933).

2. *Munna spicata* n. sp.

(Figs. 4-9)

MATERIAL : Holotype : sample OC-324 DG (Admiralty Bay, central part, 430 m) (immature female 2.5 mm length ; ZM Berlin 26984) ; paratypes : sample OC-347 GSN (61°44.2'S 58°16.7'W, 260-285 m) ; male 2.5 mm ; male 2.5 mm ; male 2 mm ; immature female 2 mm ; male 2.3 mm (immature female 1,8 mm). — Further material used for description : sample OC-s345 GSN (60°59.7'S 55°57.2'W, 240-260 m) (1 immature female 2.2 mm) ; sample OC-347 GSN (61°44.2'S 58°16.7'W, 260-285 m) (3 males 2-2.5 mm, 4 immature females 1-2.5 mm, 1 ovigerous female 2.5 mm) ; sample OC-547 VVG (Admiralty

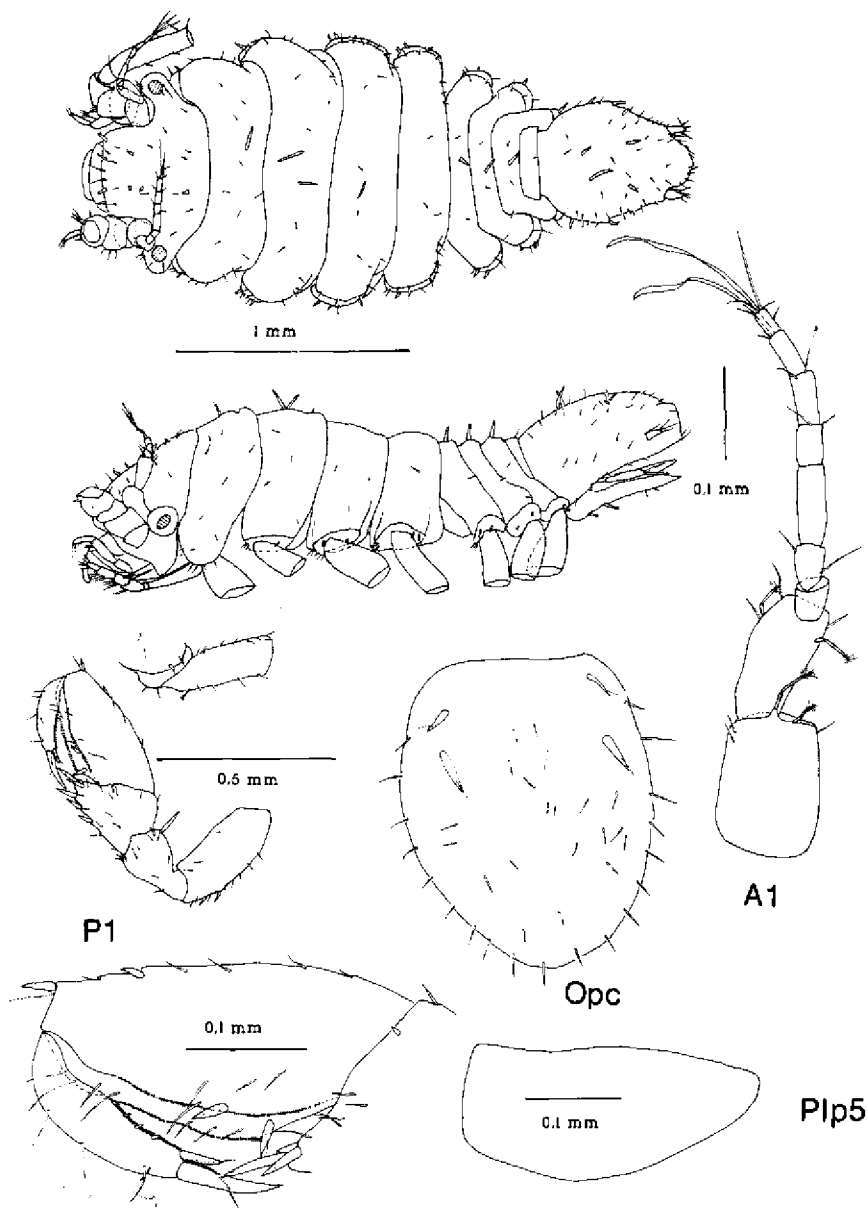


FIG. 4. — *Munna spicata* n. sp. : dorsal and lateral view of immature female 2.5 mm length (holotype) from King George Island, and A1, P1, Opc, Plp5 of this same specimen.

Bay, Ezcurra Inlet 330 m) (1 male 2 mm). — **Material from EPOS-expedition** : St. 245 (74°39.7'S 29°41.6'W, 483m) : 1 immature specimen 2.3 mm in sample AGT 9; 1 male 2.6 mm in sample MG 10 (4). EPOS St. 278 sample MG 20 (71°29.3'S 12°32.1'W, 537 m) (1 male 3.2 mm); St. 290 sample AGT 24 (71°5.9'S 12°34.0'W 522 m) (1 female, 4 mm) (deposited specimens : MNHN Is 3044-3047).

DISTRIBUTION : Only known from the new localities : King George Island (down to 430 m); Weddell Sea, 483 m.

DESCRIPTION

Female

Female holotype (fig. 4) : anterior body dorsally convex, in dorsal view long oval. Cephalothorax convex with few setae and sensory spines on dorsal surface. Eye small, stalked, eyelobe anteriorly directed, not protruding beyond the lateral margin of first segment. Eyelobes without ocular spines. Rostral margin straight, with four sensory spines and setae. Pseudo-rostrum rectangular, more than 1/2 as long, and almost 1/2 as wide as cephalothorax. Pereonites 1 and 4 of similar length. Lateral parts of first two pereonites directed anteriorly, segments 3 and 4 straight. First pereonite narrower than next three ones, pereonites 5-7 shorter, about half as long as 1-4 medially. On pereonites single sensory spines visible, member of spines probably varying; furthermore on each segment on dorsal surface and lateral margin few simple short setae. Coxae 2-7 visible in dorsal view, rounded, each with 2-3 short sensory spines. Second free pleonite slightly shorter than pereonites 5-7. Pleotelson oval, dorsally convex in lateral view, apex not concave. On dorsal surface and lateral margins of pleotelson few sensory spines in different length.

Female A1 (fig. 4) consisting of 9 articles with two aesthetascs on two last articles, with two feather-like bristles on first and second article. Second article of flagellum about twice as long as next ones.

A2 known only from male specimens.

Md (fig. 5) first palpal article half as long as second and third, with two setae distally. Second article with one or two simple setae on distal part and on opposite side 2 plumose setae, the additional small sensillum usually seen in other species of the genus absent. Incisor with 5 blunt teeth. Lacinia mobilis in rMd like seta in setal row. Molar with four setae on proximal margin. lMd differs from right one in solid lacinia with four blunt teeth, on proximal margin on molar only 2 setae visible.

Mx1 (fig. 5) outer endite with 12 spines apically, some of these serrated. Inner endite bearing 12 spines and additionally 3 simple setae on distal lateral edge. Lateral margins of both endites bearing few small setae.

Mx2 (fig. 5) on inner endite 2 plumose and two serrated setae and row of four long setulated setae. Combed spine on medial and on outer endite shorter than the other three spines.

Mxp (fig. 5) setation of endite not clearly distinguishable in the part mounted on slides. Third palpal article almost rounded without protruding disto-lateral edge. 3 coupling-hooks on lateral margin in height of proximal part of second palpal article.

Female P1 (fig. 4) carpus comparatively short, trapezoidal, with three short sensory spines on ventral margin and 3 ones on ventro-distal edge. Propodus long oval with 2 sensory spines on palm in its proximal part further two ones on dorsal margin.

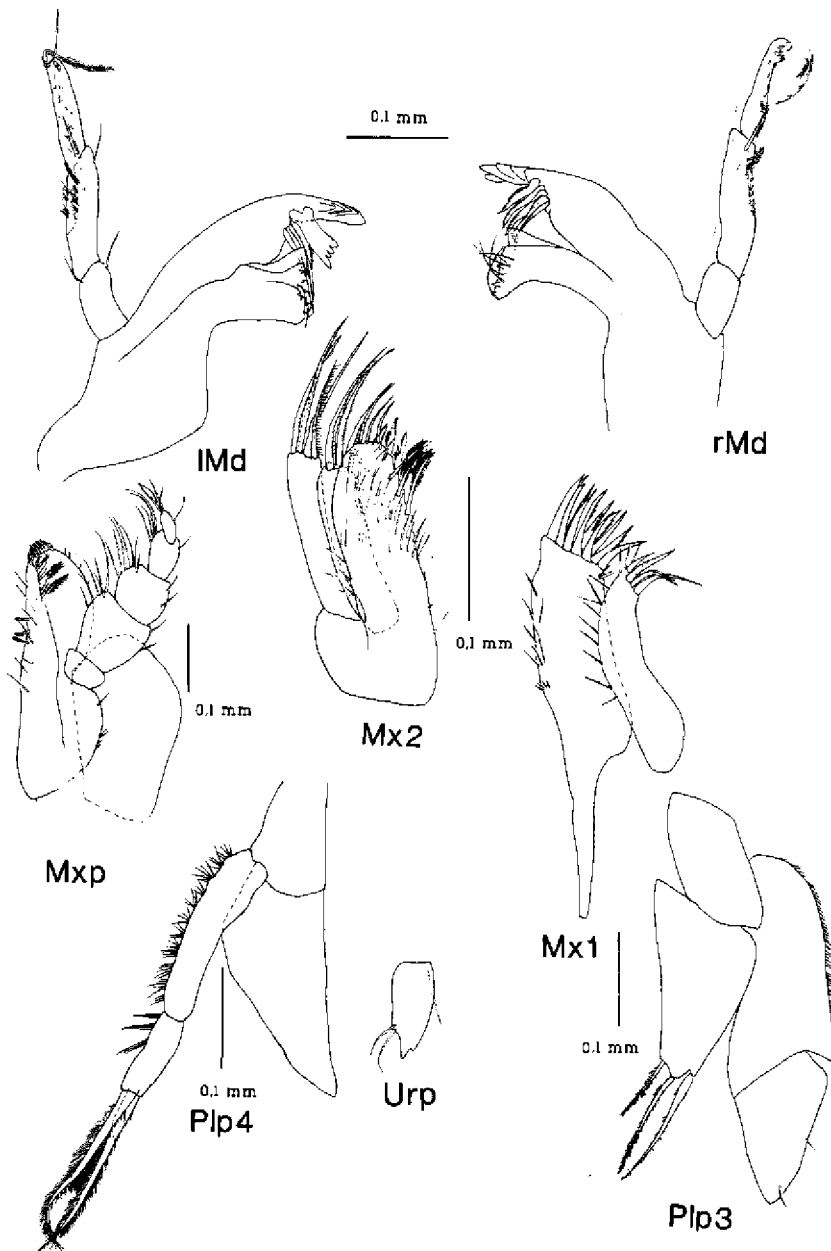


FIG. 5. — *Munna spicata* n. sp. : mouthparts, Plp2 and 4 of immature female 2.5 mm length (holotype) ; Urp of paratype female (2 mm length).

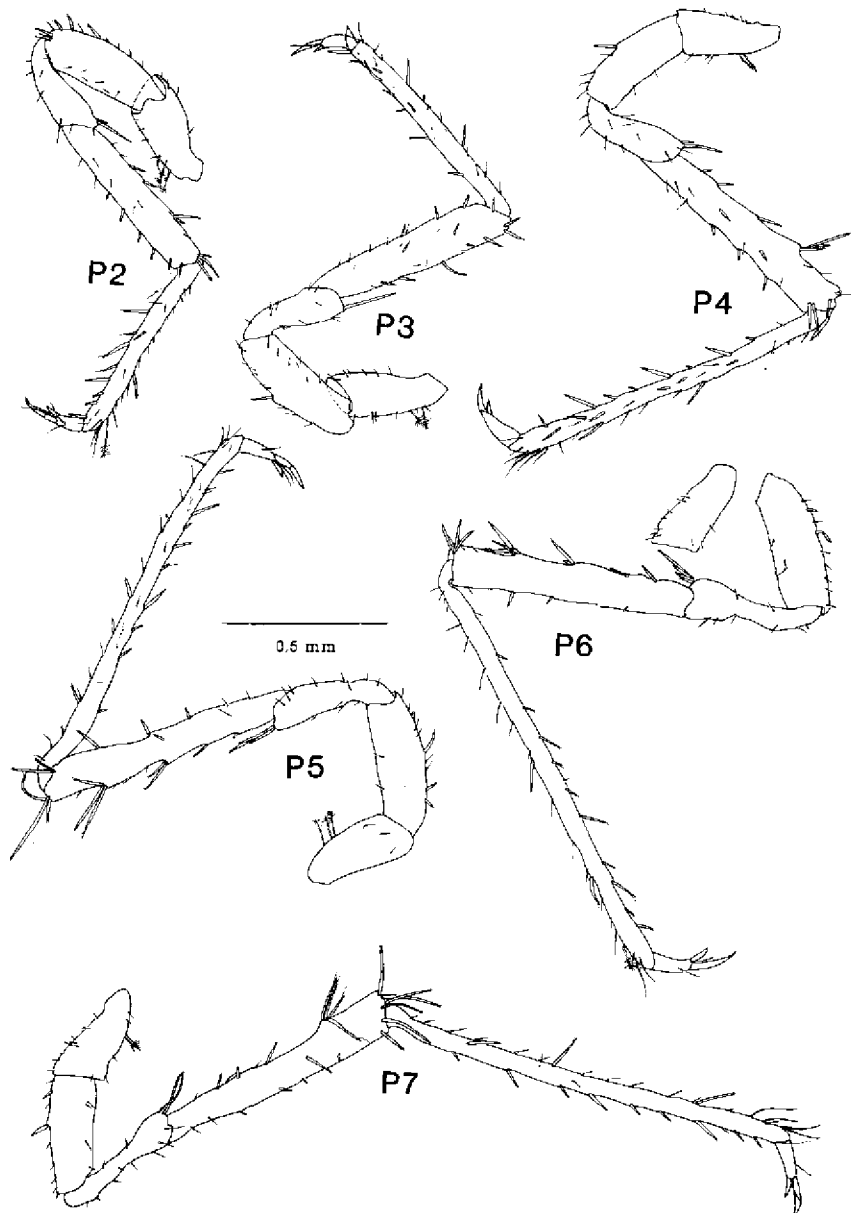


FIG. 6. — *Munna spicata* n. sp. : P2, 3, 5, 6 and 7 of immature female (2.5 mm length, holotype) ; P4 of immature female (2 mm length).

P2-P7 (fig. 6) merus and ischium similar in length, basis usually slightly shorter. On ischium 1-5, on merus 2-3 sensory spines. Sensory spines in comparison with other species of *Munna* not very abundant, sometimes forming on carpus two groups, one distally and one subdistally on dorsal margin. On propodus sensory spines on both margins.

Operculum (fig. 4) oval, with two pairs of sensory spines located on proximal part, nearer lateral margins. On ventral surface and margins several simple setae.

Plp3 (fig. 5) with exopod surpassing endopod, second article only with two setae on distal margin. Plp4 (fig. 5) second exopod article without setae on medial margin.

Urp (fig. 5) bearing only two simple setae on laterally, feather-like bristles on distal margin not visible.

Male

First pereonite much longer than in female, more than twice as long as next segments. Pereonites 2-4 of similar length, 5-7 shorter, about $\frac{3}{4}$ as long as 2-4. Specimen from South Shetlands on pereonite 1 four sensory spines on medial part, on second 2 sensory spines. Segments 3 and 4 with only few simple short setae, on 5 and 6 one, and on 7 three sensory spines. Spines on cephalothorax longer than in female, furthermore on rostral margin without simple setae. Specimens from Weddell Sea (fig. 9) with more spines, patterns variable. A1 of 10 articles, last 6 bearing one aesthetasc each (!).

A2 (fig. 8) third peduncular article bearing 1 sensory spine and few setae, fourth only setae. Very characteristic are articles 5 and 6, which bear apart simple setae also comparatively many sensory spines — about 10 on each article. Flagellum consisting of 30 articles. P1 longer than in female but in comparison with other species of *Munna* quite short. Carpus trapezoidal, only slightly broader in distal part. Ventral margin bearing 5 sensory spines and few setae. On dorsal margin only simple setae. Ventro-distal edge protruding distally forming two blunt teeth, occupying almost all of free distal margin of carpus. Propodus about $\frac{3}{4}$ as long as carpus, with deep sinuous palm. On dorsal margin 3 sensory spines, on palm only setae. Plp1 broader in proximal part, bearing proximally on ventral surface 3 pairs of sensory spines and on distal part few long setae. Distal margin straight, bearing 7 setae, disto-lateral edge concave, lateral horn located above of it, on lateral margin.

Plp2 protopod with many setae on lateral margin, mostly concentrated on distal part, few setae on ventral margin. Distal tip blunt, without setae, endopod not reaching tip of protopod.

Further variations : Ornamentation on dorsal surface, length and number of dorsal and coxal spines depend on age and locality. Specimens from the Weddell Sea have a richer dorsal ornamentation than those from the South Shetlands, but there are also individual variations (compare pleotelson drawings in fig. 9).

REMARKS : With its strong dorsal spines this species can not be confounded with any other Antarctic munnid. The elongated and broad first pereonite of the mature male occurs in several but not all species of *Munna* (e.g. : *Munna longipoda* n. sp., *Munna globicauda*), in the new species this feature occurs in very small males (about 2 mm length). The function of this sexual dimorphism is not clear and it is not known whether it evolved more than once. Strong spines

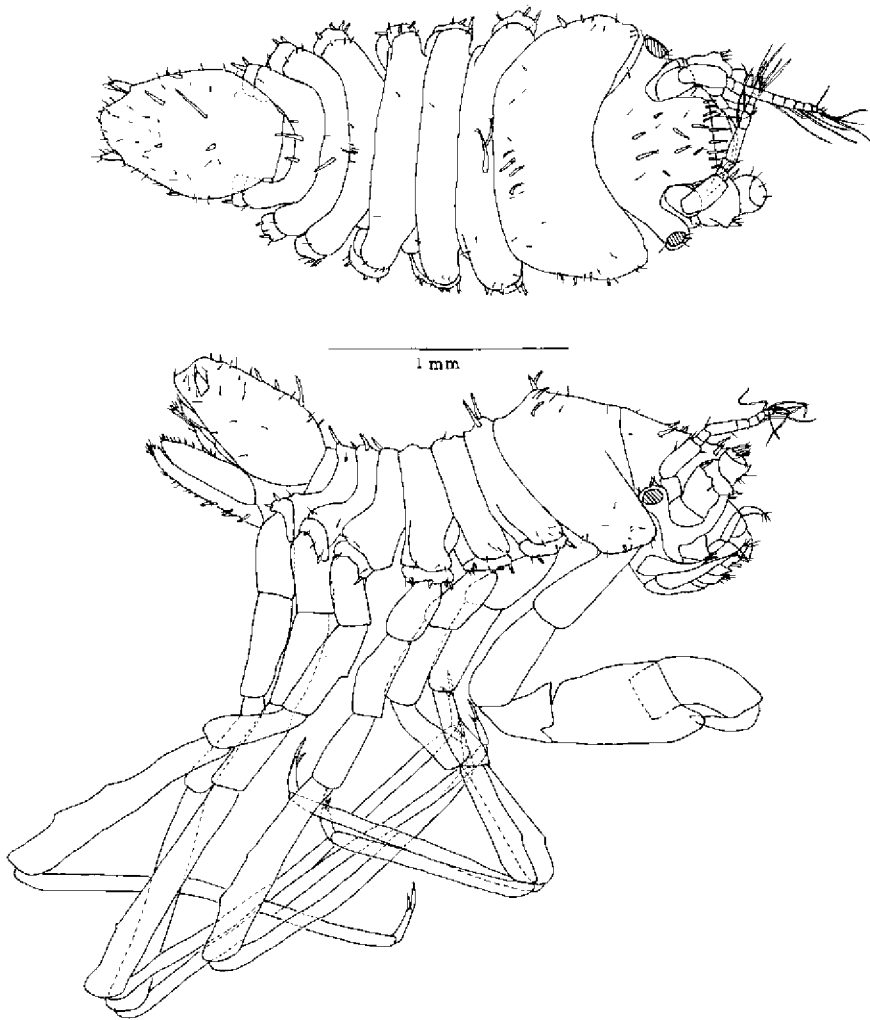


FIG. 7. — *Munna spicata* n. sp. : dorsal and lateral view of male (2.5 mm length).

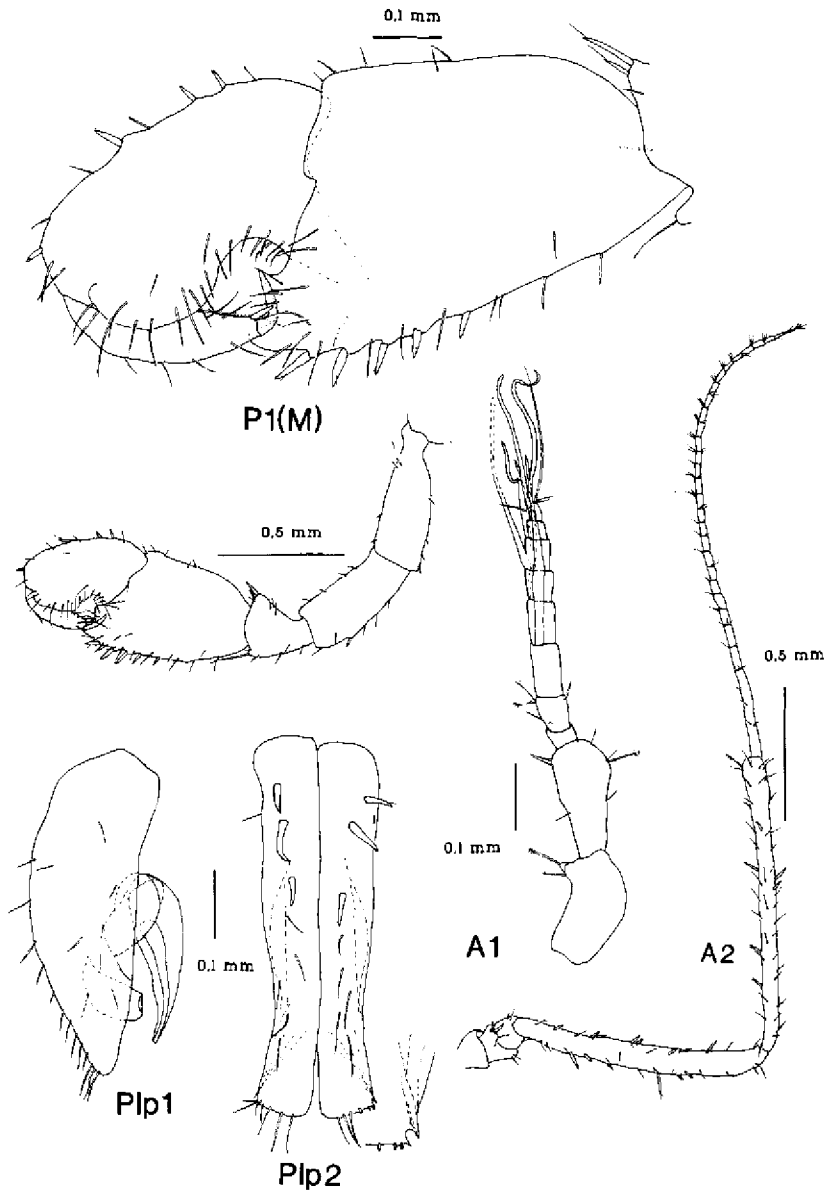


FIG. 8. — *Munna spicata* n. sp. : Plp1 and Plp2 of 2.5 mm male ; P1, A1 and A2 of second specimen of male (also 2.5 mm length).

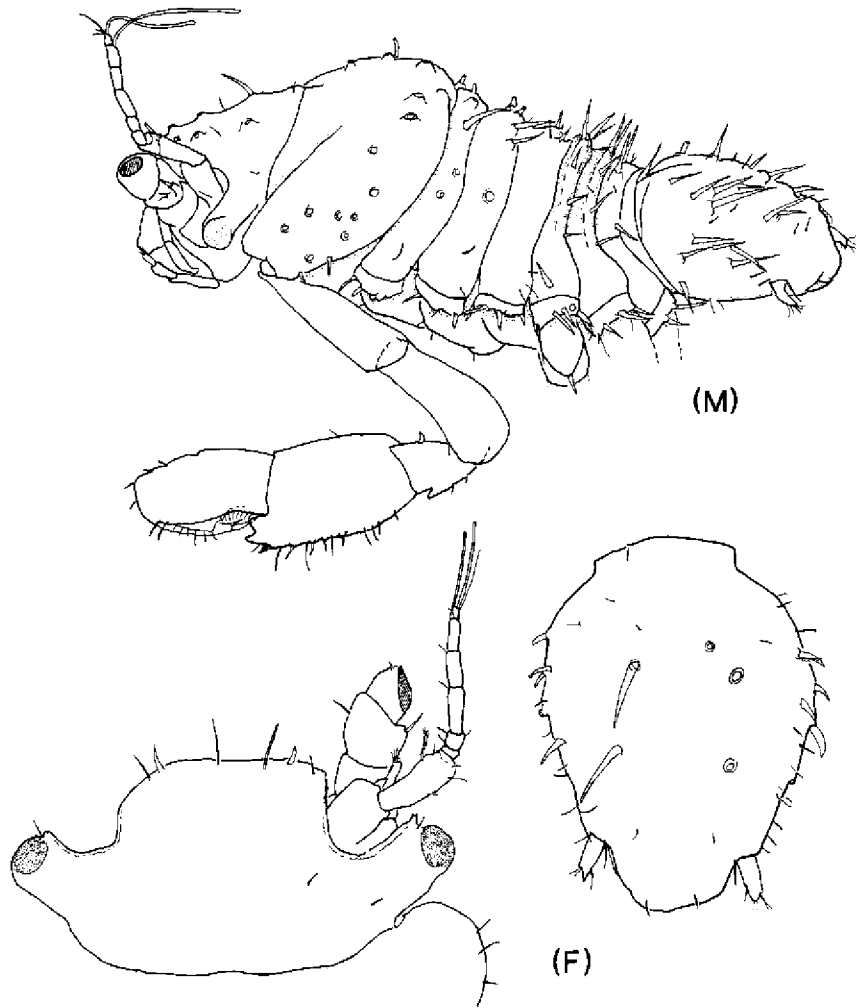


FIG. 9. — *Mumma spicata* n. sp., specimens from the Weddell Sea : adult male (2.6 mm) in lateral view and cephalothorax and pleotelson of immature female (2.3 mm) in dorsal view.

ventrally on the female operculum also occur in *M. maculata*, *M. longipoda* n. sp. and *M. jazdzewskii* n. sp. None of the latter species has the same slender eyestalks and the dorsal ornamentation. Seen in *M. spicata* n. sp.

3. *Munna amphoricauda* n. sp.

(Figs. 10, 11)

MATERIAL : Holotype : EPOS St. 292, sample MG21 (71°3.8'S 12°42.1'W 561 m) (1 immature female 2.5 mm) (MNHN Is 3048); paratype : EPOS St. 245, sample AGT 9 (74°39.7'S 29°41.6'W, 483 m) (1 male 2.5 mm, damaged) (MNHN Is 3049).

DISTRIBUTION : Only known from the new localities; Weddell Sea, 483-561 m.

DESCRIPTION

Anterior pereon dorsally convex, pleotelson elongated-oval, dorsally convex, inflated (as in *M. globicauda*, but longer). Eyes relatively small, eyestalks short and not as broad as in *M. globicauda* (fig. 10). Length of pseudorostrum less than 50 % of cephalothorax length, rostral margin bearing 3 pairs of long setae (can be partly lost). Tergites without spines, bearing dorsally and dorsolaterally few long setae. Pereonite 2 in immature female longest and broadest, pereonites 3-7 of decreasing size (fig. 10). Coxae in dorsal view laterally rounded, not pointed, without spines. Pleotelson nearly as long as the pereon, adorned with some long setae, spines absent (fig. 10). Small uniramous uropods visible in dorsal view. Anus not covered by pleopods.

A1 consisting of 8 articles, second article with long plumose setae, short plumose setae on fourth article (= first flagellar article of other isopods). Last 2 articles each with a single long aesthetasc. Mandibles with boader lacinia mobilis on left mandible (fig. 10). Mx1 with 11 terminal spines on lateral endite, 2 shorter setae distally on medial margin; medial endite with 4 spines, one of these thick (fig. 11). Mx2 lateral and central endite each with only 3 long apical setae, medial endite with 13 setae; of the latter 3 setae of medial margin combed (with fine setules). Mxp : see fig. 11. Pereopods missing in our specimens. Female operculum roughly ovate, terminal slightly pointed, with few pairs of long setae on ventral surface (fig. 11). Plp3 and 4 as typical for the genus (fig. 11). Male Plp1 with truncate apex, lateral horns projecting caudally. Male Plp2 sympod lateral margin with fine cuticular hairs; ventrally some simple setae (fig. 11).

REMARKS : At first sight similar to a small *Munna globicauda*, but eyelobes more slender and less protruding. The inflated pleotelson reminds of *Munna globicauda* and *Munna arcacauda* n. sp., but it is more elongated, the coxae of *Munna amphoricauda* n. sp. are smoother than in the other two species. Another similarity of *Munna amphoricauda* n. sp. shared with *Munna globicauda* are the large, caudally directed lateral horns of the male Plp1. It might be that these 3 species are closely related.

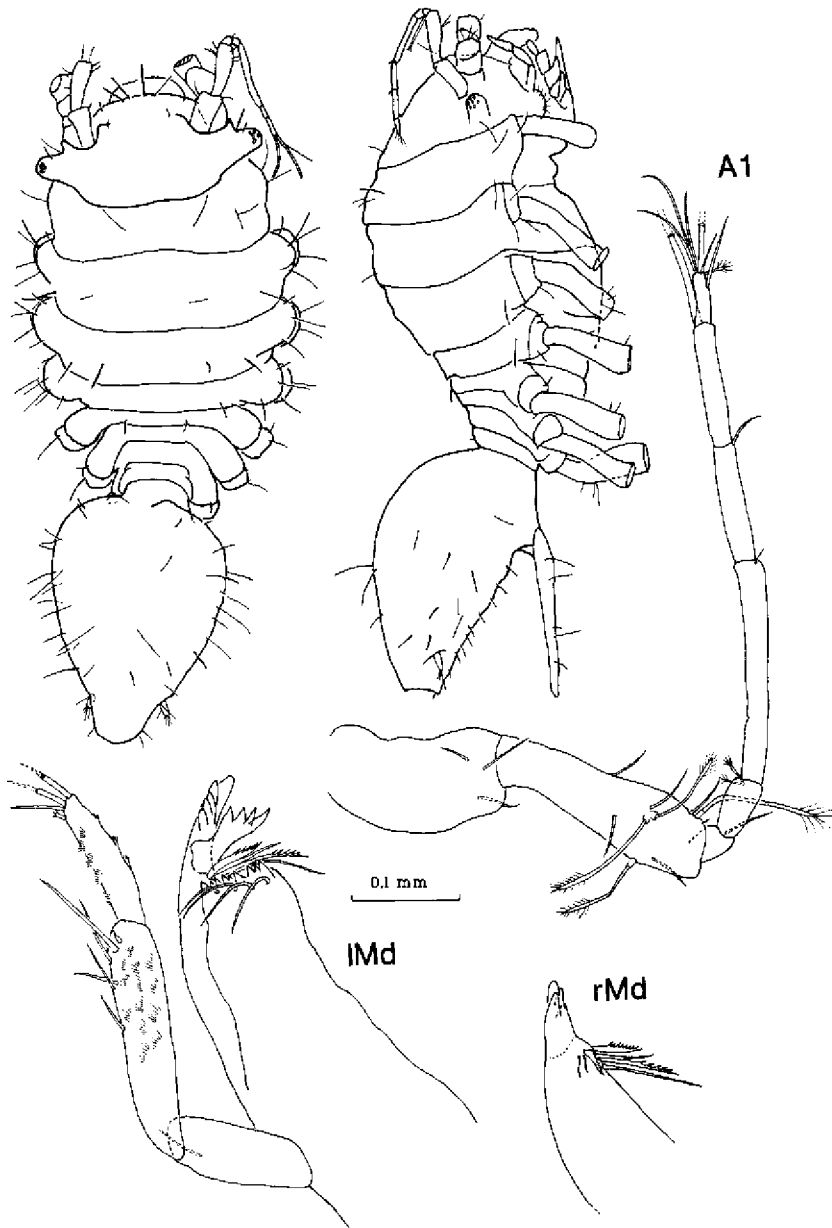


FIG. 10. — *Munna amphoricauda* n. sp. : holotype (immature female, 2.5 mm).

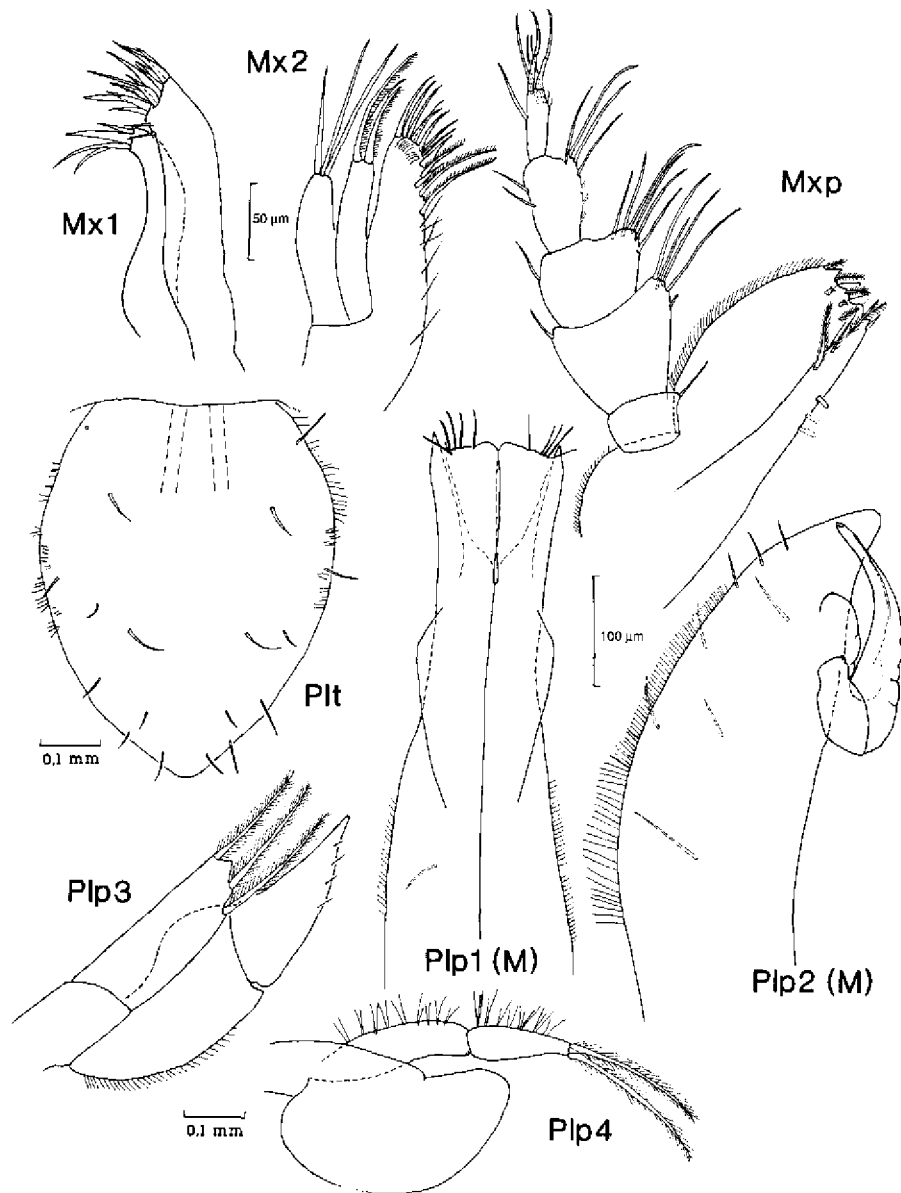


FIG. 11. — *Munna amphoricauda* n. sp. (F) : holotype (immature female, 2.5 mm); (M) : paratype male (2.5 mm specimen).

4. *Munna globicauda* Vanhöffen, 1914

(Figs. 12, 13)

MATERIAL : Syntypes from the Gauss station, Deutsche Südpolarexpedition 1901-1903, Posadowsky Bay (66°2'9"S 89°38'5"E, 385 m), Zoologisches Museum Berlin no. 17724. — **Weddell Sea** : EPOS-St. 217 60°37.6'S 46°58.1'W 237 m (1 immature specimen); EPOS-St. 224 (71°15'S 12°59.8'W 193 m) (1 immature female 7.5 mm); EPOS-St. 230, sample AGT 5 (75°12.8'S 26°59.4'W 244 m) (1 juvenile 2 mm, 2 immature females 4-5 mm); EPOS-St. 245, sample AGT 9 (74°39.7'S 29°41.6'W, 483 m) (1 male 5.1 mm); EPOS-St. 271, sample AGT 15 (73°17.0'S 20°59.4'W, 399 m) (1 male 4.6 mm); EPOS St. 274 (71°37.1'S 12°10.9'W, 211 m) (1 male 5 mm); EPOS-St. 284, sample GSN 13 (71°12.0'S 13°14.0'W, 402 m) (fragment of 2.8 mm); EPOS-St. 290, sample AGT 24 (71°5.9'S 12°34.0'W 522 m) (1 immature female 4.1 mm) (deposited material : MNHN Is 3029-3030, 3050-3056). — **Material from the South Shetlands** : sample OC-272 DG (Admiralty Bay, Ezcurra Inlet 70 m) (1 male 8 mm, 1 specimen without pleotelson about 7 mm); sample OC-347 GSN (61°44.2'S 58°16.7'W, 260-285 m) (1 immature female 1.8 mm); sample OC-472 VVG (Admiralty Bay, central part, 245 m) (1 male 4.5 mm); sample OC-515 VVG (Admiralty Bay, central part, 175 m) (1 male 5 mm, 1 immature female 2.5 mm).

DISTRIBUTION : Eastern Antarctica : Gauss Station, Adelie Land; Davis Sea; Weddell Sea; South Shetlands; 26-522 m (AMAR & ROMAN, 1973, KUSSAKIN, 1982, VANHÖFFEN, 1914; present paper)

REMARKS

Figures 12 and 13 show some features of the specimens collected in the Weddell Sea. Though the species is easily recognized by its inflated and spinose pleotelson, there seem to be some differences between individuals and comparing local populations. AMAR & ROMAN (1973) illustrated a specimen from the archipelago of Pointe Géologie with a transverse row of spines dorsally on pereonite 1. Our material from the Weddell Sea has in this place a transverse ridge with only 2 pairs of spines. Not all specimens have strong spines on the pleotelson (fig. 12).

M. globicauda from the South Shetlands has according to the few specimens we have seen a large tubercle near the rostral margin in addition to the more posterior tubercles present in the Weddell-specimens. The pleotelson seems to be flatter distally and has only few spines. The row of spines on the ventral margin below the uropods is present.

M. globicauda belongs to those *Munna* species, where the first pereonite of mature males is very large. Characteristic is also the male Plp1 with its prominent, caudally directed lateral horn, similarly seen in drawings published by KUSSAKIN (1982), less prominent in VANHÖFFEN'S drawings (1914).

M. globicauda can only be confused with the following new species, which has a more quadrangular pleotelson and dorsally a single large tubercle on its cephalothorax.

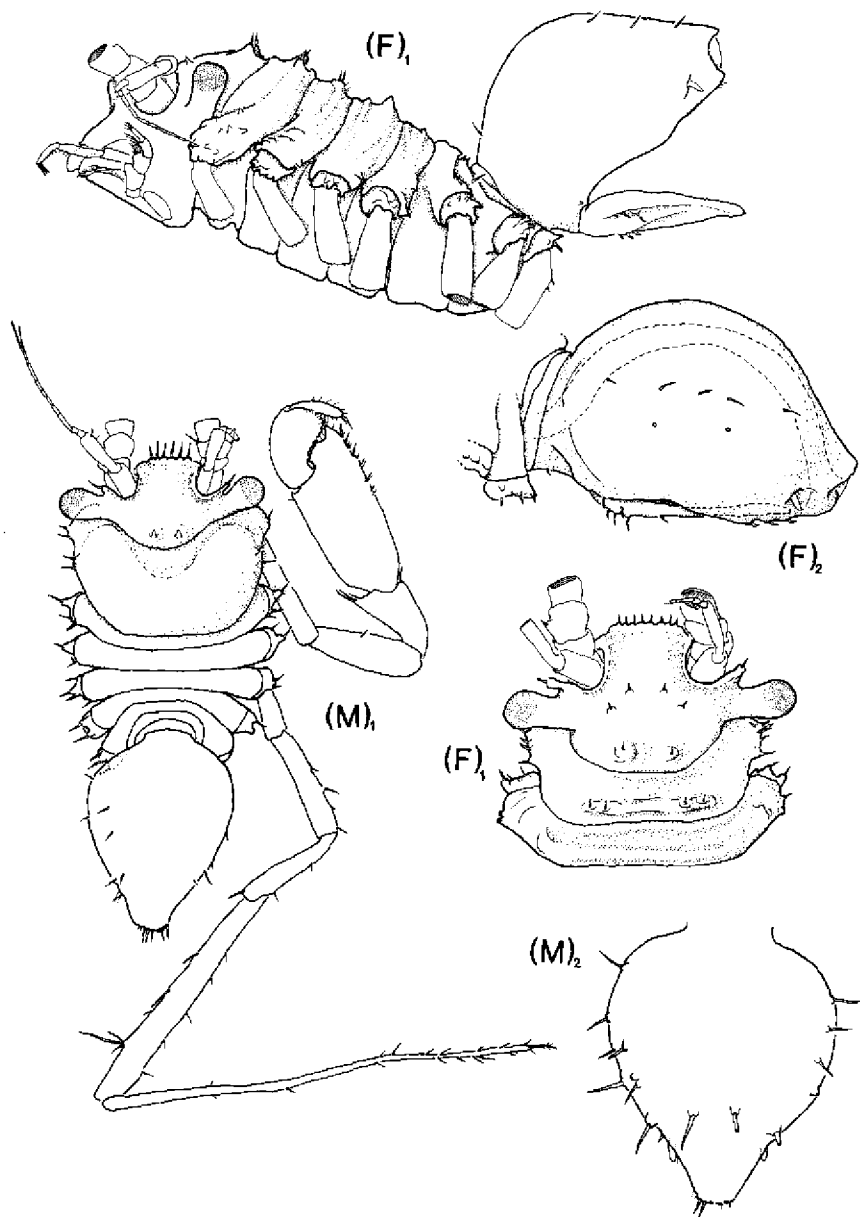


FIG. 12. — *Mumma globicauda* Vanhöffen, 1914, specimens from the Weddell Sea. Lateral view of body and dorsal view of anterior body of 7.5 mm immature female (F)₁; dorsal view of 4.6 mm male (M)₁; lateral view of pleotelson of 5 mm female (F)₂; dorsal view of pleotelson of 5.1 mm male (M)₂.

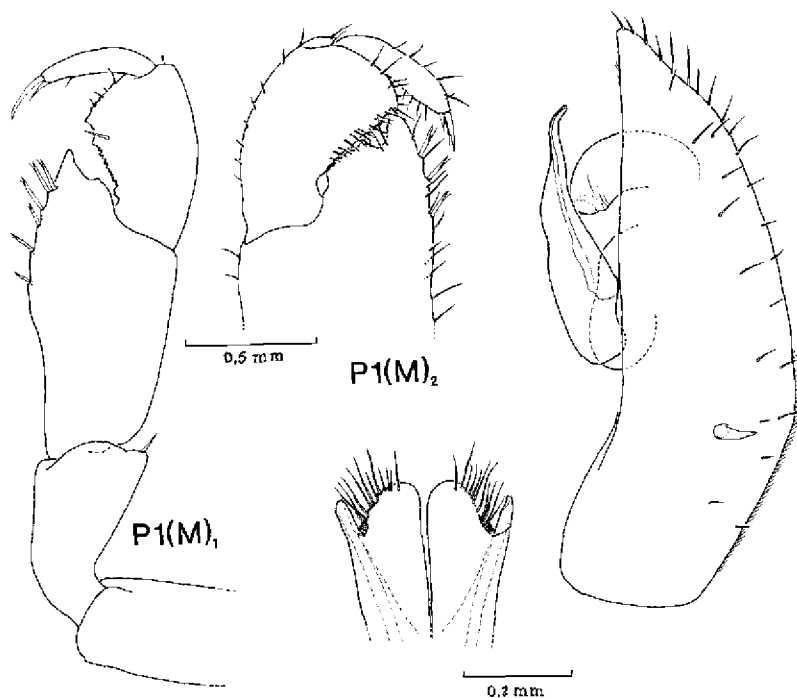


FIG. 13. — *Munna globicauda* Vanhöffen, 1914; male P1(M)₁ of syntype from Gauss station (ZM Berlin no. 17724); P1(M)₂ male specimen from the Weddell Sea.

5. *Munna arcacauda* n. sp.

(Figs. 14-16)

MATERIAL : EPOS-St. 226 sample, GSN 5 (75°15.9'S 25°58.3'W 574 m) (1 immature female 6 mm, fragments of mature male) (MNHN Is 3031); EPOS-St. 271 sample AGT 15 (73°17.0'S 20°59.4'W, 399 m) (1 immature specimen 6.2 mm, holotype) (MNHN Is 3032).

DISTRIBUTION : Not found elsewhere. Weddell Sea, 399-574 m.

DESCRIPTION

Body form very similar to *M. globicauda*, with slender eyestalks, protruding eyes, a large hooked ocular spine. Rostral margin nearly straight, bearing short spine-like setae; pseudo-rostrum about 50 % of length of cephalothorax (dorsal view) (fig. 14). Medially on cephalothorax a large, single rounded tubercle, caudally of it a pair of smaller tubercles, bearing a very short spine in some specimens. Pereonites dorsally near caudal margin with a transverse ridge, without spines or conspicuous setae. Coxae with laterally directed strong

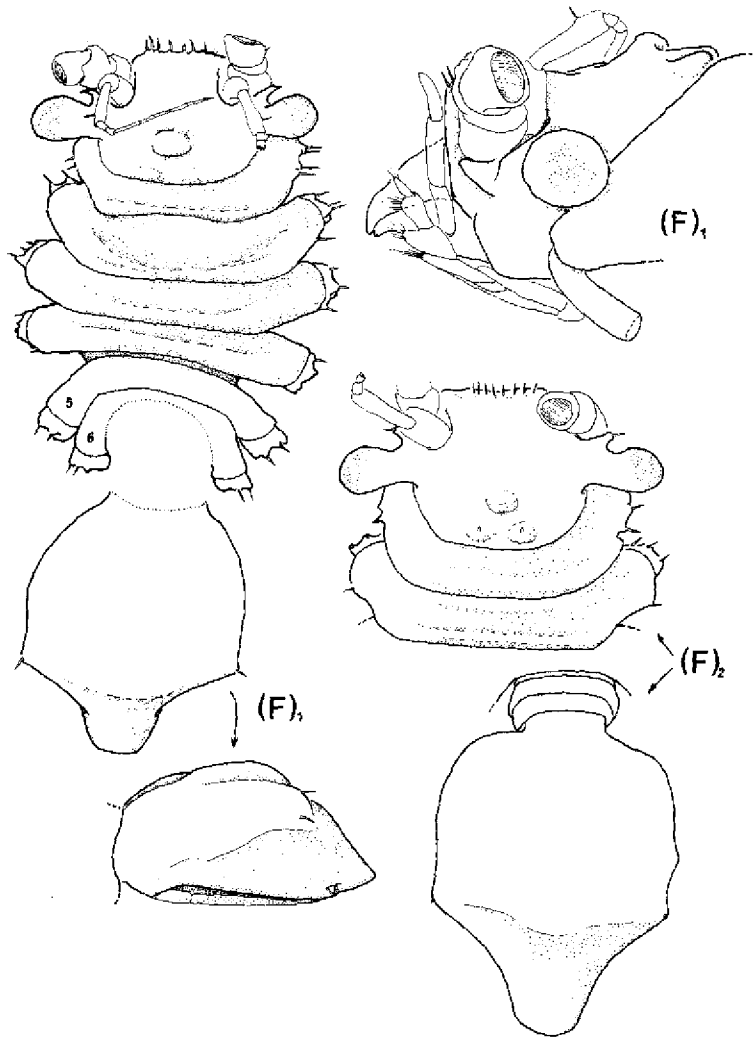


FIG. 14. — *Munna arcocauda* n. sp. : dorsal view of body (pereonite 7 missing, pleotelson detached from pereon) of (about 6.2 mm) holotype female (F)₁, with lateral views of cephalothorax and pleotelson. Further details of a 6 mm female (F)₂.

spines, each spine on a small tubercle. Pleotelson inflated as in *M. globicauda*, in apical third tapering to a broad, rounded apex ; a pair of prominent spines on dorsolateral edges of caudal part of pleotelson (fig. 14), but no further spines ; anterior 2/3 of pleotelson sometimes nearly quadrangular. Uropods tiny, not visible in dorsal view.

A fragment of a male shows the same sexual dimorphism as the male of *M. globicauda*, the first pereonite is very large.

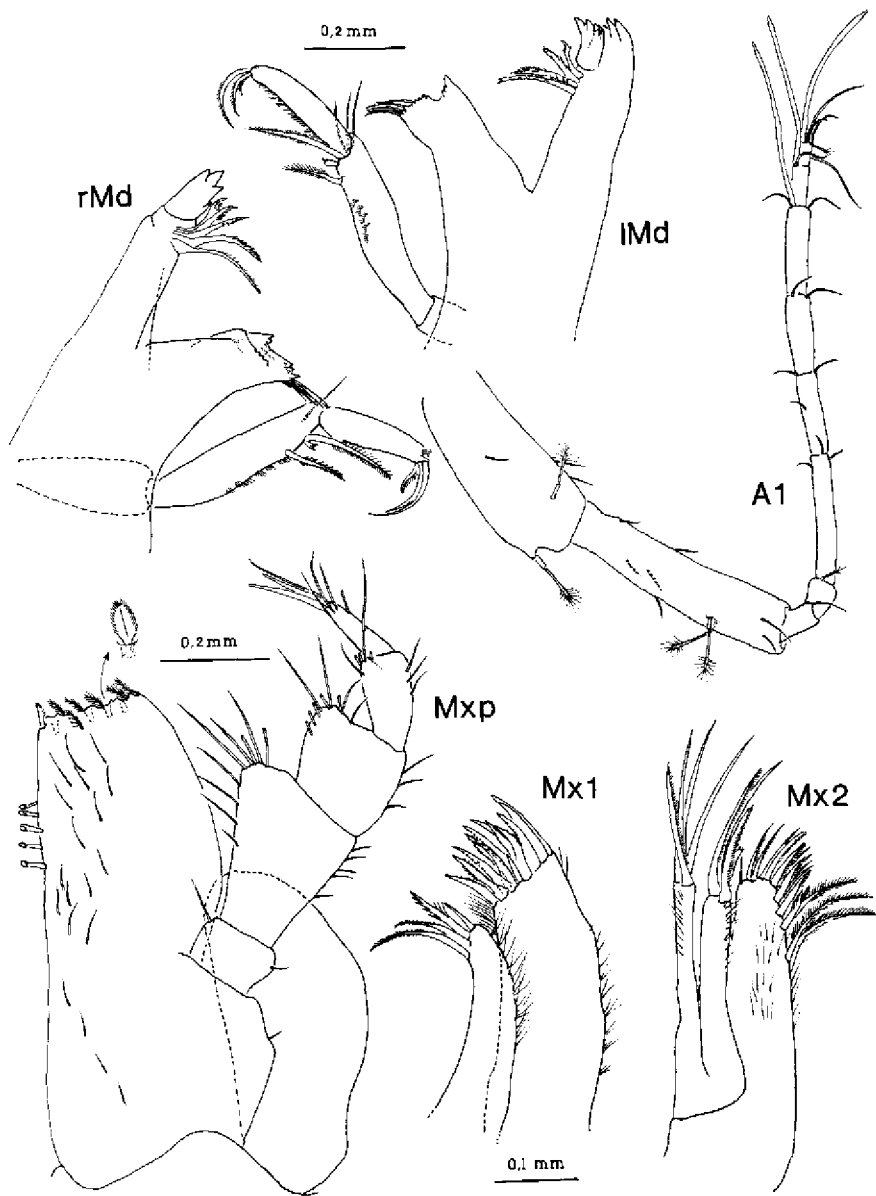


FIG. 15. — *Munna arcacauda* n. sp. : A1 and mouthparts of 6.2 mm immature female (holotype).

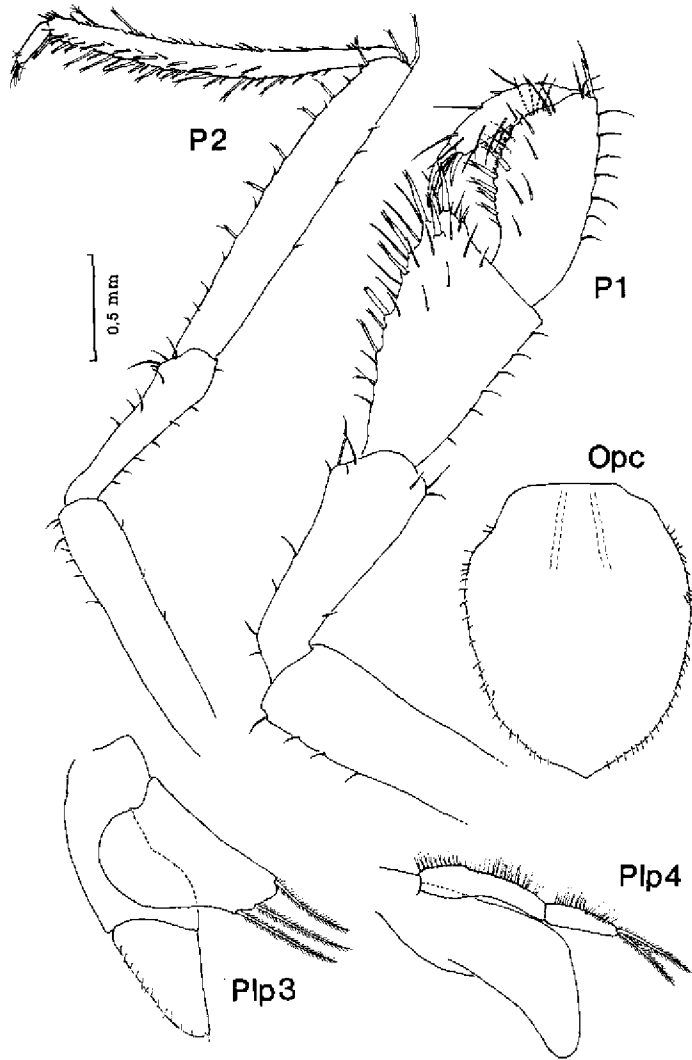


FIG. 16. — *Munna arcacauda* n. sp. : appendages of 6.2 mm immature female (holotype).

A1 of 10 articles, relatively slender, differing from the A 1 of most other species by having 3 terminal aesthetascs (instead of 2), one on each of the last 3 articles (fig. 15). Mandibles as in other species of *Munna*, palp with 3 finely setulated setae terminally on last article, 2 apical setulated (nearly plumose) setae on second article together with some simple setae ; inbetween the setulated setae a tiny, apically broadened sensillum. Lateral endite of Mx 1 bearing apically 12 spines of varying shapes, partly serrated (fig. 15), medial endite with only 4 spines, the proximal 2 finely serrated and longest, the distal one shortest and smooth.

Mx 2 with 4 long partly combed setae on each of the 2 lateral endites, medial endite with 16 setae of varying shapes (fig. 15), the longest being the 3 proximal ones on the medial margin. Mxp : see figure 15.

P 1 only known from immature female (fig. 16). Carpus trapezoidal, apically broadened, distal margin about 3/4 of length of article ; medial margin bearing 8 sensory spines in addition to several simple setae ; propodus shorter and less wide than carpus, palm proximally concave, but over 3/4 of its length convex, with 5 sensory spines and some simple setae, dorsal margin with row of simple setae and a distal spine. P 2 as in figure 16. Other appendages missing. Female operculum (Plp2) ovate, apex slightly pointed, with only marginal setae, spines absent. Plp 3 and Plp 4 : see figure 16.

REMARKS : Though only known from the fragments described herein, this is obviously a species related to *M. globicauda*, but clearly different and easy to distinguish. The "unicorn"-head and the strange pleotelson are very characteristic. Common characters of the two species are the inflated pleotelson, a short cephalothorax with large eyelobes, spinose coxae, male sexual dimorphism (large pereonite 1), an increased number of aesthetascs on antenna 1 (illustrated for *M. globicauda* by KUSSAKIN 1982), the large number of spines on the propodus of P1 in females or immature specimens. Both species have been found sympatrically in EPOS St. 271.

6. *Munna studeri* Hilgendorf, 1893

(Fig. 17)

MATERIAL : Syntypes : ZM Berlin no. 8585 ; largest specimens 2.6 to 3 mm.

DISTRIBUTION : Only known from type locality : "close to Kerguelen", 210 m depth ("Gazelle" Expedition 1875 : HILGENDORF, 1893 : 3).

REMARKS

For the purpose of the present study it was necessary to ensure a correct determination of *M. studeri*, of which only a drawing of a female P1 exists (by VANHÖFFEN, 1914). Fortunately the type material was available. Drawings of complete specimens show important characteristics of this species (fig. 17).

Body dorsally only slightly convex, with few slender setae. Eyes large, protruding, but not distinctly stalked. Between insertion of antenna 1 and eye a large frontal spine-like protrusion. Rostral margin only slightly convex, less than 1/3 of width of cephalothorax. Length of

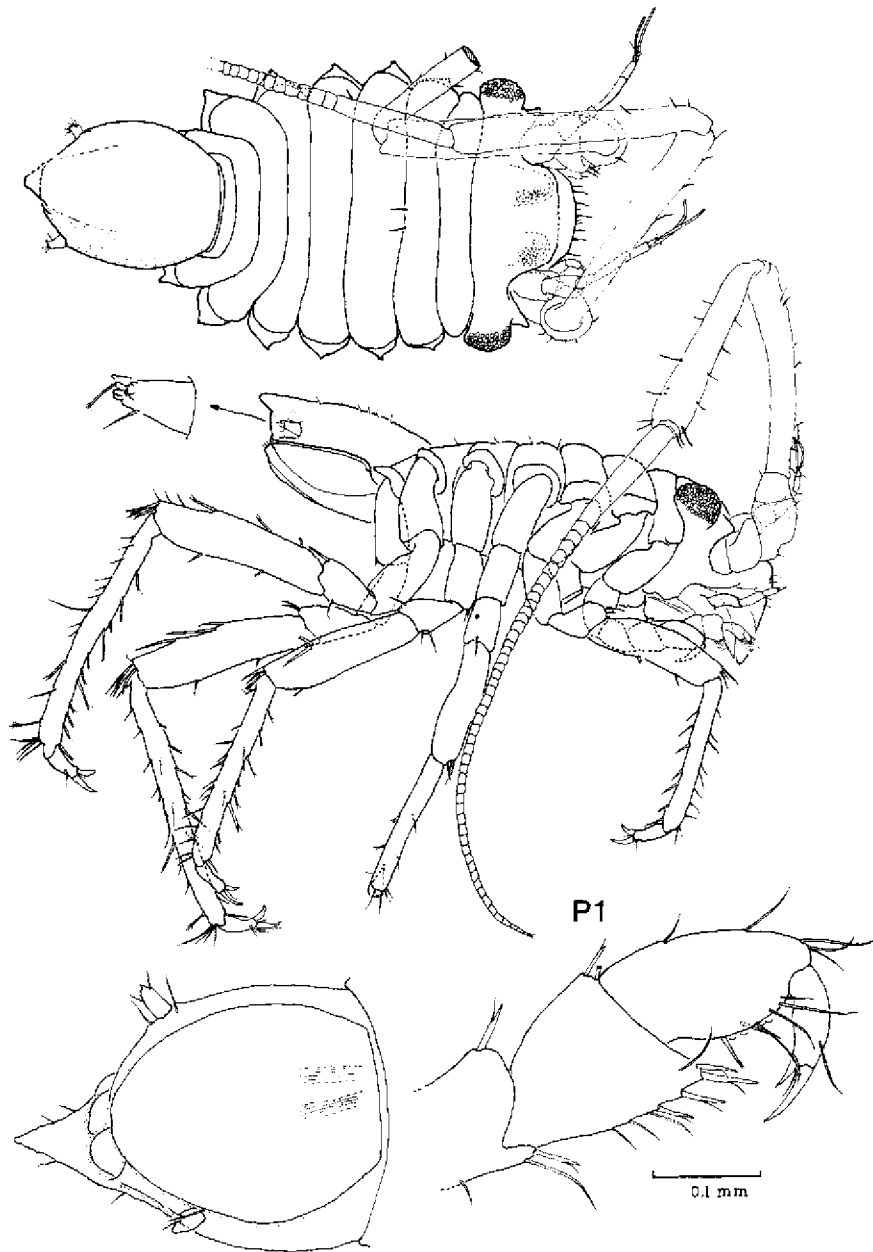


FIG. 17. — *Muma studeri*. All drawings from syntypes (ZM Berlin, no. 8585, Kerguelen archipelago). Dorsal and lateral view of immature male, length of body : 3 mm. Below : ventral view of a 2.6 mm non-ovigerous female and P 1 of immature male.

pseudorostrum more than 1/2 of total cephalothorax length (dorsal view), with a pair of longitudinal ridges. Coxae 2-7 visible in dorsal view, each laterally with a single short spine-like point visible in dorsal view.

Characteristic protruding caudally directed apex of pleotelson, therefore anus not visible in dorsal view. Female operculum (Plp 2) oval, without conspicuous long setae or spines.

HILGENDORF (1893) described few characteristic features (outline of body), but published no drawings. Besides the drawing of a P 1 from a syntype, VANHÖFFEN (1914) did not add informations. The species can be easily discerned from the other munnids described in the present study by the acute pleotelson in combination with the outline of the body.

7. *Munna antarctica* (Pfeffer, 1887)

(Figs. 18-24)

SYNONYMS

Haliacris antarctica : PFEFFER, 1887.

Haliacris australis : HODGSON, 1902 ; RICHARDSON, 1906, 1908.

Munna antarctica documented with illustrations : AMAR & ROMAN, 1973 ; MONOD, 1931 ; NORDENSTAM, 1933.

non *Munna antarctica* Vanhöffen, 1914.

non *Munna antarctica* Stebbing, 1919.

MATERIAL

The following specimens were checked :

M. antarctica : Zoologisches Museum Hamburg nos. K-18796 (Syntypes), K-23154 ; Naturhistoriska Riksmuseet Stockholm no. 6059, 7283, 7936, 7937.

Haliacris antarctica : Muséum d'Histoire Naturelle Paris nos. Is 2931, 2932 ; The Natural History Museum London : no. 1921.11.29.

Haliacris australis : The Natural History Museum London no. 1901.12.13.19 (Syntypes).

Material from Admiralty Bay : sample OC-113 OTH (Admiralty Bay, central part, 60 m) (2 immature females 4 and 5 mm) ; sample OC-214 DG (Admiralty Bay, central part, 60-90 m) (1 male 5 mm) ; sample OC-255 VVG (Admiralty Bay, central part, 72 m) (1 immature female 4 mm) ; sample OC-256 VVG (Admiralty Bay, central part, 83 m) (anterior part of body of specimen about 4 mm) ; sample OC-283 DG (Admiralty Bay, central part, 15 m) (1 male 5 mm) ; sample OC-286 DG (Admiralty Bay, central part, 150 m) (1 male 5 mm) ; sample OC-289 DG (Admiralty Bay, central part, 30 m) (1 male 5 mm) ; sample OC-299 VVG (Admiralty Bay, Ezcurra Inlet 15 m) (1 male 7 mm) ; sample OC-308 DG (Admiralty Bay, Ezcurra Inlet 30-40 m) (2 males 5 and 6 mm, 3 immature females 5.5-6 mm) ; sample OC-318 DG (Admiralty Bay, central part, 30 m) (1 male 3 mm) ; sample OC-319 DG (Admiralty Bay, central part, 70 m) (3 immature females 5-6 mm) ; sample OC-329 DG (Admiralty Bay, Ezcurra Inlet 30 m) (1 immature female 5 mm) ; sample OC-331 DG (Admiralty Bay, Ezcurra Inlet 40 m) (1 immature female 5 mm) ; sample OC-334 DG (Admiralty Bay, 80 m) (1 male 5.5 mm, 2 immature females 5 and 6 mm) ; sample OC-337 OTH (Admiralty Bay, central part, 15-20 m) (1 male 4.5 mm, 1 immature female 2.5 mm) ; sample OC-456 VVG (Admiralty Bay, central part, 60 m) (1 immature female 5 mm) ; sample OC-458 VVG (Admiralty Bay, central part, 46 m) (8 males 4-6 mm, 6 immature females 2-5 mm) ; sample OC-461 VVG (Admiralty Bay, central part, 97 m) (2 males 5 mm, 2 immature females 3.5 mm) ; sample OC-463 VVG (Admiralty Bay, central part, 110m) (1 immature female 3 mm) ; sample OC-500 VVG (Admiralty Bay, central part, 156 m) (2 males 3.5 mm) ; sample OC-522 VVG (Admiralty Bay, central part, 50 m) (1 male 4 mm) ; sample OC-527 VVG (Admiralty Bay, central part, 72 m) (1 male 3 mm, 2 immature

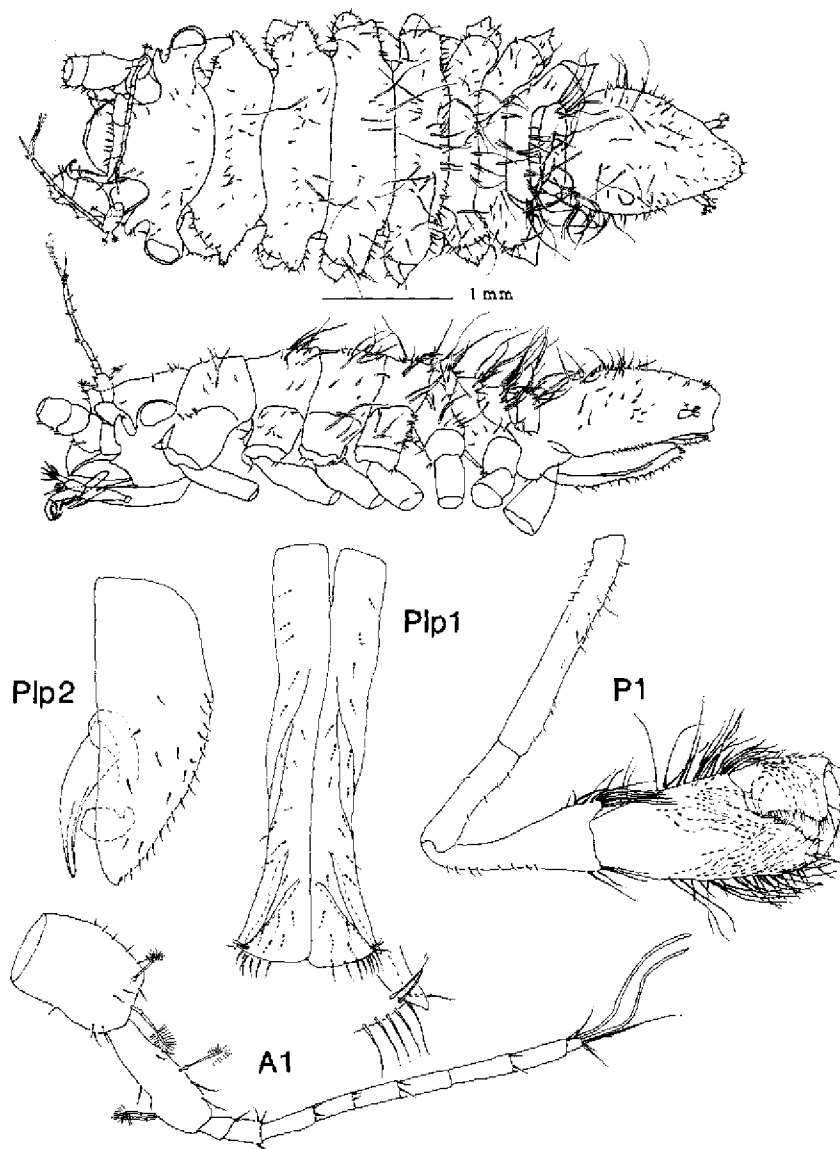


FIG. 18. — *Mumma antarctica* (Pfeffer, 1887) : dorsal and lateral view of male (5 mm) from King George Island ; A1, P1 and P1p1 of this same specimen ; P1p2 of second specimen of male (5 mm).

females 3 mm); sample OC-528 VVG (Admiralty Bay, Ezcurra Inlet 53 m) (2 males 2 and 3 mm, 2 immature females 2 and 4 mm).

DISTRIBUTION : New localities : South Shetland Islands, King George Island, Admiralty Bay (see material). Further records : Kerguelen, South Georgia, South Shetlands, Bellingshausen Sea, Vestfold Hills, Kosmonaut Sea, Davis Sea, George V Coast, Adelie Land, 2 to 320 m (see AMAR & ROMAN, 1973 ; HALE, 1937 ; CARVACHO, 1977 ; HODGSON, 1902 ; KUSSAKIN, 1982 ; KUSSAKIN & VASINA, 1980, 1982 ; MONOD, 1931 ; NORDENSTAM, 1933 ; PFEFFER, 1887, 1890 ; RICHARDSON, 1906, 1908 ; STEPHENSEN, 1947 ; TUCKER & BURTON, 1987).

Reports without descriptive notes should be treated with care. Specimens reported from the Falklands by STEBBING (1919) belong — according to MONOD (1931) — to the species *M. neglecta*. The species was not represented in the new material from the Weddell Sea (EPOS expedition).

REDESCRIPTION

Male

Body (fig. 18) dorsally flat, in dorsal view long-oval. Cephalothorax dorsally straight, smooth, with few setae on surface except on central part of cephalothorax. Eyes on eyelobes, slightly directed posteriorly. On eyelobe comparatively long, pointed ocular spine, distinctly curved laterally, with few small setae on its disto-lateral part. Rostral margin straight, bearing about 10 setae. Pseudorostrum almost rectangular, 1/2 as long and more than 1/3 as broad as cephalothorax. Pereonites 1-4 similar in length, with complicated shape of lateral margins (figs. 18, 23). Tergites of these segments with postero-lateral edge pointed. Pereonites 5-7 about 3/4 as long as 1-4. First free pleonite clearly visible, second as long as pereonites 5-7, first only half as long. Pleotelson oval, broadest in anterior quart, in lateral view relatively flat, apex slightly concave. In dorsal view coxae 2-7 visible, pointed. On all coxae, pereonites and pleotelson many short setae, furthermore on pereonites 2-7, free pleonites and pleotelson on dorsal surface very long setae, usually as long as length of the pereonites 1-4 (fig. 18).

Male A1 (fig. 18) consisting of 11 articles, last two with 1 aesthetasc each. On first article 2, and on second 4 feather-like bristles.

A2 (fig. 20) very long, on peduncular articles 2-6 setation consisting of short setae and on article 6 on distal part two feather-like bristles. Peduncular articles 5 and 6, 10 times as long as broad. Flagellum consisting of more than 100 articles.

Md (fig. 20) : second palpal article longest, first and third similar in length. First and second articles bear few simple setae, 2 thick plumose setae distally on article 2. On third article apically only three plumose setae, two longer distinctly annulate, small sensillum absent. rMd lacinia mobilis like seta in setal row, serrated, incisor bearing 4 blunt teeth. On proximal margin of molar 2 setae, on opposite side group of many small setae. Lacinia on IMd with three teeth, incisor with five teeth.

Mx1 (fig. 20) outer endite apically with 12 spines, some of these serrated, some setulated. On lateral margin few very small setae on medial part, on medial margin few setae located distally. Inner endite has both margins without setation. On distal edge additionally several setae in various length.

Mx2 (fig. 20) inner endite medially 3 plumose and above 3 serrated setae, last of these also slightly setulated. Apical row of 5 long setae, below similar row consisting of 4 setae, on ventral surface third row of long setae parallel with medial margin.

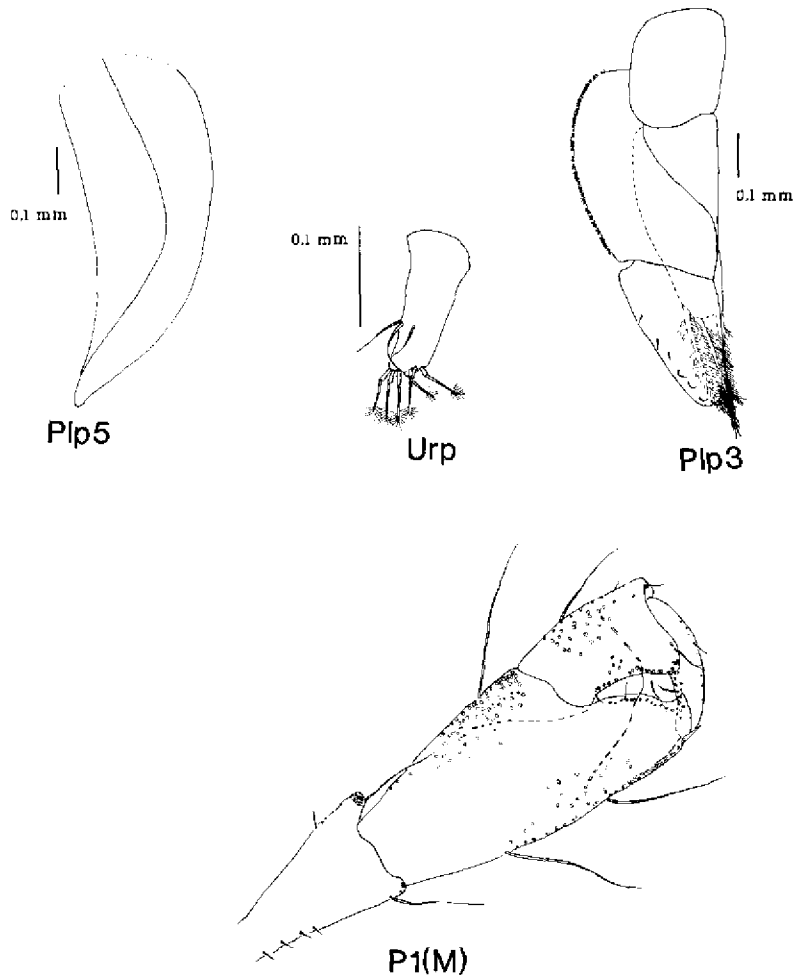


FIG. 19. — *Munna antarctica* (Pfeffer, 1887) from King George Island : P1 of male (5 mm); Plp3, Plp5 and Urp of second specimen (5 mm male).

Mxp (fig. 20) third palpal article disto-lateral edge protruding but rounded, free distal margin straight. On endite ventral row consisting of 5 scale-like setae, apically with 8 and dorsally with 11 setulated setae. On medial margin 4 coupling-hooks. Lateral margin of endite on its distal part row of small cuticular hairs.

P1 (figs. 18, 19) basis and ischium similar in width over entire length, basis about twice as long as ischium. Both proximal articles with few simple setae concentrated on proximal part of basis. Merus longer than ischium, long trapezoidal, with few short setae on ventral margin and two groups of long cuticular "hairs" on both proximal edges. Carpus trapezoidal, medially as long as merus, with distinctly protruding ventral-distal edge. On ventral and dorsal

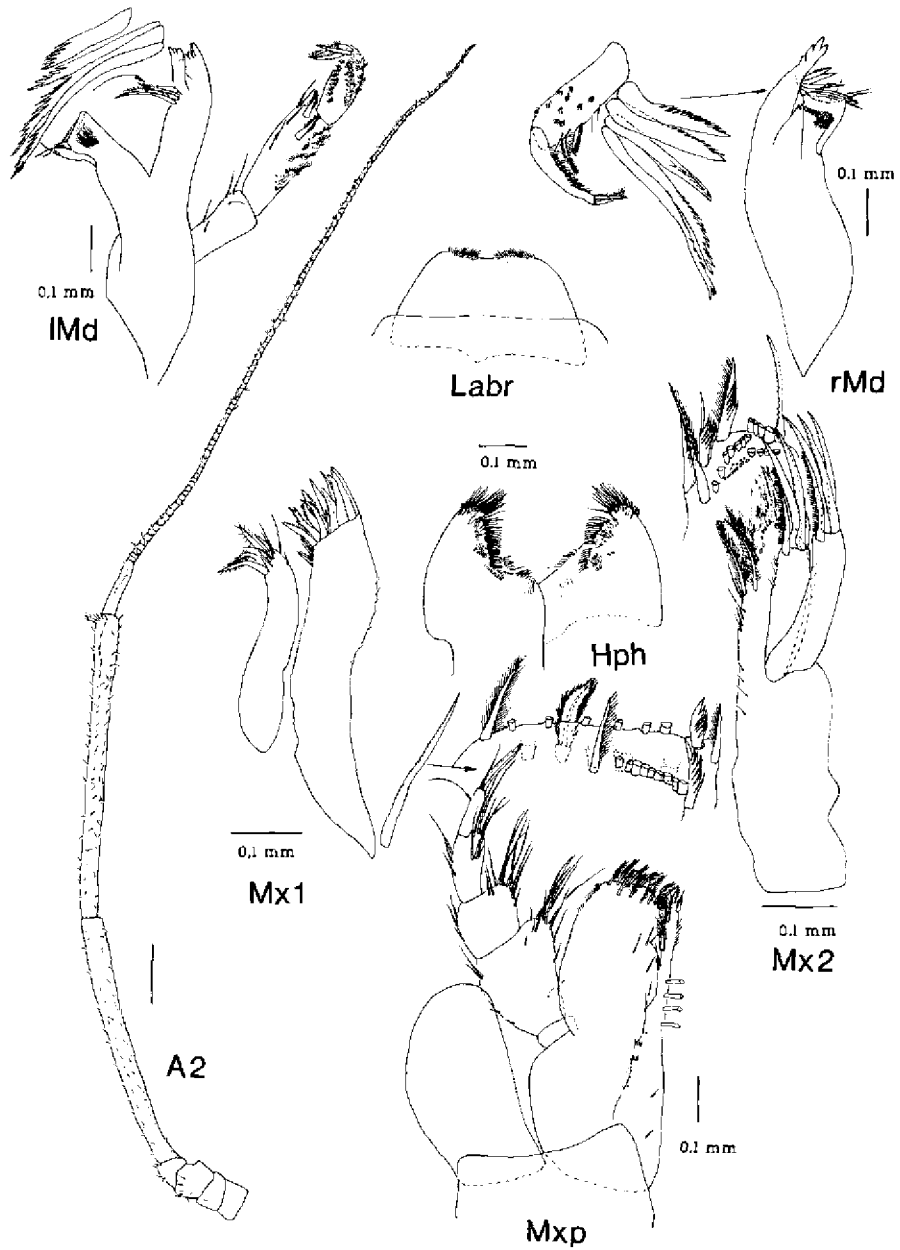


FIG. 20. — *Muma antarctica* (Pfeffer, 1887) from King George Island : mouthparts of male (5 mm) and A2 of second specimen (male 5 mm).

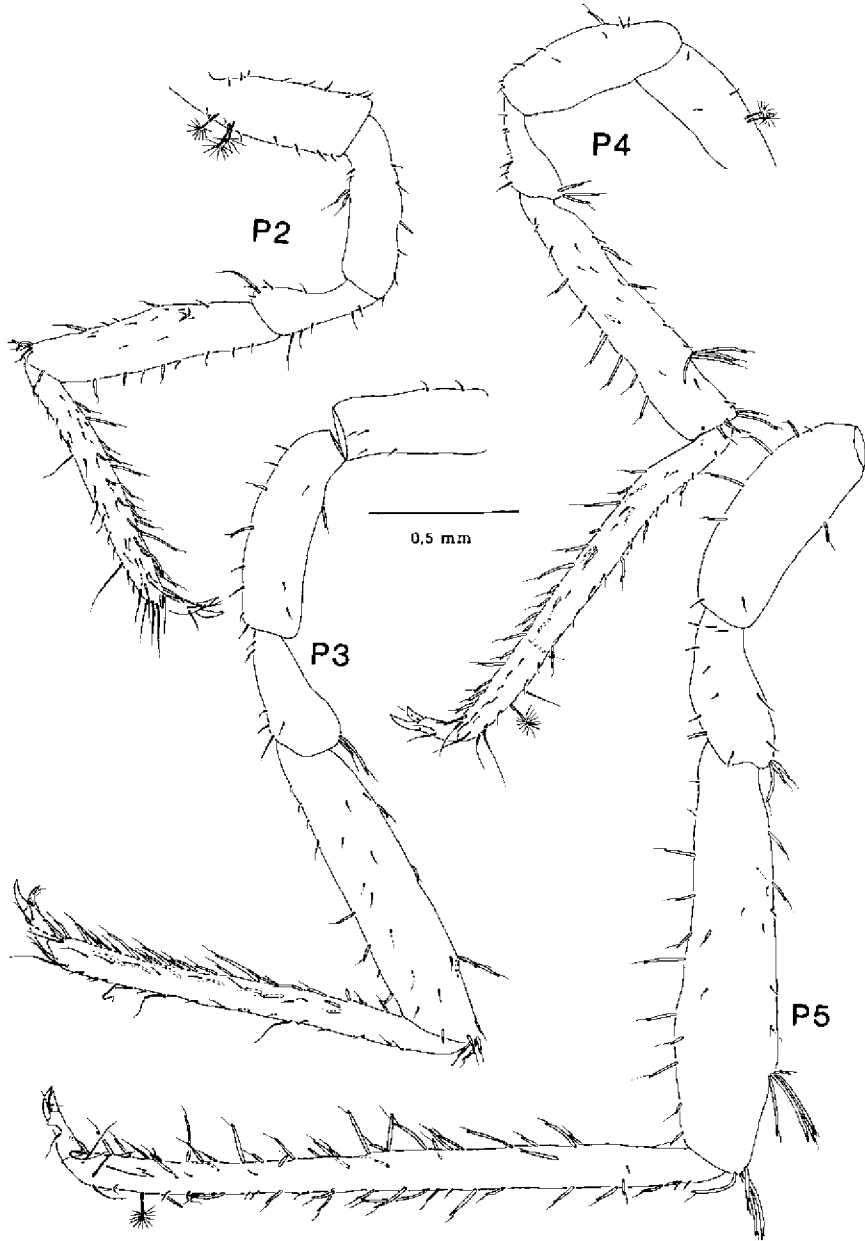


FIG. 21. — *Munna antarctica* (Pfeffer, 1887) from King George Island : P3 and P5 of male (5 mm) and P2 and P4 of 4 mm male.

margin many very long cuticular hairs. Propodus subrectangular, slightly wider in its distal part, palm concave, complementary in shape to protrusion of carpus. On dorsal margin of propodus also many long cuticular hairs, palm and ventro-distal edge bearing only short setae.

P2-P7 (figs. 21, 22) on ischium 1-7 sensory spines on both margins, on merus 1-3 on disto-dorsal edge. On carpus sensory spines forming usually two groups, one distally, one subdistally on lateral margin, furthermore few single sensory spines on surface. Very numerous sensory spines on propodus, particularly on P5-P7, where simple setae appear only exceptionally. Sensory spines distributed evenly on surface while on P2-P4 they are concentrated mostly on medial surface.

Male Plp1 (fig. 18) widest at half of its length and at the end, narrowest distally at 3/4 of its length. On ventral surface about 20 setae on each ramus. Distal margin almost straight, with 6-8 setae and with further 2 on dorsal surface. Lateral horn small, pointed.

Male Plp2 (fig. 18) with about 20 setae on lateral margin of protopod and about 10 on ventral surface. Medial margin straight, tip blunt. Endopod not reaching tip of protopod, exopod oval.

Plp3 (fig. 19) endopod with three plumose spines longer than exopod. Exopod with row of setae near lateral margin, parallel to it. Plp4 lost during dissection. Plp5 (fig. 19) oval, uniramous. Urp (fig. 19) cylindrical, twice as long as broad, with 3 setae inserted laterally and 6 feather-like bristles terminally.

Female (figs. 23, 24)

Dorsal surface without the long setae described in male specimen. A2 consisting of 8 articles. Opc oval with many short setae concentrated particularly on circumference. Central part of operculum without setae. P1 similar to other female specimens of the genus *Munna*. Sensory spines occur only on ventral and one on distal margin of carpus. On palm 2 sensory spines. Carpus and propodus on their ventral surface few setulated cuticular scales.

The difference in width between males and female specimens that usually occurs in the genus *Munna* is here marked only very weakly. Oviparous females can be rather broad.

Further variations : Very characteristic for this species are very long A2. They can be three times as long as the body but unfortunately the A2 (as most of the pereopods) very often are lost in fixed material. Lateral protrusion of male pereonite 1 in smaller males not so acute and protrudes not as conspicuously as in figure 18 (male of 5 mm length). Number and length of dorsal setae are very variable and generally depend on age, length, and sex. Usually smaller specimens and females bear shorter setae on the dorsal surface. Setation on dorsal surface and pleotelson of large males (5-6 mm) sometimes very rich (e.g. males from sample OC-458) though also exceptions from this pattern occurred in our material. (e.g. males from sample OC-308). Pointed coxae of pereopods 1-4 are sometimes in small specimens not conspicuous (e.g. female 2.5 mm from sample OC-337), but the lateral pointed edge of pereonites 1-4 is usually well developed.

REMARKS : PFEFFER (1887) published several drawings, of which especially the dorsal view of the whole animal is very helpful. The species has laterally on all coxae acute points ; the tergites 1 to 3 have a laterally protruding posterior edge, situated caudally of the coxal point ;

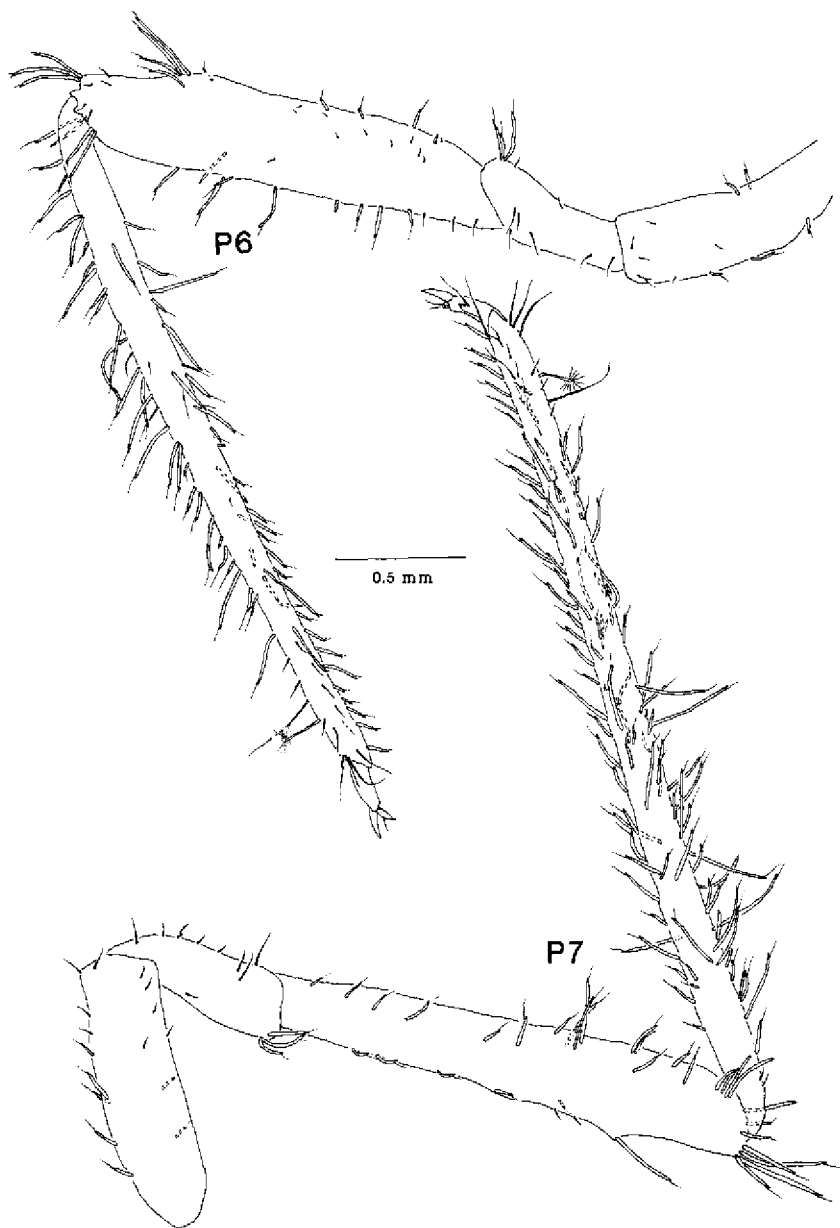


FIG. 22. — *Munna antarctica* (Pfeffer, 1887) from King George Island : P7 of male (5 mm), P6 of second specimen of male (5 mm).

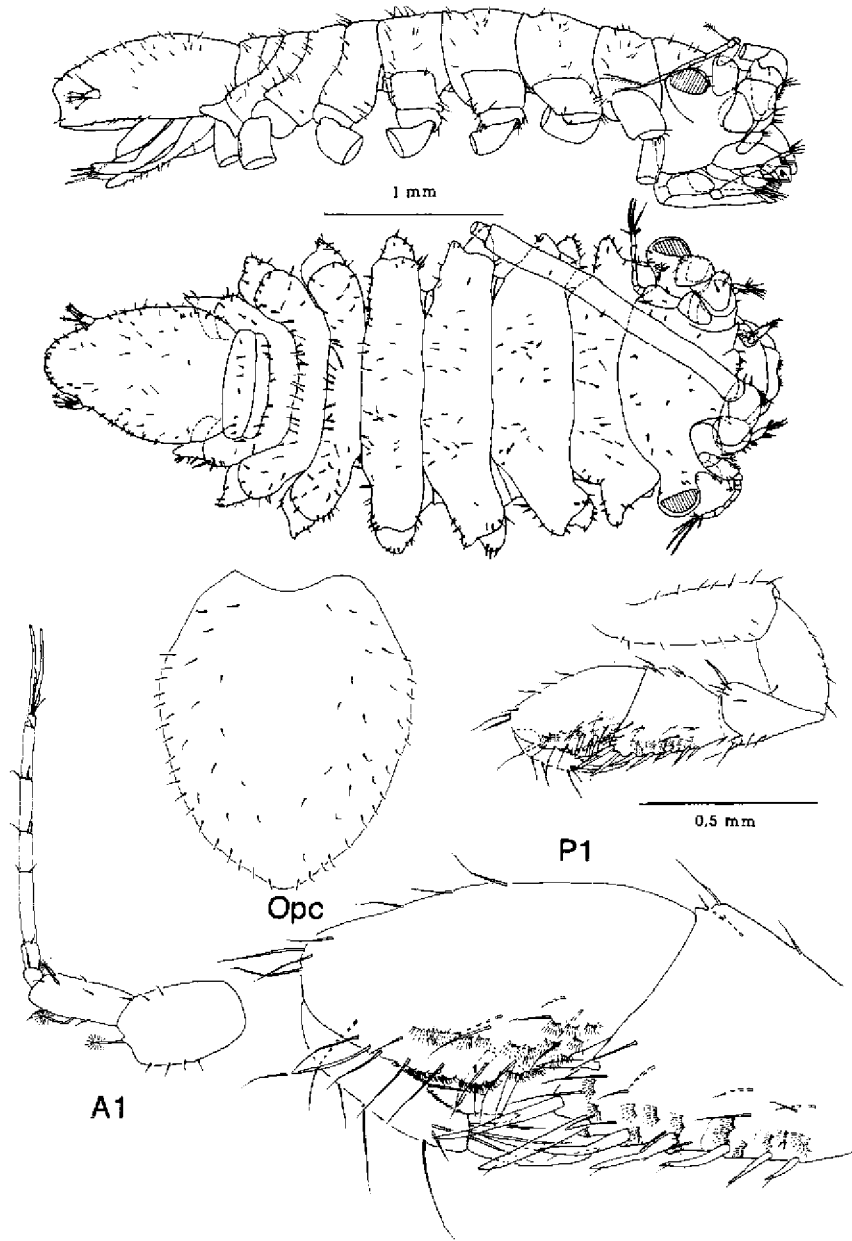


FIG. 23. — *Munnina antarctica* (Pfeffer, 1887) from King George Island : dorsal and lateral view of immature female (4 mm) ; A1 and Opc of this same specimen ; P1 of second specimen of immature female (4 mm).

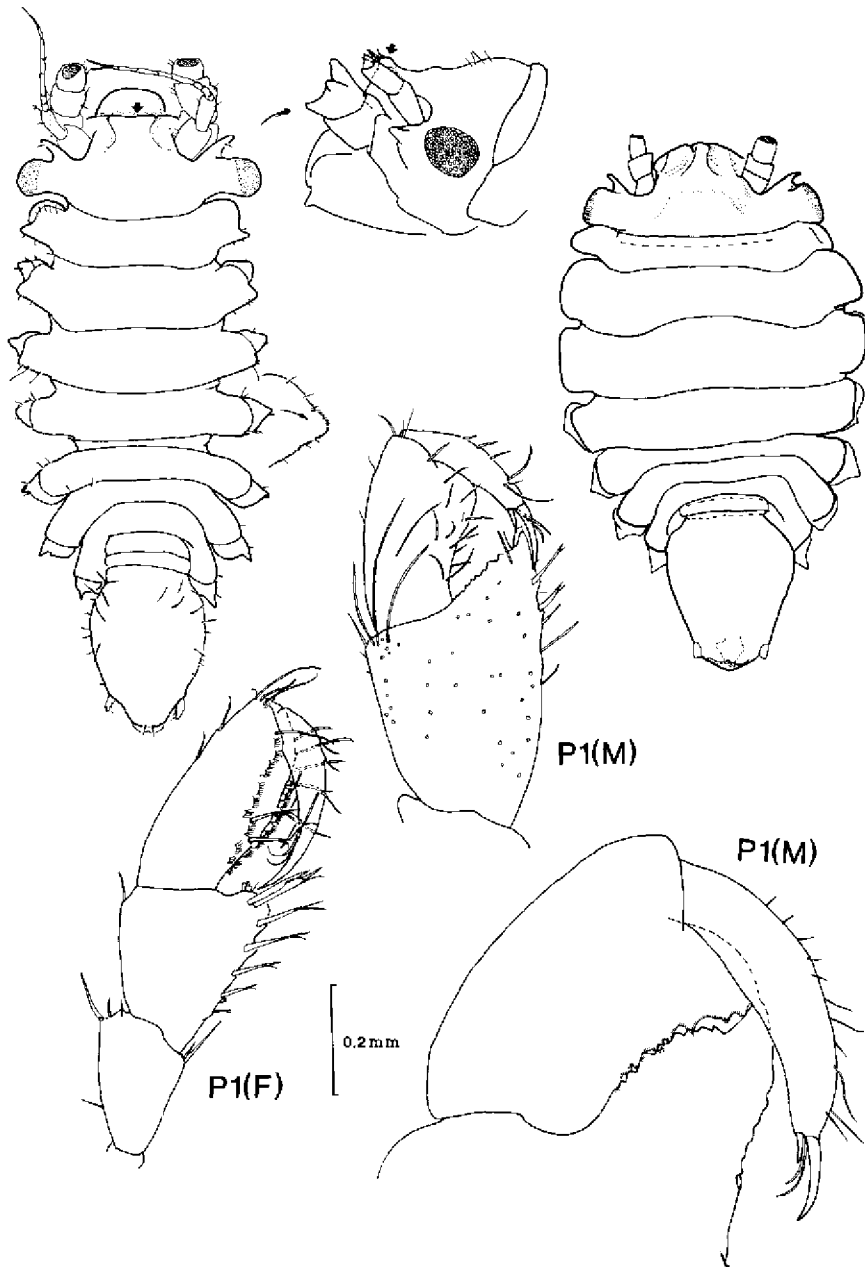


FIG. 24. — *Munna antarctica* (Pfeffer, 1887). Dorsal view of male (left drawing) from Cap Adare (NHM London 1901.12.13.19) and of flattened 2.8 mm ovigerous female (right) from South Georgia, (syntype, Zool. Mus. Berlin K-18796), which was in bad state and whose coxae 2 and 3 are not visible. Other syntype specimens resemble the male (left drawing). Lateral view of cephalothorax of juvenile female (3.8 mm) from South Georgia. Below : three forms of P1 : Left : P1 of immature female (Kerguelen) ; center : 3.5 mm male from South Georgia ; right : P1 of 5.2 mm male (Kerguelen ; setae omitted).

the anterior spine on the eyestalk is large and laterally curved; the pleotelson has a rounded apex. In *M. bituberculata* pointed coxae occur only on segments 5 to 7, furthermore there were few other features which allow to distinguish these two species (see remarks under *M. bituberculata*); in *M. studeri* on all coxae, but this species has an unique pointed pleotelson and no protruding edges of tergites 1 to 3. Thus the shape of the body is very helpful to discern *M. antarctica*. These features are also clearly visible on the drawing published by HODGSON (1902 : "*Haliacris australis*").

The specimen illustrated by VANHÖFFEN 1914 is a different species of *Munna*, the published drawings do not allow an identification. We studied type material and further specimens from South Georgia (Svenska Sudpolarexp. 1901-1903, det. by NORDENSTAM) and specimens from off Cape Adare, Victoria Land (NHM London, see HODGSON, 1902 : "*Haliacris australis*"), which all have the characteristic shape of the body seen in figure 24. Specimens from Kerguelen (MNHM Paris, det. by CARVACHO) do not differ conspicuously from the type material. Unfortunately the type material was in a condition that did not allow the study of the setation.

8. *Munna bituberculata* Nordenstam, 1933

(Figs. 25-31)

SYNONYMS : *M. maculata* : TATTERSALL, 1920.

MATERIAL : Slides of appendages of holotype from South Georgia and mounted holotype (NR Stockholm no. 783, 788), 4 further specimens from South Georgia (NR Stockholm no. 7298, 7861). Specimens labelled "*Munna maculata*" from South Georgia (NHM London no. 1921.5.12-17, det. TATTERSALL). — **Material from South Shetland Islands and west of South Georgia** : sample OC-325 DG (Admiralty Bay, central part, 30 m) (1 mature female 4 mm long); sample OC-333 DG (Admiralty Bay, central part, 50 m) (1 mature female 3,5 mm long). — **Material from area west of South Georgia** : sample OC-350 GSN (53°26.4'S 41°55.3'W, 140-160 m) (1 male 2.2 mm, 3 immature females 2.5-3 mm); sample OC-351 GSN (53°38.9'S 41°55.6'W, 138-141 m) (2 males 3 and 5 mm, 2 immature females 2.5 and 3 mm, 1 ovigerous female about 2.5 mm);

DISTRIBUTION : New localities : King George Island, Admiralty Bay; west of South Georgia; further records : South Georgia : May Bay 54°11'S 35°18'W, 75 m depth (type locality), Cumberland Bay, and King Edward Cove (TATTERSALL, 1920 : "*Munna maculata*"); archipelago Pointe Géologie (66°39'S 139°55'E, depth 15 m : occurrence not certain, see AMAR & ROMAN, 1973). The species was not present in the EPOS-samples from the Weddell Sea.

REDESCRIPTION

Female (fig. 25)

Body dorsally flat, in dorsal view oval. Cephalothorax in lateral view not strongly convex, bearing several setae. Eyes comparatively small, on eyelobes. Ocular spines large triangular, pointed, curved laterally, with few setae on lateral margins. Rostral margin rounded, concave medially, bearing many setae (about 20). Pseudorostrum subrectangular, more than twice as long as length of cephalothorax and 1/3 of cephalothorax width. Pereonites 2 and 3 similar, pereonite 3 sometimes somewhat shorter; 2 longer than 3, 4 distinctly shorter than 1-3 and

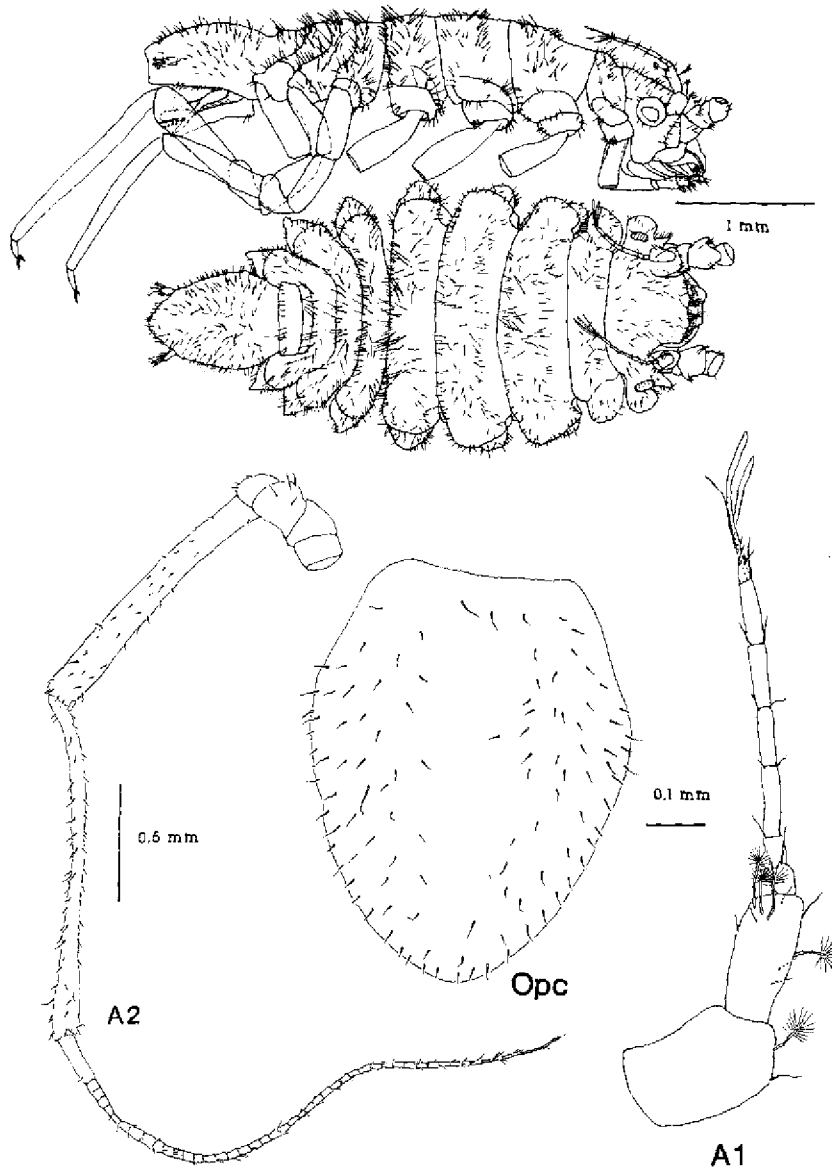


FIG. 25. — *Mumma bituberculata* Nordenstam, 1933 from King George Island : lateral and dorsal view of mature female of 4 mm length, Opc and A1 of this same specimen ; A2 of mature female (3.5 mm length).

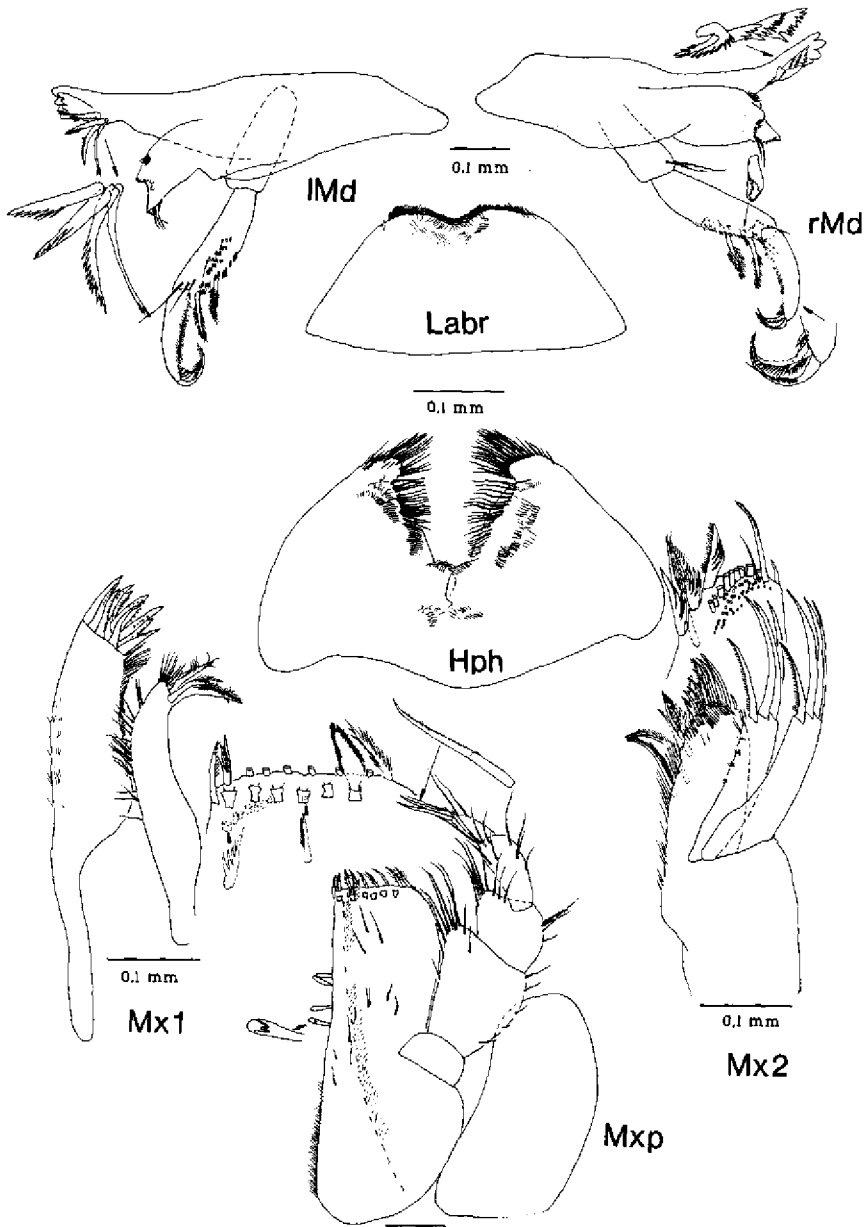


FIG. 26. — *Munnia bituberculata* Nordenstam, 1933 from King George Island : mouthparts of mature female (4 mm length).

straight. Segments 1-3 lateral part slightly directed anteriorly. Pereonites 5-7 medially about 1/2 as long as pereonites 3-4. Second free pleonite as long as pereonites 5-7. All lateral margins pereonites rounded. Coxae 2-7 visible in dorsal view, 1-4 oval, 5-7 with acute protrusion. Pleotelson oval, on dorsal surface (as on coxae) small simple setae.

A1 (fig. 25) consisting of 9 articles. On first article one, on second 4 feather-like bristles, two last articles with one aesthetasc each.

A2 (fig. 25) : Setation of peduncular articles consisting only of setae, there is no sensory spine. First and second peduncular article without setation. Flagellum with almost 50 articles.

Md (fig. 26) second palpal article somewhat longer than first and third one. On first two articles distally setae (only on rMd), on second few simple setae, distally two setulated setae and one sensillum on opposite side. Lacinia mobilis of rMd like setae of setal row, serrated, somewhat larger than setae. Incisor consisting of 4 teeth. Molar with two setae on proximal margin and group of small setae on opposite side. Lacinia of lMd solid with 4 teeth (fig. 26).

Mx1 (fig. 26) outer endite with 13 spines, serrated or setulated. Inner endite in addition to 4 spines on distal margin group of 7 setae ; lateral margins of both endites and medial one of outer endite with setation. On lateral margin of outer endite setules arranged in several groups. Setation on medial margin of this endite considerably longer in distal part.

Mx2 (fig. 26) on inner endite medially 3 plumose and above 3 serrated setae, the lateral one also setulated. One row of 10 long setulated setae partly located on distal margin, partly inserting on ventral surface. Combed spine on medial and inner endite shorter than three remaining ones.

Mxp (fig. 26) on endite ventral row with 6 scale-like spines, apically with 9, and dorsally with 8 spines. On medial margin 4 coupling hooks. Third palpal article with disto-medial edge protruding medially.

Female P1 (fig. 27) carpus almost triangular with 4 sensory spines on ventral margin and 2 on ventro-distal edge. Propodus long oval, on palm 2 sensory spines. Two rows of small cuticular setulated scales visible only on propodus.

P2-P6 (figs. 27, 28) basis as long as ischium, merus about 3/4 as long as two previous articles. Ischium of P2 and P3 without, next pereopods with 1-5 sensory spines. On merus 2-5 sensory spines. Sensory spines on carpus of P2 on both margins, on P3-P4 forming additionally two groups, one distally and one subdistally on dorsal margin. These groups in P6-P7 flown fused to one large group. On propodus of P2-P4 sensory spines only on medial margin, on P5-P6 everywhere on surface.

Opc (fig. 25) oval, with rich setation consisting only of short simple setae. Setation in central part of operculum poorer.

Pip3 endopod together with plumose setae surpassing tip of exopod. On distal article of exopod few simple setae on lateral margin.

Plp4 (fig. 28) as typical for genus *Munna*, with exopod as long as endopod, consisting of two articles, lateral margin of first and proximal part of second article bearing several groups of long thin setae, on medial margin of second exopod article several small setulated cuticular scales. Plp5 (fig. 28) almost twice as long as endopod of Plp4. Urp (fig. 28) with three simple setae laterally and 6 feather-like bristles apically.

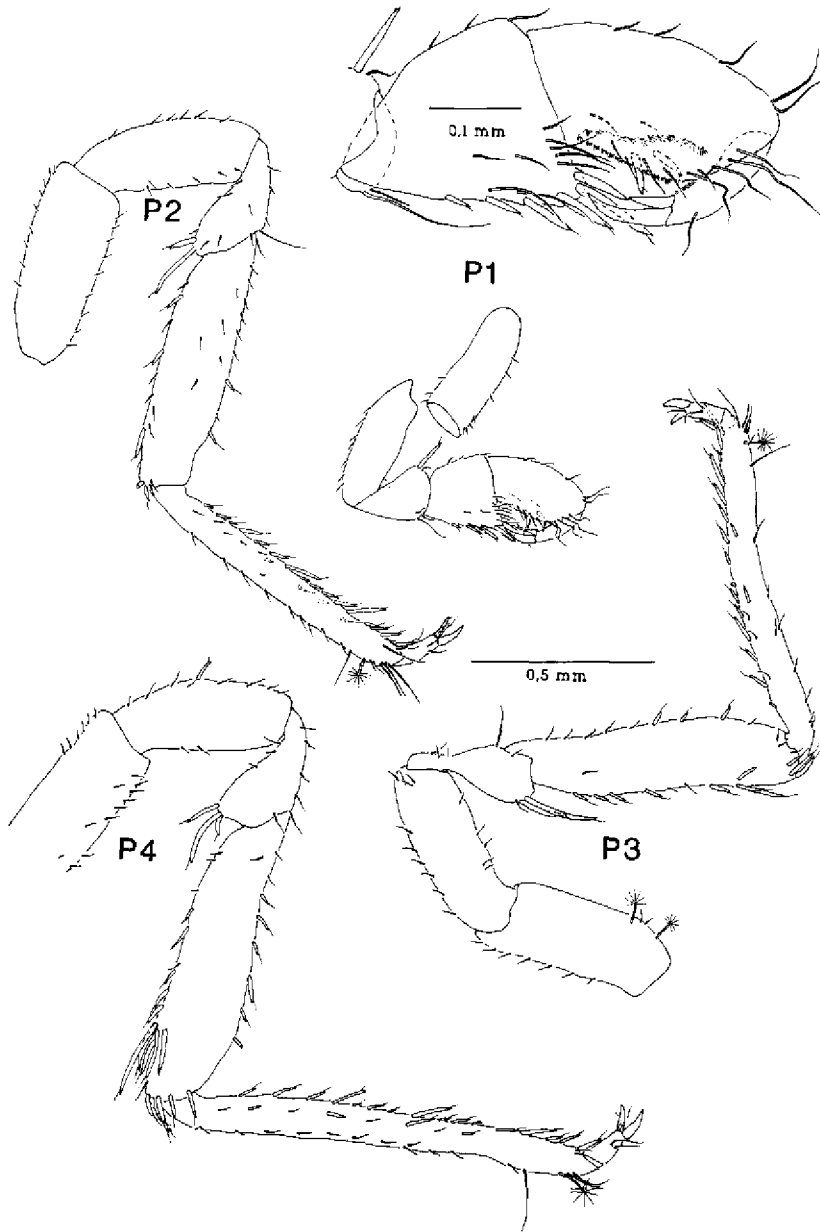


FIG. 27. — *Munna bituberculata* Nordenstam, 1933 from King George Island : P1, 2, 3 and 4 of mature female (3.5 mm length).

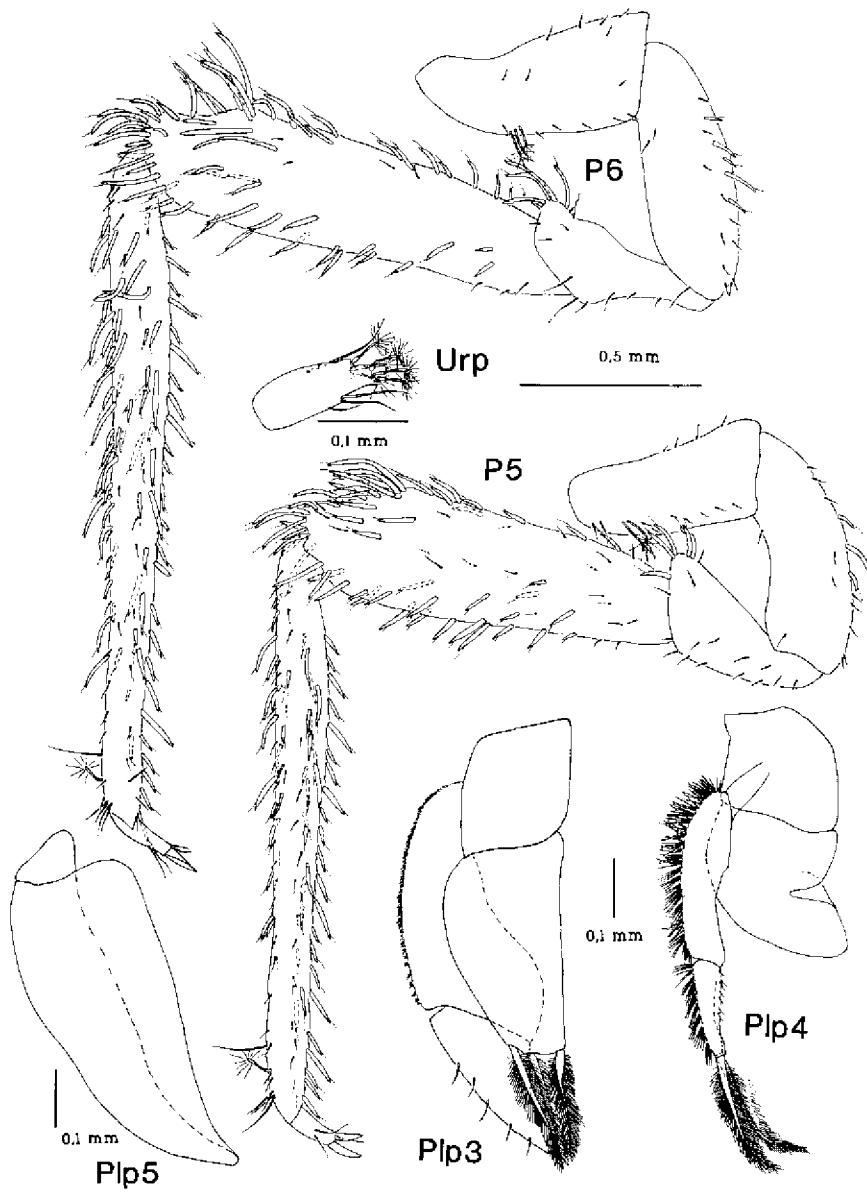


FIG. 28. — *Munna bituberculata* Nordenstam, 1933 from King George Island : P5 and P6, Plp3, 4, 5 and Urp of mature female (4 mm length).

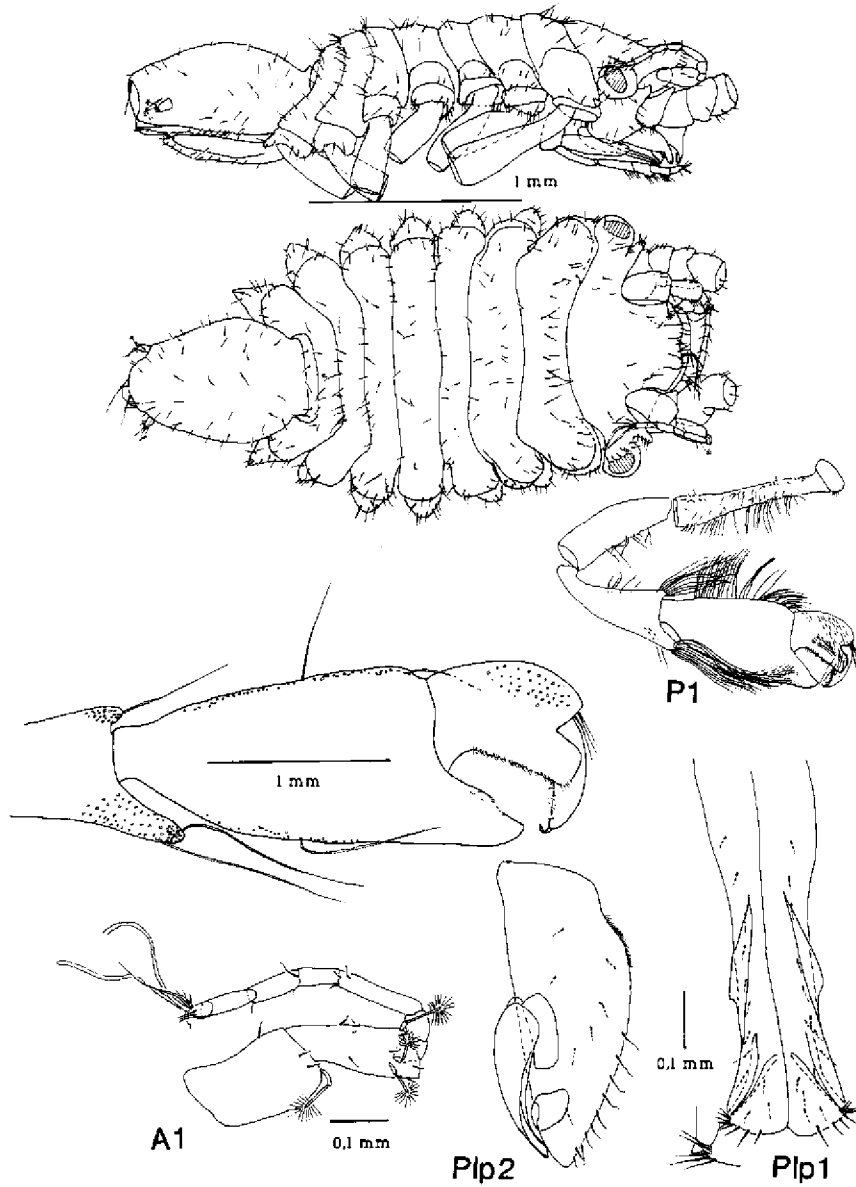


FIG. 29. — *Munna bituberculata* Nordenstam, 1933 from King George Island : dorsal and lateral view of male (3 mm length), A1, Plp1 and 2 of this same specimen ; P1 of male (5 mm length).

Male

Body (fig. 29) with distinctly poorer setation on dorsal surface, only 60 to 80 % of setae of female. First segment of pereon as long as second, fourth trapezoidal. Third segment shorter than second. P1 of large males longer and larger than in female, merus broader distally, with ventro-distal edge protruding, elongated. Dorsal margin of carpus straight, ventral one convex, ventro-distal edge of carpus protruding, forming one tooth. Propodus with palm concave, complementary in shape to protrusion of carpus, with very deep concavity on distal margin. On both edges of merus, dorsal and ventral margin of carpus and dorsal margin and medial surface of propodus many very long cuticular hairs like setae. Palm of propodus only with very short setae.

A1 consisting of 9 articles, second article of flagellum longer than next ones.

Plp1 (fig. 29) : each ramus bearing 6 setae on distal margin and two on dorsal surface in disto-lateral edge. Small, pointed, lateral horn directed somewhat laterally, very short. On ventral surface about 12 setae. Plp2 (fig. 29) with row of 10 setae on distal part of lateral margin and row of small cuticular hairs on its proximal part. On ventral surface of protopod 7 setae, tip blunt ; endopod not reaching tip of protopod.

REMARKS

NORDENSTAM (1933) published a photograph of a female specimen and drawings of appendages. The present redescription and the study of the types was necessary to enable us to identify the new material correctly. The species resembles superficially *Munna antarctica* due to the presence of pointed coxae (only coxae 5-7 in *M. bituberculata*), large ocular spines, similar long and "hairy" P1 in mature males. The pair of longitudinal ridges on the cephalothorax after which the species was named are not always distinct, furthermore a similar morphology is also seen in *M. antarctica*. *M. bituberculata* can easily be discerned from large specimens of *M. antarctica* by the laterally rounded coxae 2-3 (dorsal view). This feature was seen in specimens from King George Island as well as in those from South Georgia (figs. 29, 30). As in small specimens of *M. antarctica* pointed coxae are not always conspicuous, other features can be used for determination :

- spines on pereopods of *M. bituberculata* are generally shorter, on propodus long spines surpassing width of this article (seen in *M. antarctica*) are absent ;
- flagellum of A2 of *M. bituberculata* shorter. A2 about 1,5 as long as body ;
- disto-lateral edges of pereonites 1-4 distinctly rounded ;
- mature females were found among relatively small animals (from 2.5 mm length) while females of *M. antarctica* reach their maturity at a larger size (larger than 6 mm in Admiralty Bay).

TATERSALL's *M. maculata* specimens belong to *M. bituberculata*, he was anyway doubtful about the identification of these specimens. It seems that *M. bituberculata* is restricted to the maritime antarctic and subantarctic areas of the southern Atlantic region, while *M. maculata* might be endemic of Kerguelen's area. (see discussion of *M. maculata*). NORDENSTAM (1933) obviously compared specimens of *M. bituberculata* and *M. affinis*, but the published data allow no absolute certain distinction of the two.

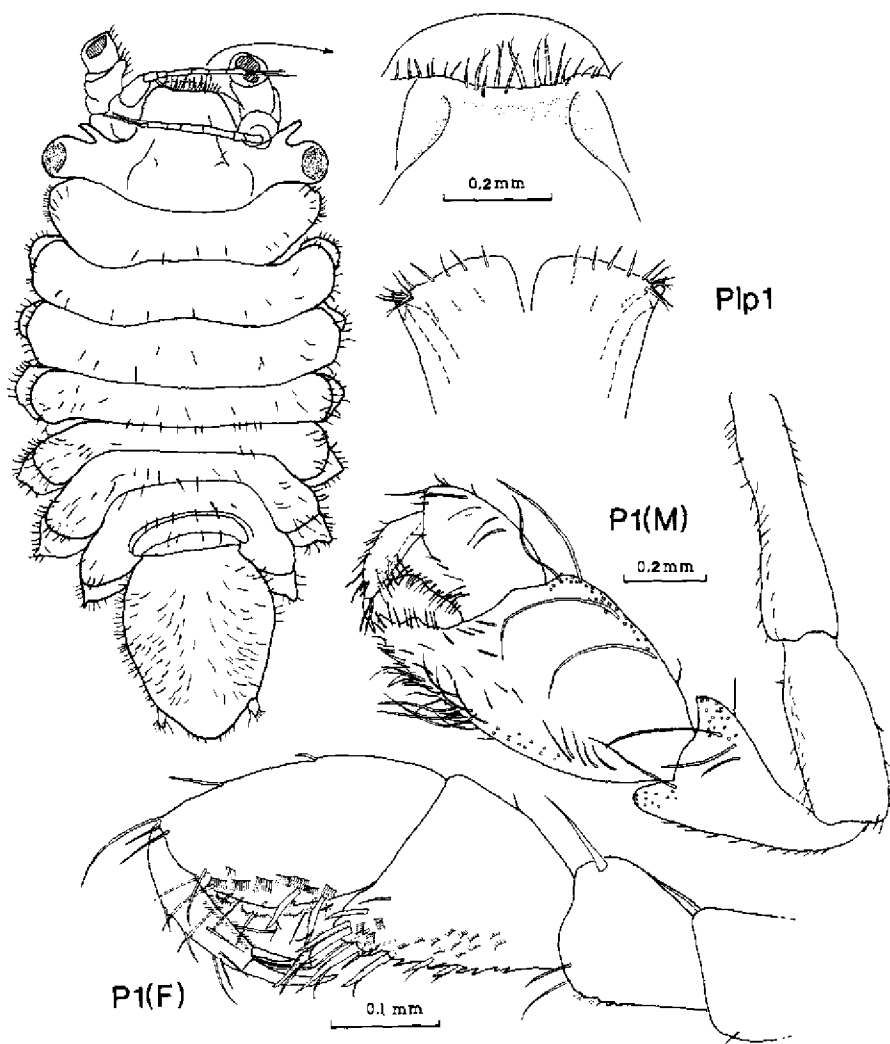


FIG. 30. — *Munna bituberculata* Nordenstam, 1933 : dorsal view of 3 mm male specimen from South Georgia, Cumberland Bay ("*M. maculata*" of TATTERSALL 1920 ; NHM London 1921.5.12-17) with detail of rostral margin ; tip of male Plp1 and P1 (below) from the same specimen ; lower P1 of juvenile female (2.6 mm) from South Georgia.

9. *Munna affinis* Nordenstam, 1933

(Fig. 32)

MATERIAL : Syntype material from South Georgia, dissected and mounted on slides (NR Stockholm no. 784, 785).

DISTRIBUTION : Only known from South Georgia (type locality), 12-15 m (NORDENSTAM, 1933).

REMARKS : NORDENSTAM (1933) published a photograph of a male and drawings of some appendages. The slides examined by us allowed a reexamination of the male P1 and Plp1 (fig. 32). The first pereopod of the male has a very broad and comparatively short carpus, resembling the P1 of a mature *M. psychrophila* (fig. 57), a high antarctic species with a straighter apex of the male Plp 1. In *M. antarctica* the carpus of the male P1 is longer, but in a medium-sized male has a similarly shaped P1. Also *M. affinis* has the same pointed coxae 5-7 as *M. bituberculata*. In contrast to the latter species *M. affinis* has eye-stalks with only a "short, obtuse tooth in front of the eyes" (NORDENSTAM, 1933 : 217), while the ocular spine of *M. bituberculata* is larger and pointed. To discover further differences a redescription based on new specimens is desirable.

10. *Munna dentata* Vanhöffen, 1914

MATERIAL : Syntypes from Kerguelen, ZM Berlin no. 17722.

REMARKS : For comparison with the EPOS-collection the types of this species were studied. They are not well conserved and a redescription was not possible. This is a very small species (1-1.2 mm, including mature females with eggs) with a broad pseudorostrum and a serrated lateral margin of the pleotelson (see drawings of VANHÖFFEN, 1914 : fig. 93) and thus cannot be confused with the other species described herein.

11. *Munna maculata* Beddard, 1886

(Fig. 33)

SYNONYMS : non *M. maculata* of TATTERSALL, 1920 (see *M. bituberculata*).

MATERIAL : Holotype from Kerguelen : NHM London nos. 89.4.27.45 (slide with body of 3.7 mm male); 1921.12.5.69; 1 3.5 mm immature female from Kerguelen (MNHN Paris Is. 2927, labelled "*Munna antarctica*"; see CARVACHO, 1977).

For other specimens labelled "*Munna maculata*" see also "material" of *M. bituberculata* and *M. longipoda* n. sp.

DISTRIBUTION : Kerguelen; other localities not certain (BEDDARD, 1886; VANHÖFFEN, 1914; MONOD, 1931; NORDENSTAM, 1933; NIERSTRASZ, 1941; KENNY & HAYSON, 1962; KUSSAKIN, 1967; CLERET, 1973; AMAR & ROMAN, 1973; KUSSAKIN & VASINA, 1980, 1982).

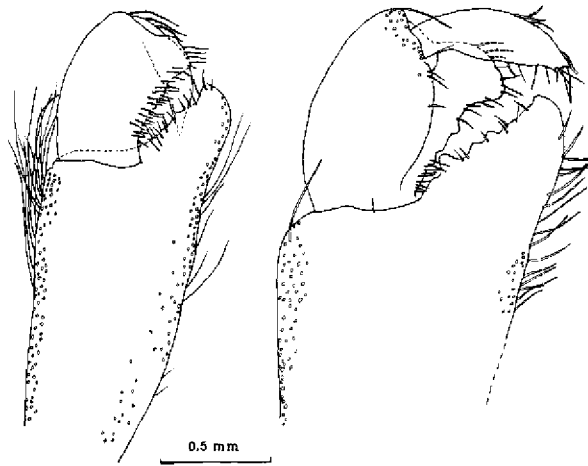


FIG. 31. — *Munna bituberculata* Nordenstam, 1933. Comparison of mature male P1 of 5 mm specimen (left) and mounted appendage from type series (right ; both from South Georgia).

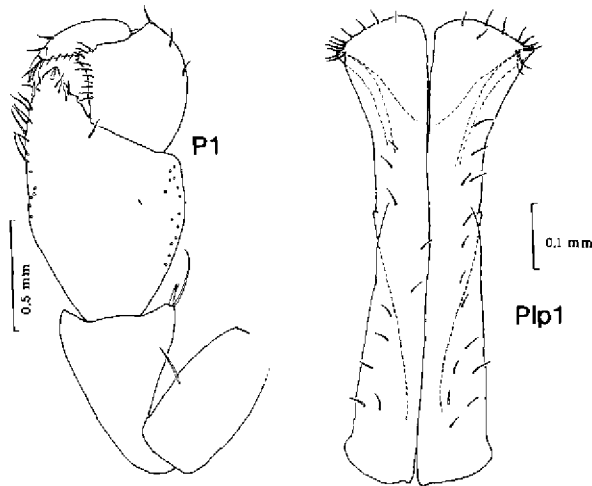


FIG. 32. — *Munna affinis* Nordenstam, 1933 : appendages of male syntype from South Georgia.

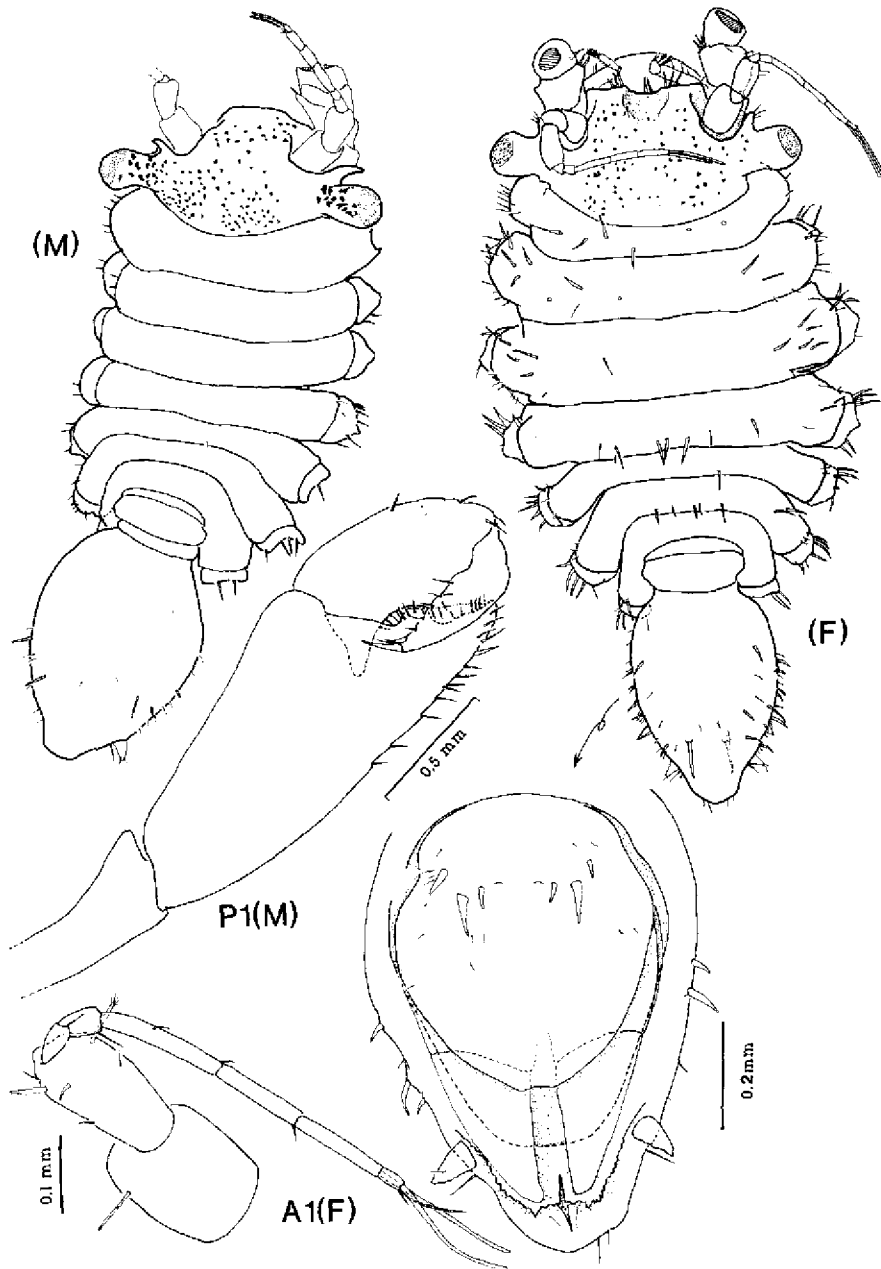


FIG. 33. — *Munna maculata* Beddard, 1886 : Holotype male (3.7 mm) (M) in dorsal view and P1 of type series. Remaining drawings of 3.5 mm immature female from Kerguelen.

REMARKS : *Munna maculata* has also been reported from the Falkland Islands, from South Georgia and from the archipelago of Pointe Géologie (66°39'S 139°55'E). The Falkland material (see NORDENSTAM, 1933) turned out to be a new species (*M. longipoda* n. sp.), TATTERSALL's material from South Georgia examined by us (TATTERSALL, 1920) consisted of specimens of *M. bituberculata*. Since published descriptions are not always very detailed and munnids in general often difficult to distinguish, reports not documented by drawings must at present be treated with care. We had no material suitable for a redescription, but some sketches of the holotype and additional data obtained from a single specimen from Kerguelen show that *M. maculata* has several spines on its pleotelson (also seen in drawings by VANHÖFFEN, 1914, and MONOD, 1931). The body — especially the cephalothorax — is dorsally adorned by dark chromatophores. Coxae bear setae and are slightly pointed (in dorsal view). Interestingly the female operculum bears 3 pairs of strong spines ventrally (present also in *M. longipoda* n. sp., *M. jazdzewskii* n. sp., *M. spicata* n. sp.) and does not cover the following pleopods distally. The male P1 of the holotype from Kerguelen has elongated proximal articles and a large carpus (see fig. 33), which proximally is more slender than in the P1 illustrated by AMAR & ROMAN (1973) from a specimen collected in the archipelago of Pointe Géologie. It might be that the latter material belongs to a different species. Though frequently reported from Kerguelen a good redescription is still wanting.

12. *Munna longipoda* n. sp.

(Figs. 34-41)

MATERIAL : Holotype sample OC-337 OTH (Admiralty Bay, central part, 15-20 m), male 3 mm (ZM Berlin no. 26986). Paratypes : sample OC-318 DG (Admiralty Bay, central part, 30 m), ovigerous female 2.5 mm ; sample OC-337 OTH (Admiralty Bay, central part, 15-20 m), male 3.5 mm ; male 3.5 mm ; female 2.3 mm. sample OC-347 GSN (61°44.2'S 58°16.7'W, 260-285 m), mature female 2 mm. — Material used for description : sample OC-325 DG (Admiralty Bay, central part, 30 m) (1 ovigerous female 1.5 mm) ; sample OC-337 OTH (Admiralty Bay, central part, 15-20 m) (7 males 2-3 mm, 3 immature female 1-2.5 mm, 5 mature female 2-3 mm, 1 ovigerous female 1.5 mm) ; sample OC-347 GSN (61°44.2'S 58°16.7'W, 260-285 m) (1 male 2 mm, 2 immature female 1.5-1.8 mm, 4 mature female 2-2.5 mm, 1 ovigerous female about 3 mm without pleotelson) ; sample OC-524 VVG (Admiralty Bay, central part, 48 m) (1 male 3 mm) ; sample OC-527 VVG (Admiralty Bay, central part, 72 m) (1 mature female 2.5 mm) ; sample OC-528 VVG (Admiralty Bay, Ezcurra Inlet 53 m) (8 males 1.5-3 mm, 3 immature females 1.8-2.5 mm).

Specimens labelled "*Munna maculata*" from Tierra del Fuego (Svenska Sydpolarexp. 1901-1903, 55°10'S 66°15'W, 100 m depth, eastern entrance of the Beagle Channel, NR Stockholm nos. 7303, 6127, det. NORDENSTAM) and from Port Williams, Falklands (NR Stockholm no. 7908) ; Berkeley Sound, Falkland Islands, 51°33'S 58°0'W, depth 16 m (NR Stockholm no. 7313).

DISTRIBUTION : See material : Tierra del Fuego, Falklands, South Shetlands.

DESCRIPTION

Male

Body dorsally depressed, long oval in dorsal view (fig. 34, 40, 41). Cephalothorax slightly convex, elevated posteriorly, bearing few setae on dorsal surface and rostral margin. Eyes on broad eyelobes, only slightly protruding beyond the lateral margin of first segment. Ocular

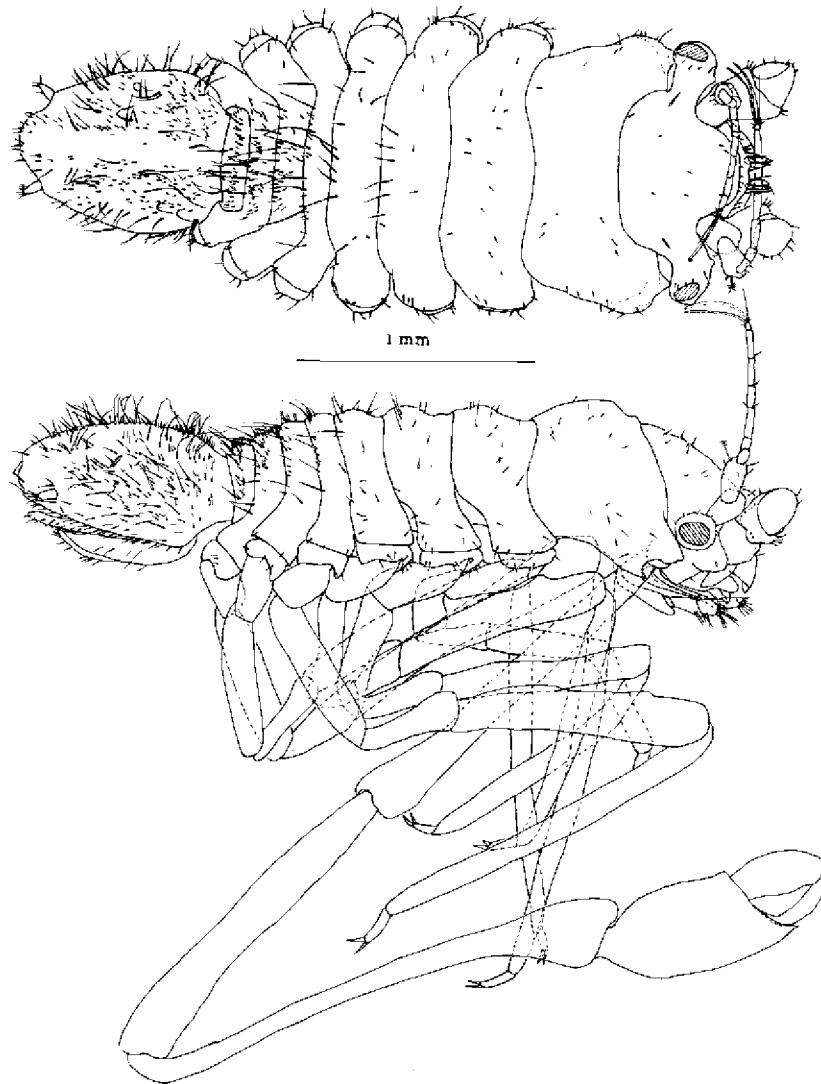


FIG. 34. — *Munna longipoda* n. sp. : dorsal and lateral view of male (3 mm length) (holotype from King George Island).

spine on eyelobe small, blunt, not conspicuous. Rostral margin straight or slightly concave. Pseudorostrum less than twice as long as cephalothorax and about $1/3$ of its length. Pereonite 1 very large, trapezoidal, with acute protrusion on anterior margins. Pereonite 2 half as long as pereonite 1, lateral margins shorter than in pereonite 1, rounded; pereonite 3 shorter than 2, also slightly curved; 4 short, nearly straight. Pereonites 5-7 and second free pleonite about $1/2$ as long as pereonite 4, first pleonite probably absent. Coxae 2-6 visible in dorsal view, rounded, each with few setae. Pleotelson oval, less than $1/3$ as long as length of body.

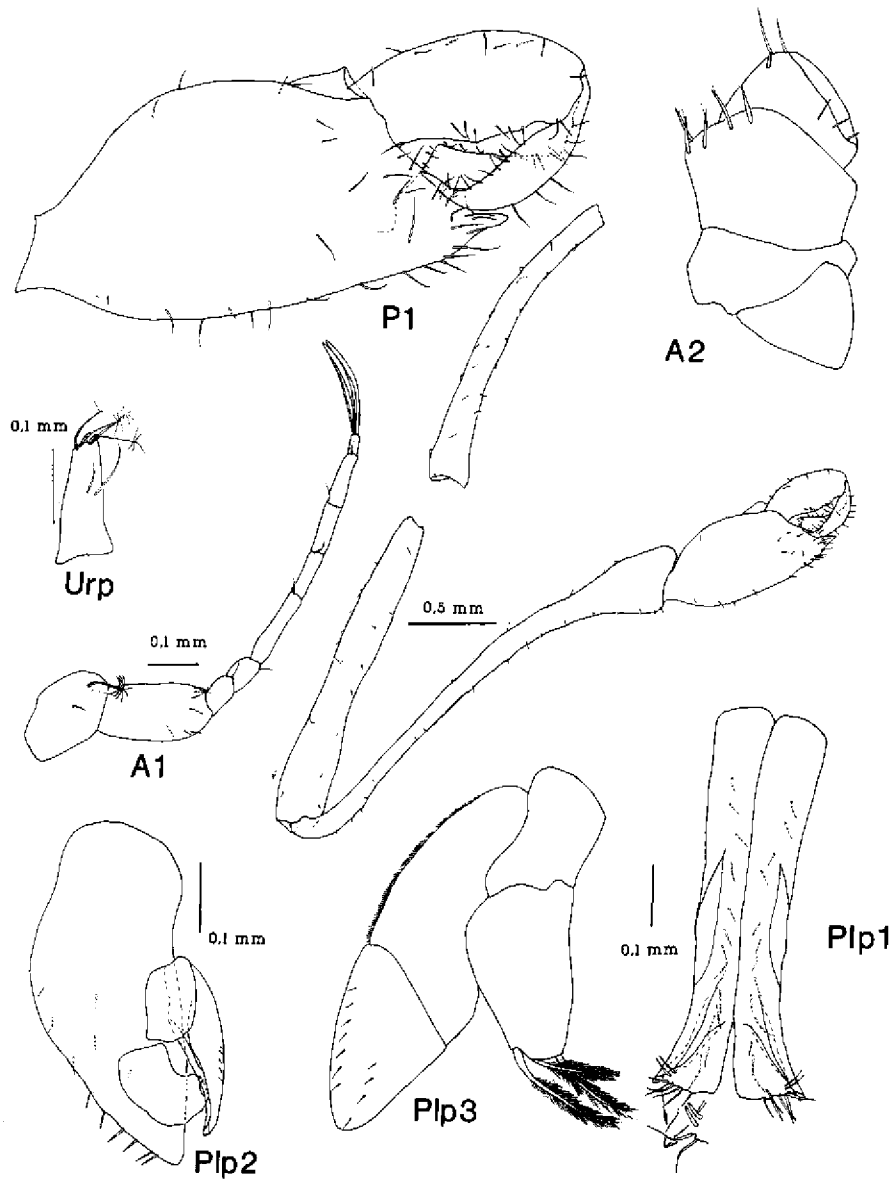


FIG. 35. — *Munna longipoda* n. sp. : A1, A2 and P1p2 of male (holotype); P1, P1p1, P1p3 and Urp of second male (3.5 mm length).

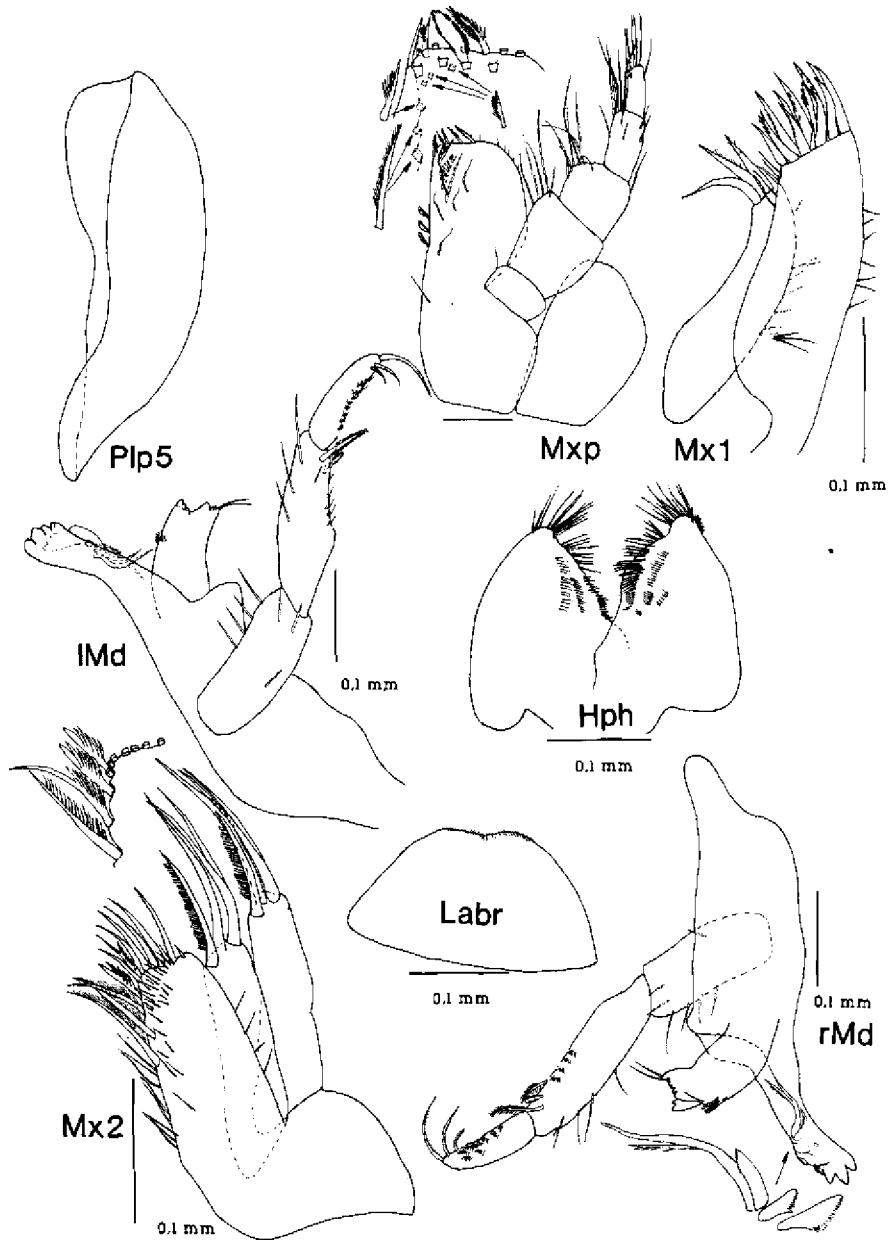


FIG. 36. — *Muna longipoda* n. sp. : mouthparts of male (holotype) ; Plp5 of 3.5 mm male.

Apex rounded. On pleotelson, on pereonites 3-7 medio-dorsally, and on pleonite 2 many very long setae, furthermore on surface of pleotelson, pleon and on two last segments of pereion many short setae. Other segments bearing only very few small setae (fig. 34).

A1 (fig. 35) consisting of 8 articles with two aesthetascs on two last articles. First article bearing one feather-like bristle.

A2 (fig. 35) on peduncular articles 3 and 4 few sensory spines and setae. Following articles lost in fixed material.

Md (fig. 36) palpal articles 1 and 2 almost similar in length, article 3 shorter. On article one and two few simple setae. On last article the small sensillum usually seen in all species of the genus *Munna* absent. Lacinia mobilis on rMd like a seta. Molar with two setae on proximal margin and with group of very small setae on distal surface. Incisor with 5 blunt teeth. lMd lacinia solid with 4 blunt teeth.

Mx1 (fig. 36) outer endite with 13 spines, partly serrated, inner endite only with 4 spines on apical margin as always seen in the genus *Munna*. Thin setae visible only on lateral margins of both endites.

Mx2 (fig. 36) inner endite with 3 plumose, 3 serrated and row of 5 long setae on apical margin. On medial and outer endite combed spine shorter than three next ones.

Mxp (fig. 36) endite with ventral row of 4 scale-like setae, apical row of 8 and dorsal row of 4 setulated setae. Disto-lateral edge of third palpal article not protruding, free distal margin convex. On medial margin at the height of border between palpal article 1 and 2 three coupling-hooks.

Male P1 extremely long (fig. 35), almost twice as long as body, basis, ischium and merus elongate, with about 20 very small cuticular hairs each. Merus narrowest, only in distal part broader, very long, carpus with convex dorsal margin and almost straight ventral one. Ventro-distal edge of palpus forming one tooth. Propodus twice as long as broad, rectangular. Setation (fig. 35) only with single simple setae.

P2-P7 (figs. 37, 38) ischium about twice as long as merus and three times as long as basis. 3-6 sensory spines on ischium and usually 3 on latero-distal edge on merus, sometimes 1 on opposite side. Sensory spines on carpus of P2-P5 usually arranged in two groups on dorsal margin and few single spines on both margins. In P6-P7 most sensory spines in two groups : one subdistally on dorsal margin and one distally on carpus. On propodus sensory spines distributed evenly on surface. Male Plp1 (fig. 35, 41) of nearly constant width, with about 20 setae on dorsal surface ; distal margin straight, with distinctly formed disto-lateral, pointed horn. 6 setae on distal margin and 2 on dorsal surface near lateral horn.

Male Plp2 (fig. 35, 41) protopod with some simple setae on lateral margin and on ventral surface. Tip blunt. Endopod not reaching tip of protopod.

Plp3 (fig. 35) exopod as long as endopod (with setae), with two rows of tiny single setae on ventral surface of second article. (Plp5 lost during dissection). Urp (fig. 35) with two lateral setae and 4 feather-like bristles apically.

Female (fig. 39)

Body broader than in male, segments 1-4 subequal in length, first slightly curved anteriorly, next 3 almost straight, third broadest. On each segment several relatively long setae.

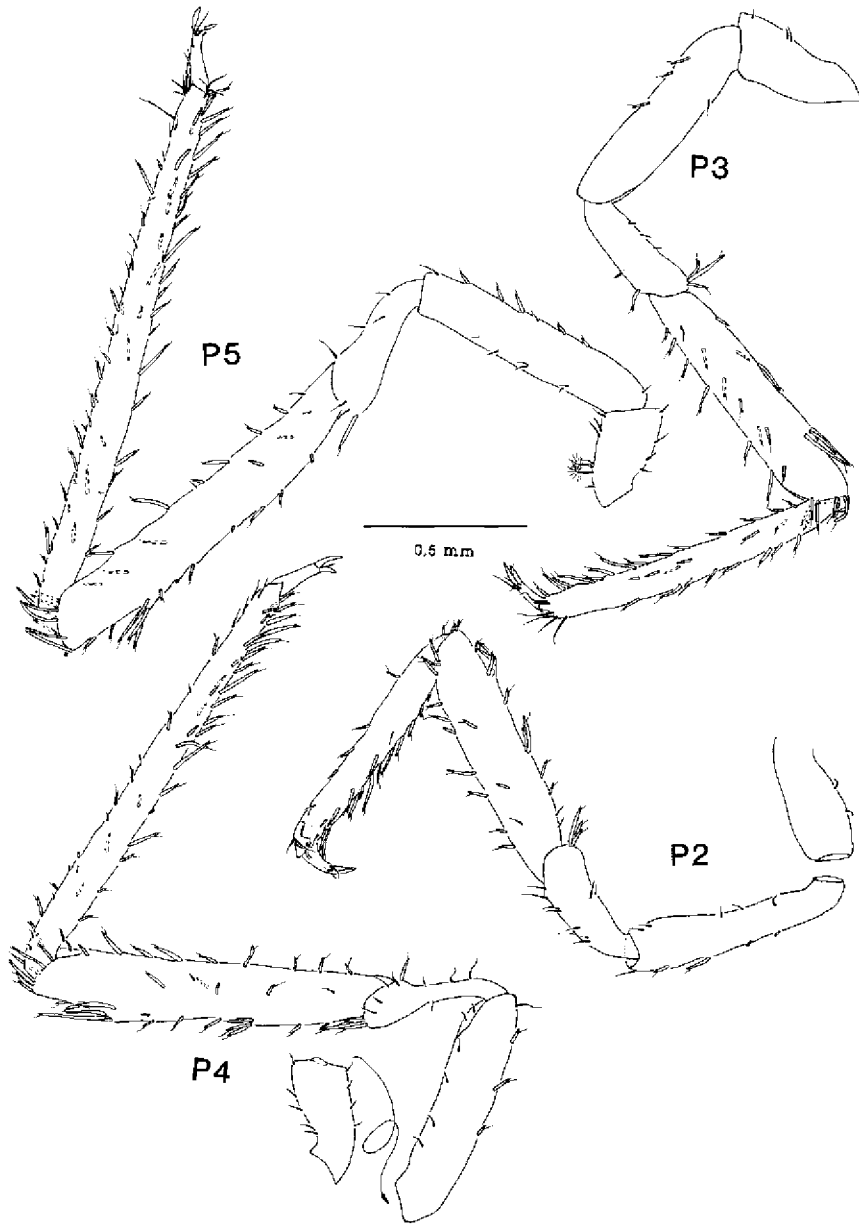


FIG. 37. — *Munna longipoda* n. sp. : P2, 3, 4 and 5 of male (holotype).

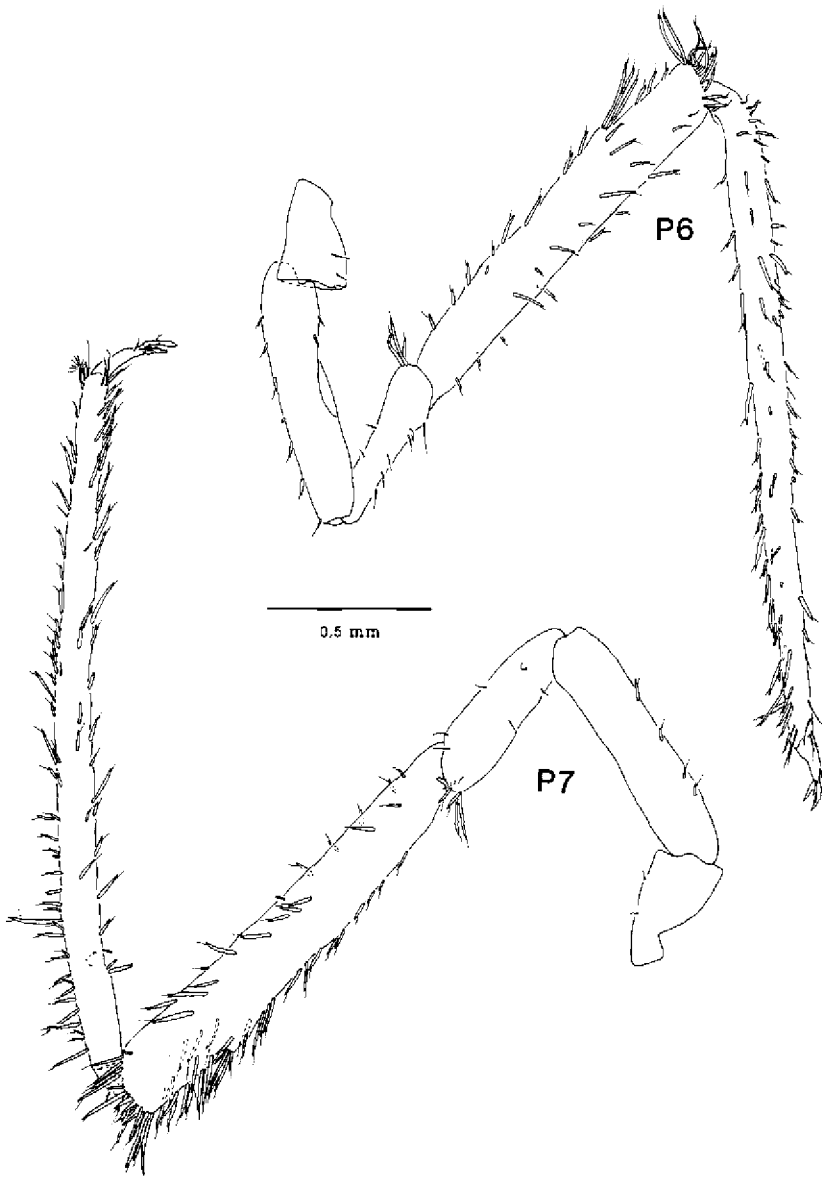


FIG. 38. — *Munna longipoda* n. sp. : P6 and P7 of male (3 mm holotype).

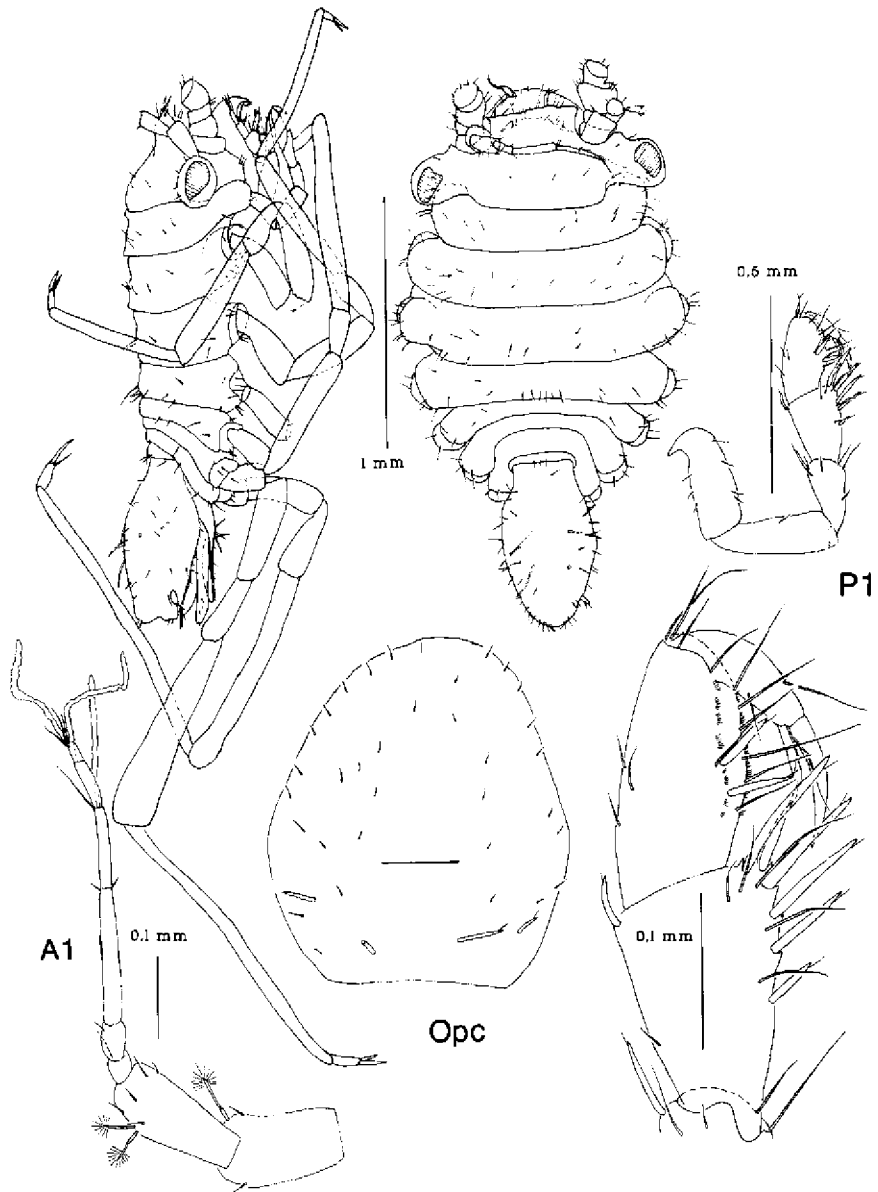


FIG. 39. — *Munna longipoda* n. sp. from King George Island : dorsal and lateral view of ovigerous female (2.5 mm length); P1 and A1 of this same specimen; operculum of female of 2 mm length.

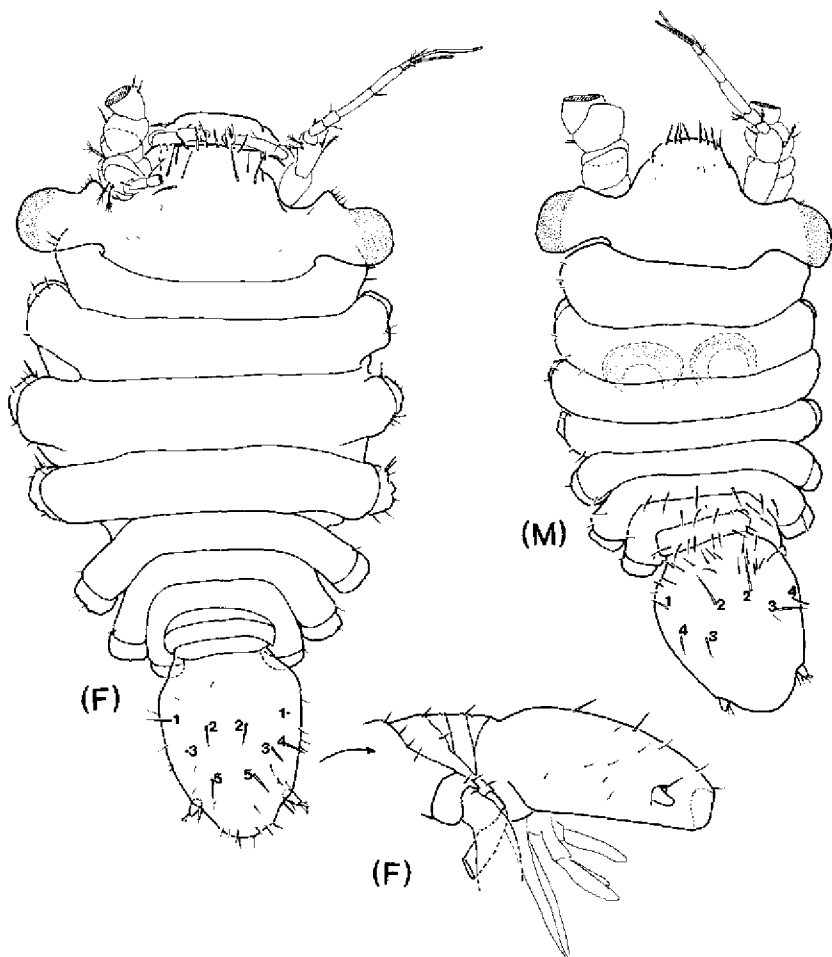


FIG. 40. — *Munna longipoda* n. sp. : dorsal view of 1.9 mm non-ovigerous female (left), (NR Stockholm no. 7313) and 1.8 mm mature male (right) from the Falkland Islands (NR Stockholm no. 7303); female pleotelson in lateral view.

On pleotelson at least four long setae-like spines. Rostral margin with 4 setae-like spines, and laterally 2-3 setae.

A1 (fig. 39) consisting of 8 articles, second peduncular article distinctly longer than next ones, with 3 aesthetascs on last three articles. P1 carpus trapezoidal, with 4 sensory spines on ventral margin, two on ventro-distal edge and one on dorso-distal edge Propodus long oval with two sensory spines on palm. On propodus 2 rows of cuticular scales. Operculum oval with many small setae on ventral surface and margins and with two pairs of sensory spines in proximal part (two more medially and two laterally).

Further variations : The male P1 is very long in the illustrated specimen, in smaller males it is shorter and similar to the general pattern found in other species of the genus *Munna*. In

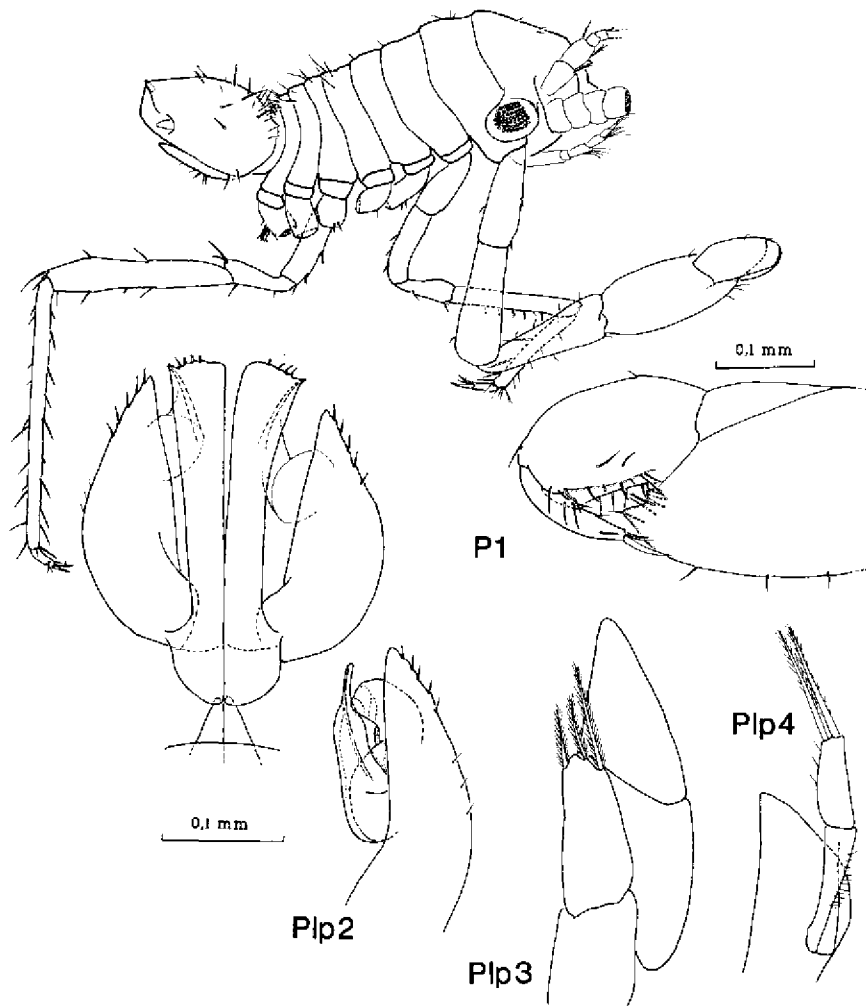


FIG. 41. — *Munna longipoda* n. sp. : dorso-lateral view of mature male from the Falkland Islands (NR Stockholm no. 7303) and some appendages of male.

our material we found also males of similar length of the body but with very different length of the P1, they are obviously in different stages of maturity. The dorsal surface of the cephalothorax of females bears sometimes few long spines. Ovigerous females were found among relatively small specimens (about 2-2.5 mm).

REMARKS : It seems that this is a south boreal/subantarctic species, with smaller specimens north of the Drake Passage (1.6 to 1.8 mm, at King George Island 1.5 to 3.5 mm). This distribution is very unusual, since subantarctic species are rare in the Magellanic area, but

there are exceptions (see maps on pp. 50-88 in BRANDT, 1991). With its dorsally convex and smooth surface and the reduced ocular spine the species might be confused with the high-antarctic *M. cryophila* and *M. psychrophila*. But the latter two species do neither have the pattern of long pleotelsonic setae (fig. 39, 40) nor the spines ventrally on the female operculum (Plp2). We have seen the latter spines in females from the Falkland Islands as well as from King George Island. In samples from Admiralty Bay this species was often found together with *M. neglecta* and at first sight large females may be confused. However *M. longipoda* can be easily discerned from *M. neglecta* by the richer setation on its dorsal surface, the small blunt ocular spines, relatively slender pereopods with a large number of sensory spines and almost absence of simple setae.

13. *Munna jazdzewskii* n. sp.

(Figs. 42-47)

MATERIAL : Collection for surveys of the benthic fauna by several Polish expeditions to King George Island. Holotype sample OC-326 DG (Admiralty Bay, Ezcurra Inlet 15 m) : male 4 mm (ZM Berlin no 26985). Paratypes : sample OC-326 DG (Admiralty Bay, Ezcurra Inlet 15 m) : female 3.5 mm ; male 3.5 mm ; male 3 mm. sample OC-330 DG (Admiralty Bay, Ezcurra Inlet 15 m) : mature female 3.5 mm ; mature female 4 mm ; male 3.5 mm. — **Material used for description :** sample OC-46 DG (Admiralty Bay, central part, 20-30 m) (1 male 1.5 mm) ; sample OC-230 DG (Admiralty Bay, Ezcurra Inlet 30-40 m) (1 immature female 3 mm) ; sample OC-298 VVG (Admiralty Bay, Ezcurra Inlet 13 m) (1 immature female 3 mm, 1 male 4 mm) ; sample OC-299 VVG (Admiralty Bay, Ezcurra Inlet 15 m) (more than 100 males and females) ; sample OC-302 VVG (Admiralty Bay, Ezcurra Inlet 17 m) (38 males and females) ; sample OC-304 VVG (Admiralty Bay, Ezcurra Inlet 10 m) (80 males and females) ; sample OC-310 DG (Admiralty Bay, Ezcurra Inlet 10-20 m) (5 males 2-3.5 mm, 5 immature females 3 mm, 1 mature female 3.5 mm) ; sample OC-326 DG (Admiralty Bay, Ezcurra Inlet 15 m) (26 males 2-4 mm, 17 immature females 1.8-3.2 mm, 4 mature females 3-3.5 mm, 3 ovigerous females 3 mm) ; sample OC-327 DG (Admiralty Bay, Ezcurra Inlet 30 m) (1 immature female 3 mm) ; sample OC-329 DG (Admiralty Bay, Ezcurra Inlet 30 m) (1 male 1.8 mm) ; sample OC-330 DG (Admiralty Bay, Ezcurra Inlet 15 m) (58 males and females) ; sample OC-544 VVG (Admiralty Bay, Ezcurra Inlet 20 m) (2 immature females 1-1.5 mm, 1 male 2.5 mm) ; sample OC-545 VVG (Admiralty Bay, Ezcurra Inlet 26 m) (5 males 2-3.8 mm, 3 immature females 1.5-3.2 mm).

DISTRIBUTION : Only known from the new localities : South Shetland Islands, King George Island, Admiralty Bay.

DESCRIPTION

Male (fig. 42)

Body dorsally only slightly convex, in dorsal view oval. Cephalothorax dorsally almost straight, elevated posteriorly, smooth, bearing a few short setae. Eyes on eye-lobes, stalked, only slightly protruding beyond the lateral margin of first segment. Ocular spine on eyelobe conspicuous, triangular, acute, with few small setae on lateral margin, not curved laterally. Rostral margin almost straight, bearing medially 8 sensory spines and laterally 4-5 short setae. Pseudorostrum more than 1/3 of width of cephalothorax and less than 1/2 of its length, subrectangular. Pereonites 1-4 subequal in width and length, lateral part of first bent anteriorly, two next less curved, fourth segment straight. Pereonites 5-7 subequal medially, each nearly 1/2

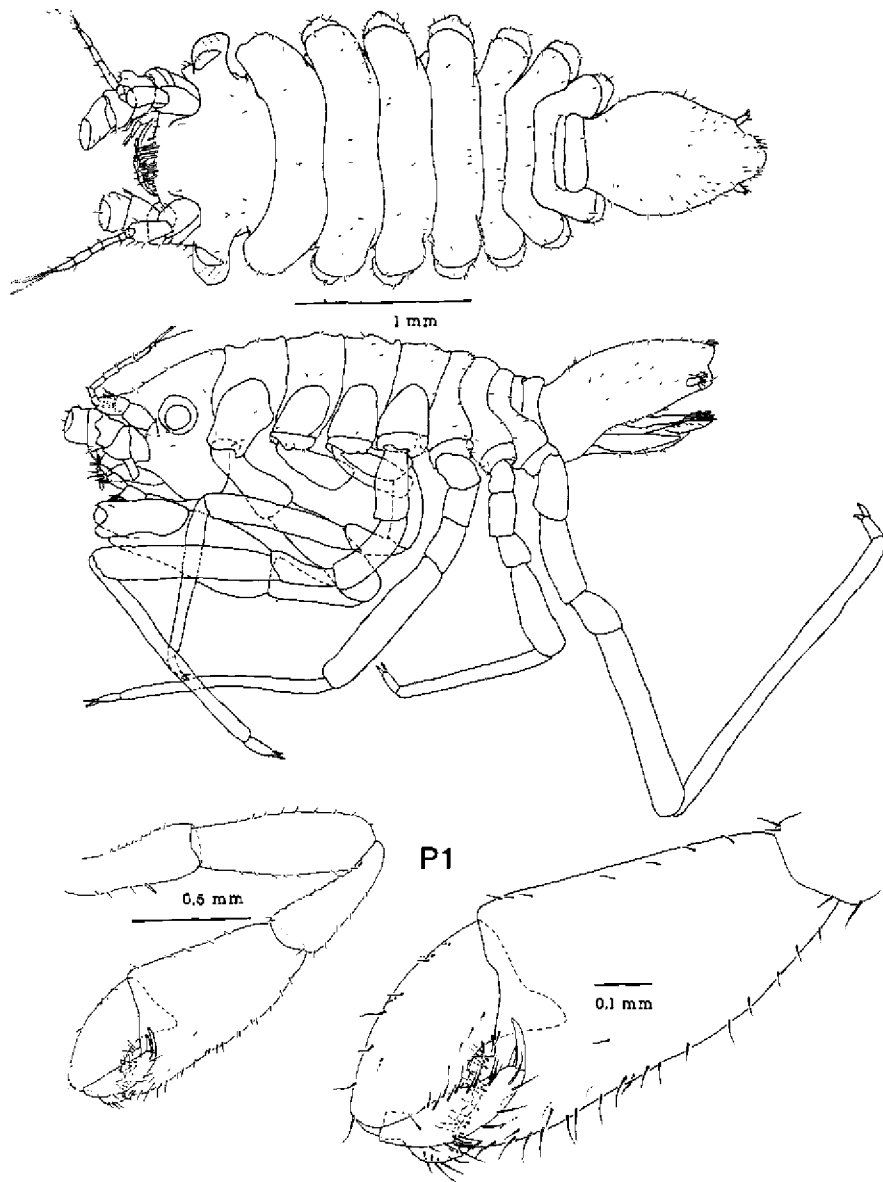


FIG. 42. — *Munna jazdzewskii* n. sp. : dorsal and lateral view of male (4 mm length, holotype) ; P1 of this same specimen.

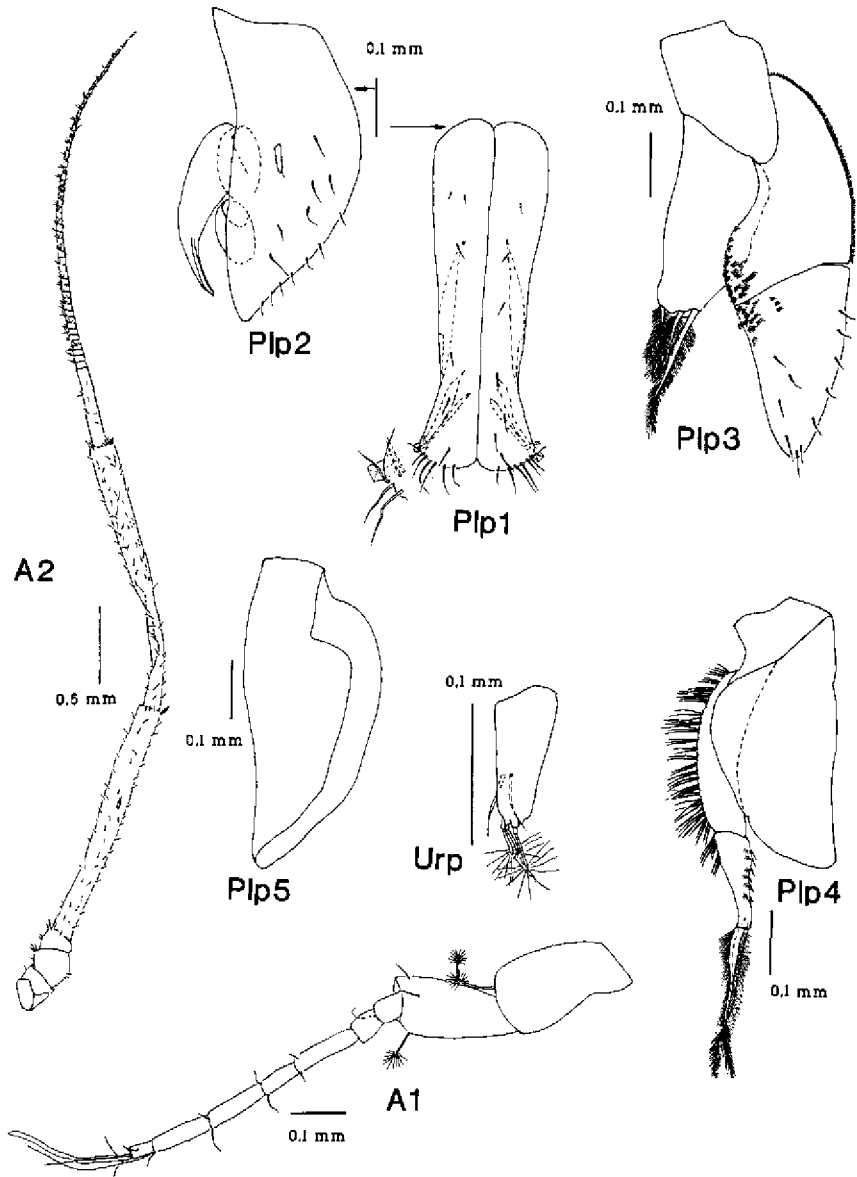


FIG. 43. — *Munna jazdzewskii* n. sp. : A1, A2, Plp1, 2, 3, 4, 5 and Urp of male (holotype).

as long as pereonites 1-4. Each tergite of pereon segments bearing about 10-15 very small cuticular hairs. All coxae with exception of the first one visible in dorsal view, each more or less rounded, with few small setae. Pereon followed by two free pleonites, second one about as long as pereonites 5-7, first half as long as second; on second (fig. 42) few small cuticular hairs visible. Pleotelson dorsally oval, less than 1/3 of length of the body, less than twice as long as medial width, with 40-50 very small cuticular hairs (similar to those on pereon), concentrated on caudal half. Apex in lateral view slightly concave. (fig. 42).

A1 as typical for the genus, consisting of 9 articles in male (fig. 43), 8 in female (fig. 47), first bearing one, second two feather-like bristles. Last two articles each with one aesthetasc.

A2 (fig. 43) very long (about twice length of body) with 6 peduncular articles and at least 50-articulated flagellum. First peduncular article partly reduced, three following articles subequal in length (third slightly longer), articles 3 and 4 with few small setae. Articles 5 and 6 slightly narrower than previous ones, each ten times longer than broad, each with many small setae on surface, furthermore fifth article bearing 2 sensory spines, one medially, second terminally.

Md (fig. 44) second palpal article longest, first and third equal in length. On first article two groups of setae (proximally 4 short ones, distally 2), second with several longer simple setae on one side and two strong setulated setae distally. Setal row of rMd consisting of four serrated setae; lacinia like a seta, incisor with four blunt teeth. Molar with 4 setae on proximal margin. lMd differs from right one in solid lacinia with four blunt teeth, on proximal margin of molar only 2 setae visible.

Mx1 (fig. 44) outer endite with 13 spines, partly serrated, inner endite apart from the four spines seen in all species of *Munna* additionally on distal ventral edge group of 5 simple setae. Lateral margins of both endites and medial of inner endite bearing thin setules.

Mx2 (fig. 44) on inner endite 3 setae plumose on one side, 3 serrated, and a row of 8 long finely setulated setae. Medial and lateral endite each with 4 setae, a single combed spine distinctly shorter than other ones.

Mxp endite with small hairs on lateral margin; apical margin bearing ventral row of 5 scale like setae (see details in figure 44), 9 apical and 9 dorsal setulated setae. On medial margin at the height of border between palpal article 1 and 2, 3 coupling-hooks. Third palpal article with disto-lateral edge distinctly protruding medially, distal free margin of this segment concave.

P1 of male (fig. 42) with trapezoidal carpus, twice as broad as long, with protruding disto-ventral edge, producing two blunt teeth. Propodus less than half length of ventral margin of carpus, with sinuous palm complementary in shape to protrusion of carpus. Dactylus smallest, with two claws. On each segment many small setae (about 10 on basis to 50 on carpus), setation without sensory spines with exception of basis (one sensory spine).

P2-P7 (fig. 45, 46) ischium slightly longer than basis and merus, proximal articles much shorter than carpus and propodus (at least 1/3 length). On basis frequently one sensory spine, on merus 2-3. Carpus of P3-P5 with 3 groups of sensory spines on dorsal margin; few on ventral margin (2-3 spines) On propodus sensory spines only on medial margin.

Male Plp1 (fig. 43) narrowest distally at 3/4 of its length, with 5-7 simple setae on ventral surface and 7 on distal convex margin, 2 on disto-lateral edge on dorsal surface. Lateral horns short (details in figure 43).

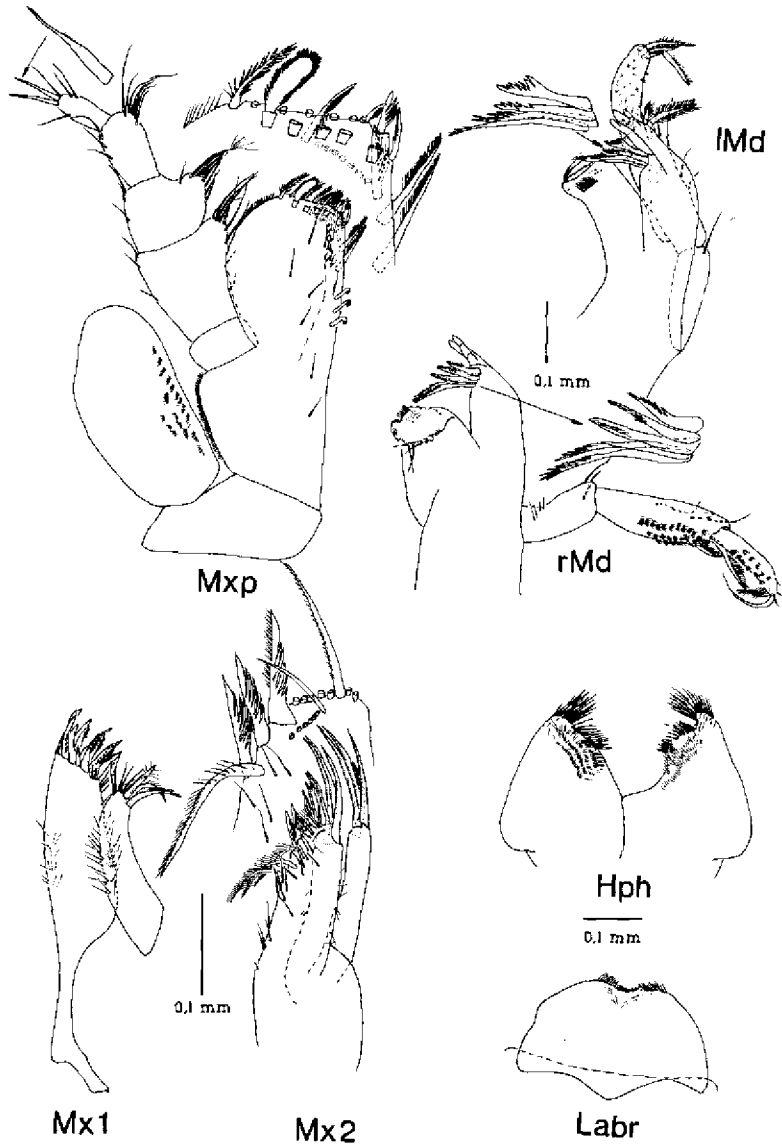


FIG. 44. — *Munna jazdzewskii* n. sp. : mouthparts of male (holotype).

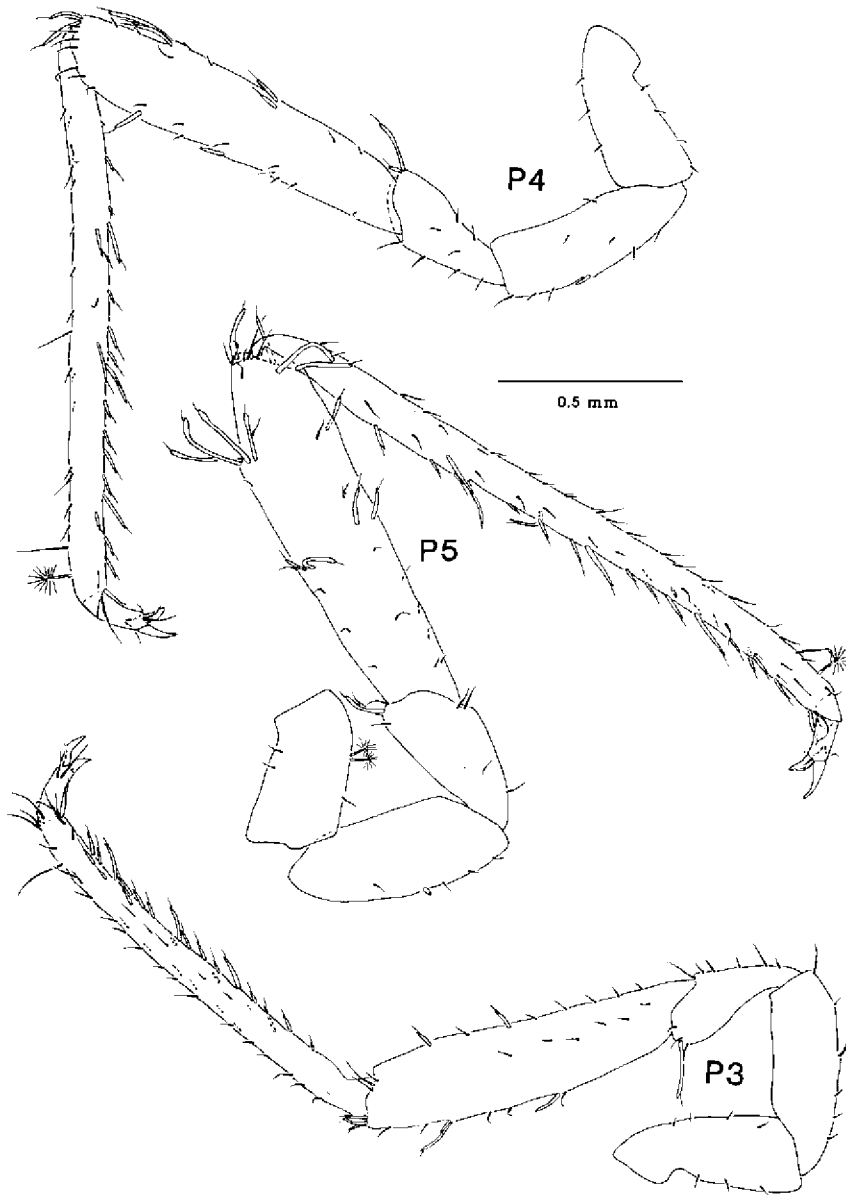


FIG. 45. — *Munna jazdzewskii* n. sp. : P3, 4 and 5 of male (holotype).

Male Plp2 protopod (fig. 43), with several setae on ventral surface and on lateral margin. Additionally 1 sensoryspine medially nearer medial margin. Lateral margin slightly concave distally, tip blunt; endopod not reaching tip of protopod, exopod oval.

Plp3 (fig. 43) with exopod surpassing endopod, of two articles, with row of small hairs on lateral margin of first article, second article tapering distally, with few simple setae on lateral margin, tip, and on ventral surface nearer medial margin. About 20 cuticular scales on medial margin in its central part and on surface.

Plp4 (fig. 43) exopod with 2 plumose setae longer than endopod, of two articles. Lateral margin of first and partly of second article covered by several groups of long setae. Second article tapering distally, on medial margin several groups of setulae; endopod oval, without setae.

Plp5 1.5 (fig. 43) times longer than endopod of Plp4. Uropods (fig. 43) with two marginal setae inserted at half of its length and 3 feather-like bristles distally.

Female

Body somewhat broader than in male (fig. 47), second pereonite slightly shorter than two next ones, with more small hairs on dorsal surface of segments 2-4 (50-60), additionally on first segment several blunt sensory spines. A1 8-articulate. P1 shorter than in male, trapezoidal carpus with 8 sensory spines on ventral margin, propodus oval distal margin concave palm with two sensory spines. On carpus and propodus groups of small setulated cuticular scales, setation as in figure (fig. 47). Operculum oval with many short setae on margins and on ventral surface, on proximal part two groups each of two large blunt sensory spines.

Further variations : The number of spines on cephalothorax and first pereon segment of females depends on age and length, usually small females bearing less spines.

REMARKS : At first sight *M. jazdzewskii* looks like *M. neglecta*, especially the males are very similar. Females can very easily be discerned from *M. neglecta* by the rounded lateral edges of pereonites 1-4, furthermore a very reliable feature are the 2 pairs of spines on the operculum. Also important, though more difficult to observe, is a single spine on the male Plp2. Both sexes bear on the dorsal surface distinctly fewer short setae than *M. neglecta*. Though both species are present in Admiralty Bay, the area of their occurrence is distinctly separated. *M. neglecta* was found only in the central, deep part, while *M. jazdzewskii* occurs only in samples from Ezcurra Inlet (western part of Admiralty Bay). The depth where both these species were found is quite similar and probably the most important factor in occurrence of both animals is different kind of bottom.



FIG. 46. — *Munna jazdewskii* n. sp. : P2 and P7 of male (holotype) ; P6 of second male (3 mm length).

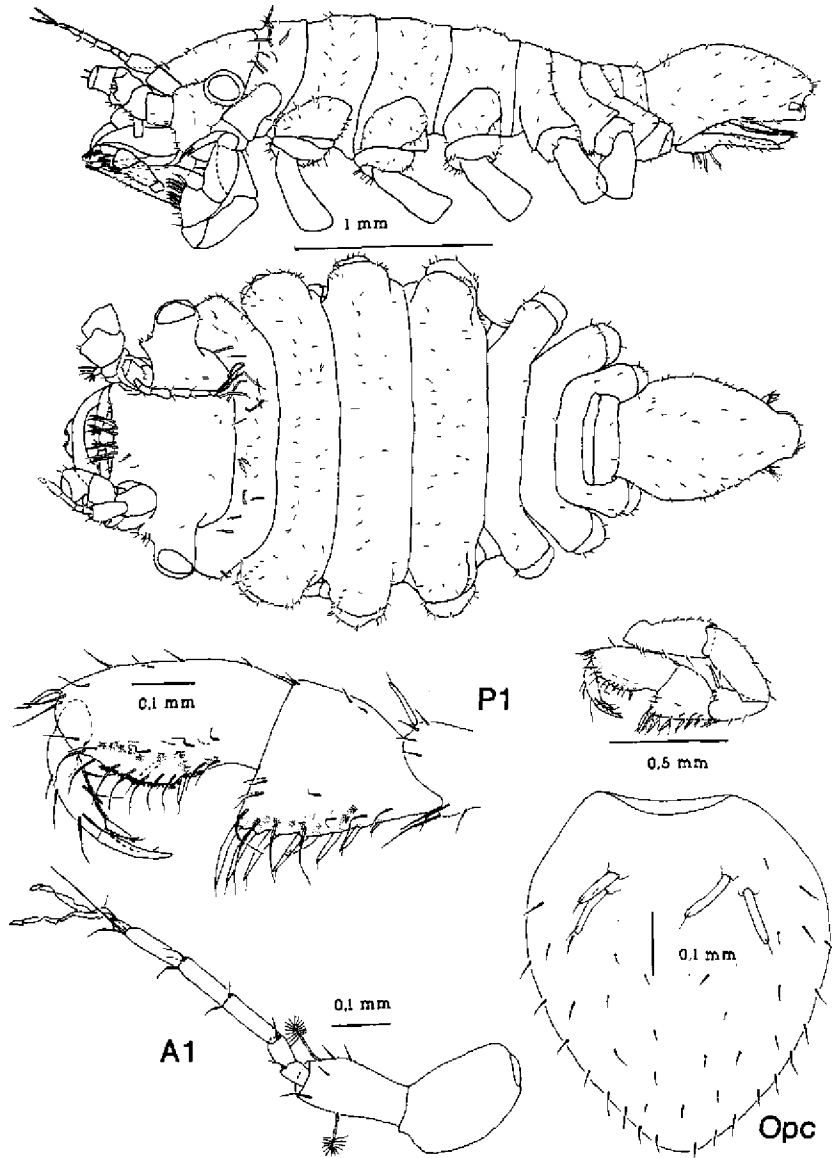


FIG. 47. — *Muma jazdzewskii* n. sp. : lateral and dorsal view of mature female (3.5 mm length) ; P1, A1 and Opc of this same specimen.

14. *Munna neglecta* Monod, 1931

(Figs. 48-55)

SYNONYMS

Haliacris antarctica : RICHARDSON, 1913; TATTERSALL, 1920.

Munna antarctica : STEBBING, 1919

MATERIAL : Specimens originally described by RICHARDSON 1913 as *Haliacris antarctica* from the Deuxième Mission Charcot (1912), Peterman Isl. : MNHN Paris nos. Is 16 (types), Is 2925-2932 ; specimens from the Svenska Sydpolarexpedition 1901-1903 (see NORDENSTAM, 1933) : Falklands, Port William 51°40'S 57°42'W (NR Stockholm no. 7911) and South Georgia, Cumberland Bay (NR Stockholm no. 7961) ; specimens from the " Terra Nova " expedition (see TATTERSALL, 1920 : "*Haliacris antarctica*"), NHM London no. 1921.11.29.17-18 (locality : Cape Adare, " Terra Nova " st. nr. 220, 45-50 fathoms). — **Material from Admiralty Bay** : sample OC-164 DG (Admiralty Bay, central part, 1 m) (1 immature female 2.8 mm) ; sample OC-165 OTH (Admiralty Bay, central part, 30 cm) (3 males 3.5-4.5 mm, 1 immature female 3 mm) ; sample OC-171 HN (Admiralty Bay, central part, 30 cm) (2 males 2.1 and 3.5 mm, 1 immature female 3mm) ; sample OC-197 DG (Admiralty Bay, central part, 20 m) (1 mature female 3.8 mm) ; sample OC-247 VVG (Admiralty Bay, central part, 14 m) (1 male 2 mm, 2 mature females 5 mm) ; sample OC-283 DG (Admiralty Bay, central part, 15 m) (2 males 3.2 and 3.5 mm, 2 immature females 3.5 and 4 mm, 2 mature females 4 and 4.2 mm) ; sample OC-289 DG (Admiralty Bay, central part, 30 m) (1 male 4.5 mm, 2 immature females 3.2 and 4 mm) ; sample OC-308 DG (Admiralty Bay, central part, 30-40 m) (1 male 3.8 mm) ; sample OC-318 DG (Admiralty Bay, central part, 30 m) (2 males 1.5 and 4.5 mm, 2 mature females 3.5 and 4 mm, 1 ovigerous female 3.5 mm.) ; sample OC-325 DG (Admiralty Bay, central part, 30 m) (more than 100 males and females) ; sample OC-337 OTH (Admiralty Bay, central part, 15-20 m) (6 males 2.9-4 mm, 4 immature females 1.5-4 mm 2 mature females 3.5 mm, 1 ovigerous female 3.2 mm) ; sample OC-338 OTH (Admiralty Bay, central part, (?)) (5 males 1.2-4 mm, 2 immature females 2.2-3.8 mm) ; sample OC-339 OTH (Admiralty Bay, central part, (?)) (1 mature female 3.2 mm) ; sample OC-453 VVG (Admiralty Bay, central part, 39 m) (1 male 3 mm).

DISTRIBUTION : New localities : South Shetland Islands, King George Island, Admiralty Bay. Specimens have been reported from the Falklands, South Georgia, South Orkneys, South Shetlands, Peterman and Wiencke Island, Kerguelen, Crozet Islands, the Antarctic Peninsula, off Cape Adare, the George V Coast, Adelic land, Vestfold Hills, 0 to 215 m depth (PFEFFER, 1887; RICHARDSON, 1913; TATTERSALL, 1921; MONOD, 1931; NORDENSTAM, 1933; HALE, 1937; AMAR & ROMAN, 1973; KUSSAKIN, 1982; KUSSAKIN & VASINA, 1980, 1982; TUCKER & BURTON, 1987). The Falkland population should be reexamined with fresh material. The partly dissected male (NORDENSTAM's specimen) examined by us did not yield enough information for a reliable determination. The species is not present in the EPOS-material (Weddell Sea).

REDESCRIPTION

Male (fig. 48, 54)

Body only slightly convex, in dorsal view long oval. Cephalothorax dorsally almost straight, bearing many small cuticular hairs on medial part and eyelobes (about 40). Eye stalked, slightly protruding beyond the lateral margin of first segment. Ocular spine conspicuous, triangular, acute with few small cuticular hairs on lateral margin and dorsal surface, somewhat curved laterally. Rostral margin convex with group of 8-10 sensory spines.

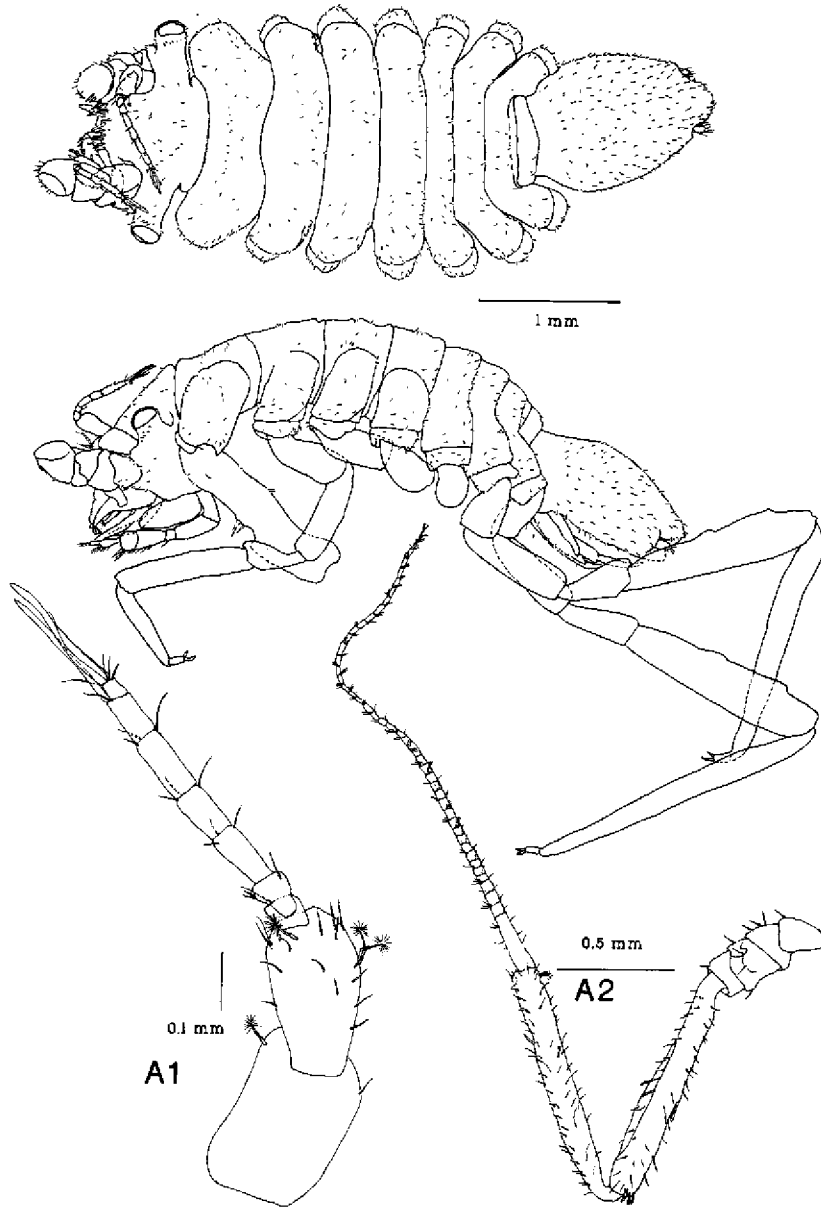


FIG. 48. — *Munna neglecta* Monod, 1931, from King George Island : dorsal and lateral view of male (4.5 mm) ; A1 of this same specimen and A2 of second male (4 mm).

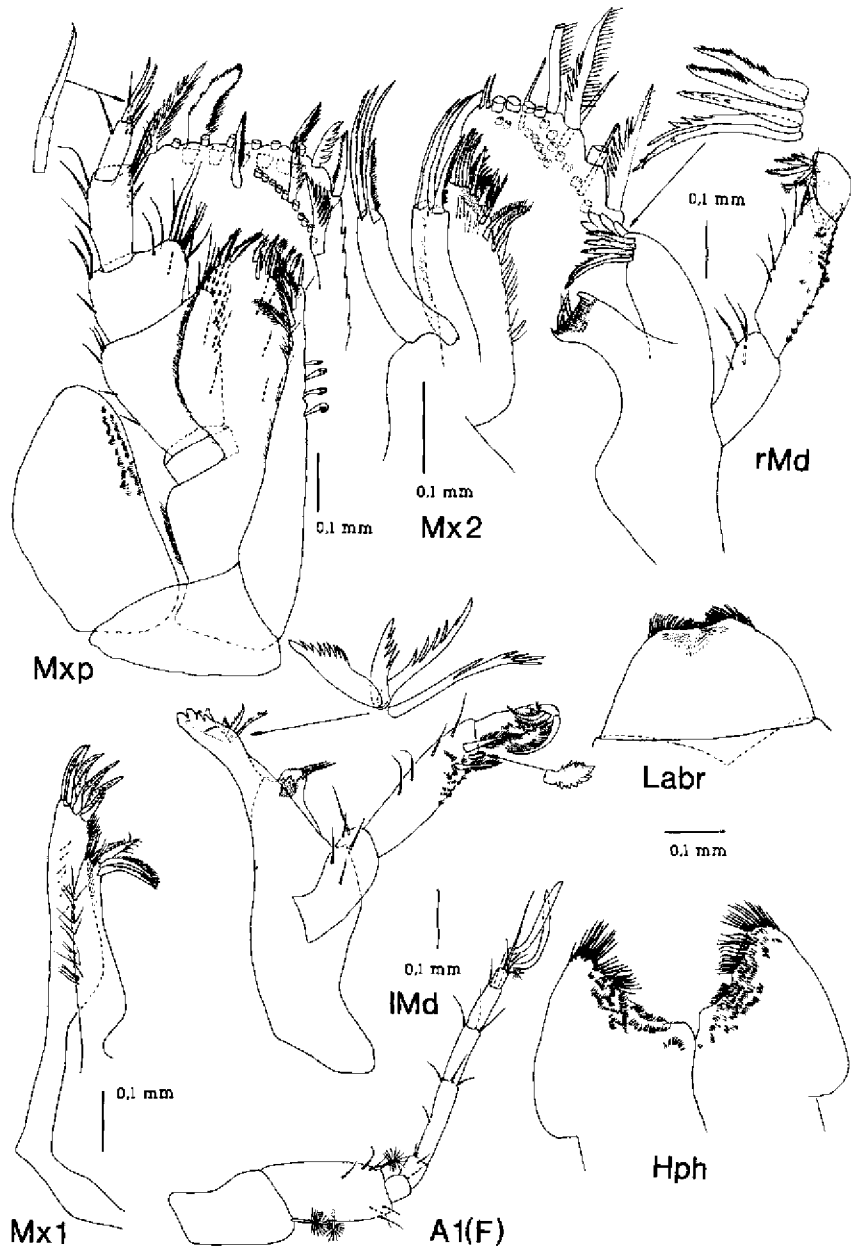


FIG. 49. — *Munna neglecta* Monod, 1931, from King George Island : mouthparts of male (4.5 mm) and A1 of mature female (4 mm).

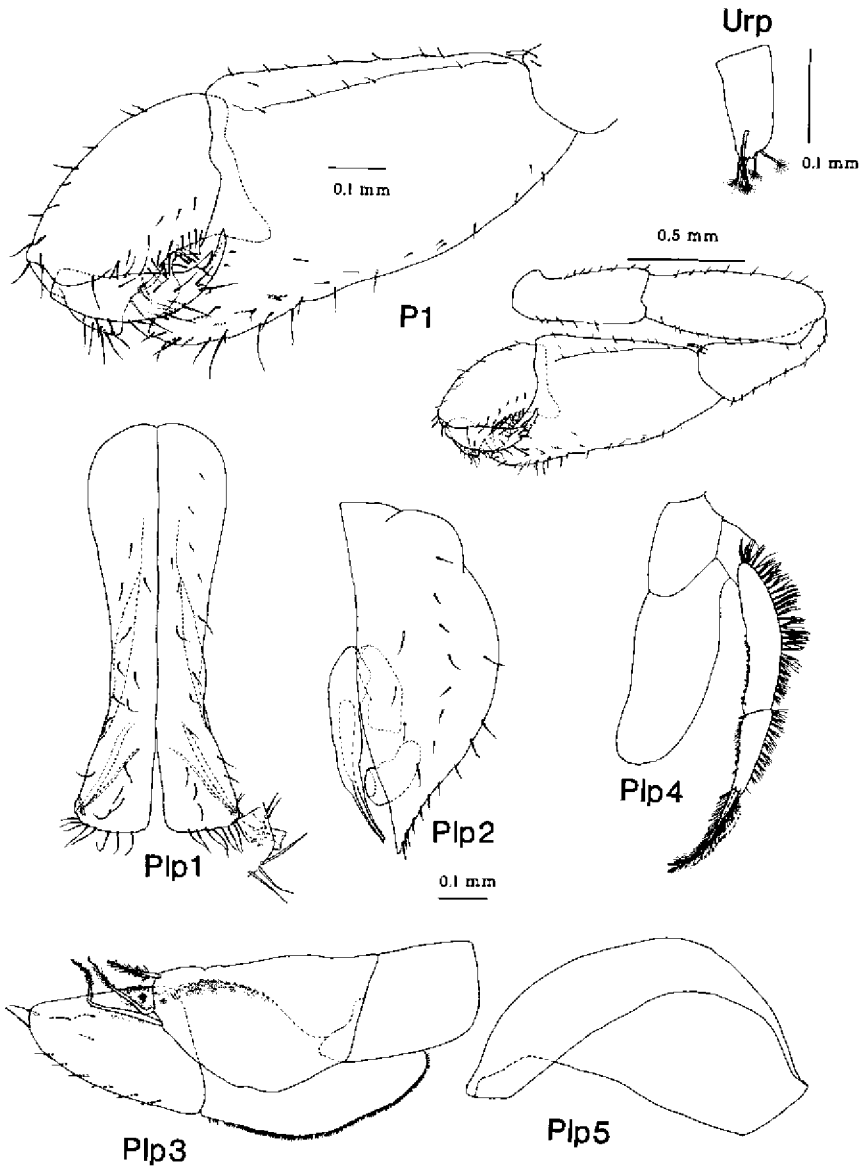


FIG. 50. — *Munna neglecta* Monod, 1931, from King George Island : P1 and P1p4 of male of 4 mm length ; P1p1, 2, 3, 4 and Urp of male 4.5 mm length.

Pseudorostrum less than $1/3$ as wide as cephalothorax and more than $1/2$ of its length, subrectangular. Pereonites 1-4 subequal in length, 1 and 2 longer than 3 and 4. First pereonite trapezoidal. Pereonites 5-7 subequal medially in length, each $1/2$ as long as pereonites 2-4. On each tergite of pereon segments about 30-50 small cuticular hairs. Coxae 2-7 visible in dorsal view, each rounded, with several small setae. On second free pleonite usually also few small setae. Pleotelson dorsal side ovate, less than $1/3$ as long as length of the body, about 1.5 as long as medial width, with about 200 small cuticular hairs like those on pereon, distributed evenly. Apex in lateral view slightly concave.

A1 consisting of 9 articles, with 1 feather-like bristle on first segment and 3 on second. Two last articles bearing 1 aesthetasc each (fig. 48).

A2 long, with few setae on peduncular articles 1-4, articles 5 and 6 each 8 times as long as broad, both bearing many short single setae on surface, and several sensory spines, furthermore on article 6 one feather-like seta visible. Flagellum of about 50 articles, first article several times longer than remaining ones (fig. 48).

Md (fig. 49) second palpal article longest, first and third equal in length, third narrower than first and second. On first and second article several long simple setae, furthermore on second article distally two strong setulated setae and one small sensillum. Setal row of rMd consisting of four serrated setae; lacinia like a seta, incisor with 4 blunt teeth, molar with four setae on proximal margin and group of small setae distally. Lacinia mobilis on lMd solid, with four blunt teeth.

Mx1 (fig. 49) outer endite with 12 spines, mostly serrated, inner endite on disto-ventral edge bearing group of 6 simple setae apart of the 4 usually seen in the genus *Munna*. Lateral margins of both endites and medial margin of inner endite bearing thin setules.

Mx2 (fig. 49) on inner endite 3 plumose setae, 3 serrated (setae distally partly setulated), and four long finely setulated setae apically, near lateral margin. On medial and inner endite the combed spine shorter than other ones.

Mxp (fig. 49) endite with small hairs on lateral margin, distally bearing ventral row of 7 scale-like setae, 9 apical and 12 dorsal setulated setae. On medial margin at height of proximal part of second palpal article 4 coupling-hooks. Third palpal article with disto-lateral edge distinctly protruding medially, distal free margin of this segment almost straight.

P1 of male (fig. 50, 55) with trapezoidal carpus, twice as broad as long, with protruding disto-ventral edge, producing two blunt teeth. Propodus less than $1/2$ as long as ventral margin of carpus, with sinuous palm complementary in shape to protrusion of carpus. Dactylus smallest, with two claws. On each segment many small setae (about 10 on basis to 50 on carpus), without sensory spines with exception of basis (one sensory spine).

P2-P7 (figs. 51-52) ischium slightly longer than basis and merus, carpus and propodus much longer than three proximal articles. On basis 0-2, on merus 2-3 sensory spines. On carpus two or three groups of sensory spines on dorsal margin and apart of it few sensory spines on all surface. On propodus most sensory spines located on ventral margin, furthermore 2-3 sensory spines on ventral margin of P4-P7.

Pip1 of male (fig. 50) with about 20 setae on ventral surface, 7 setae on apical margin and 2 on dorsal surface near disto-lateral edge. Pleopod narrowest distally at $2/3$ of its length. Apical margin almost straight, lateral horn short, not always visible under microscope when embedded in glycerin jelly.

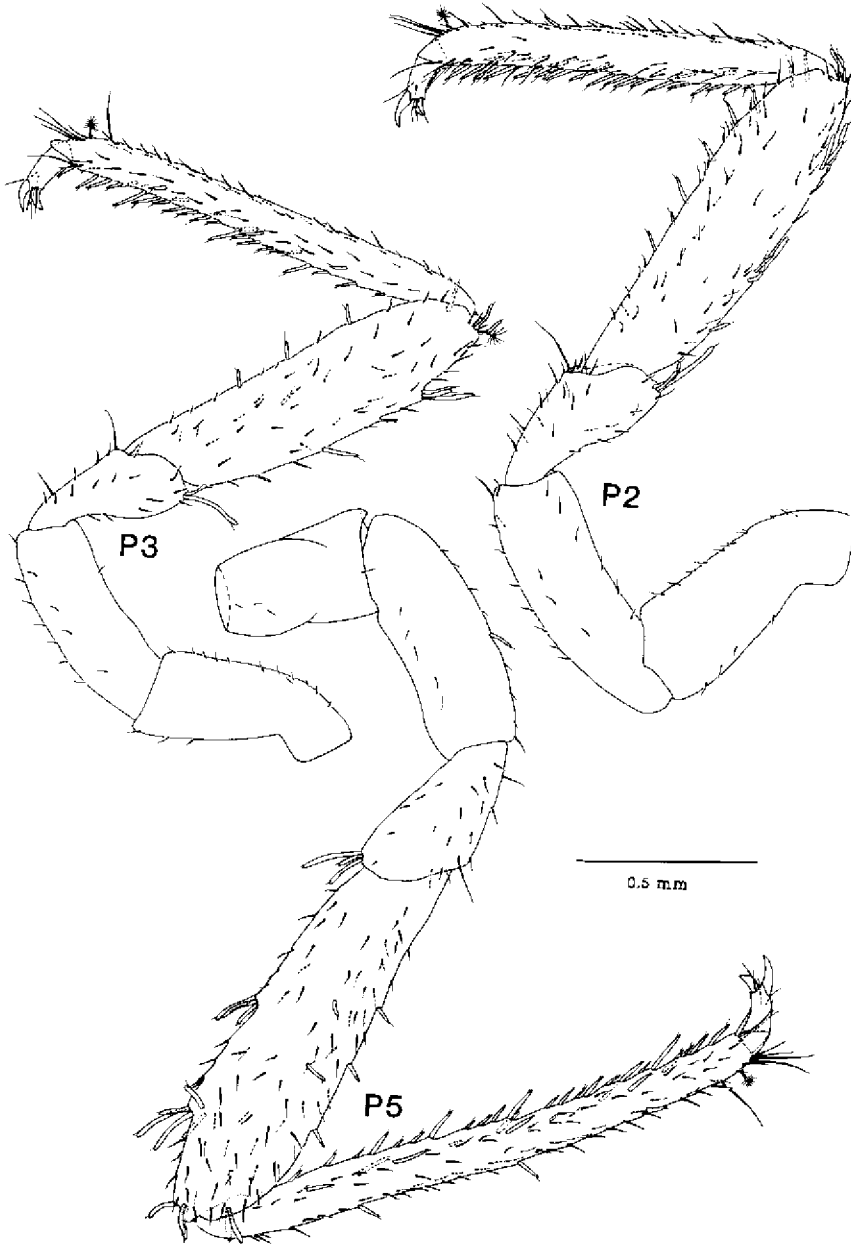


FIG. 51. — *Munna neglecta* Monod, 1931, from King George Island : P2 of 4.5 mm male ; P3, P5 of 4 mm male.

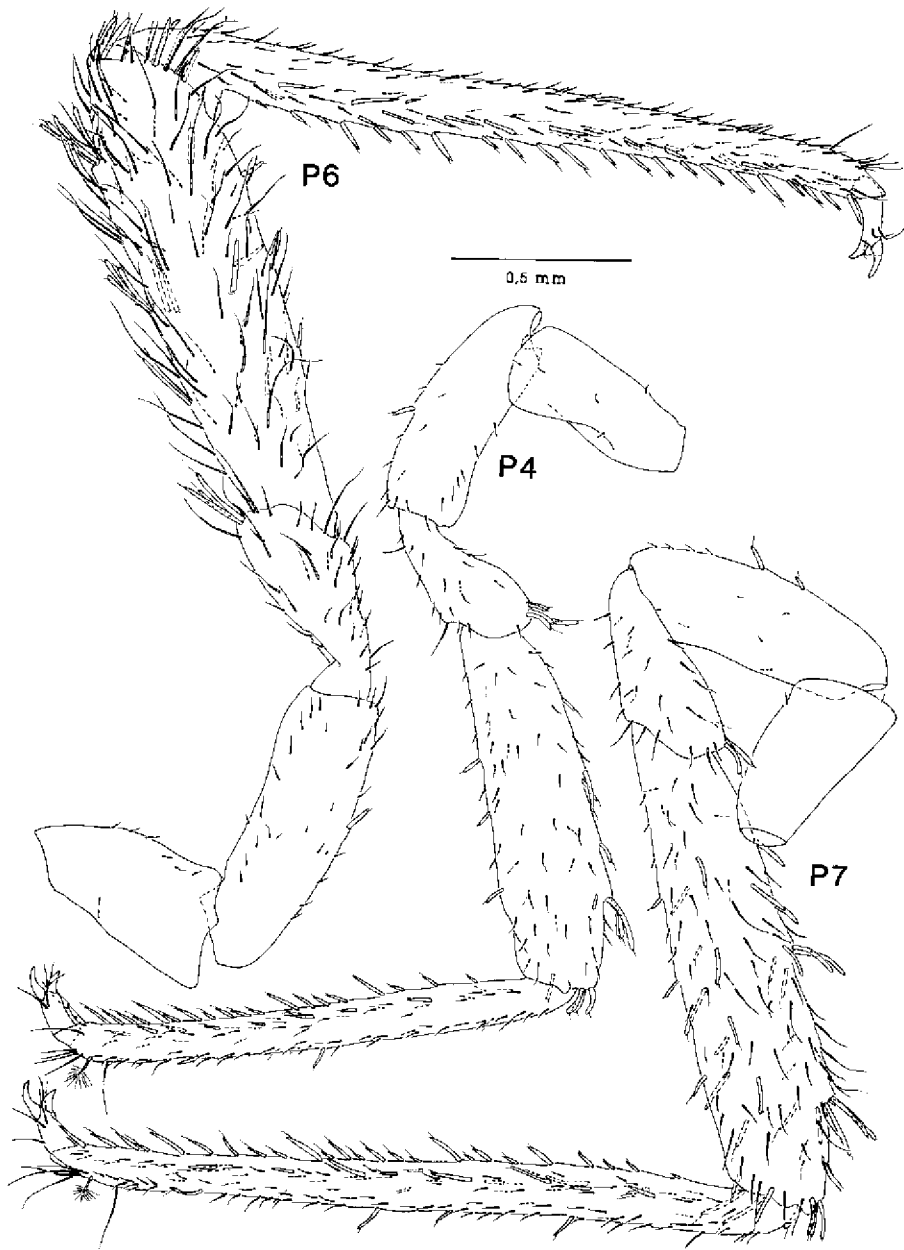


FIG. 52. — *Munna neglecta* Monod, 1931, from King George Island : P6 of 4.5 mm male length ; P4 and P7 of 4 mm male.

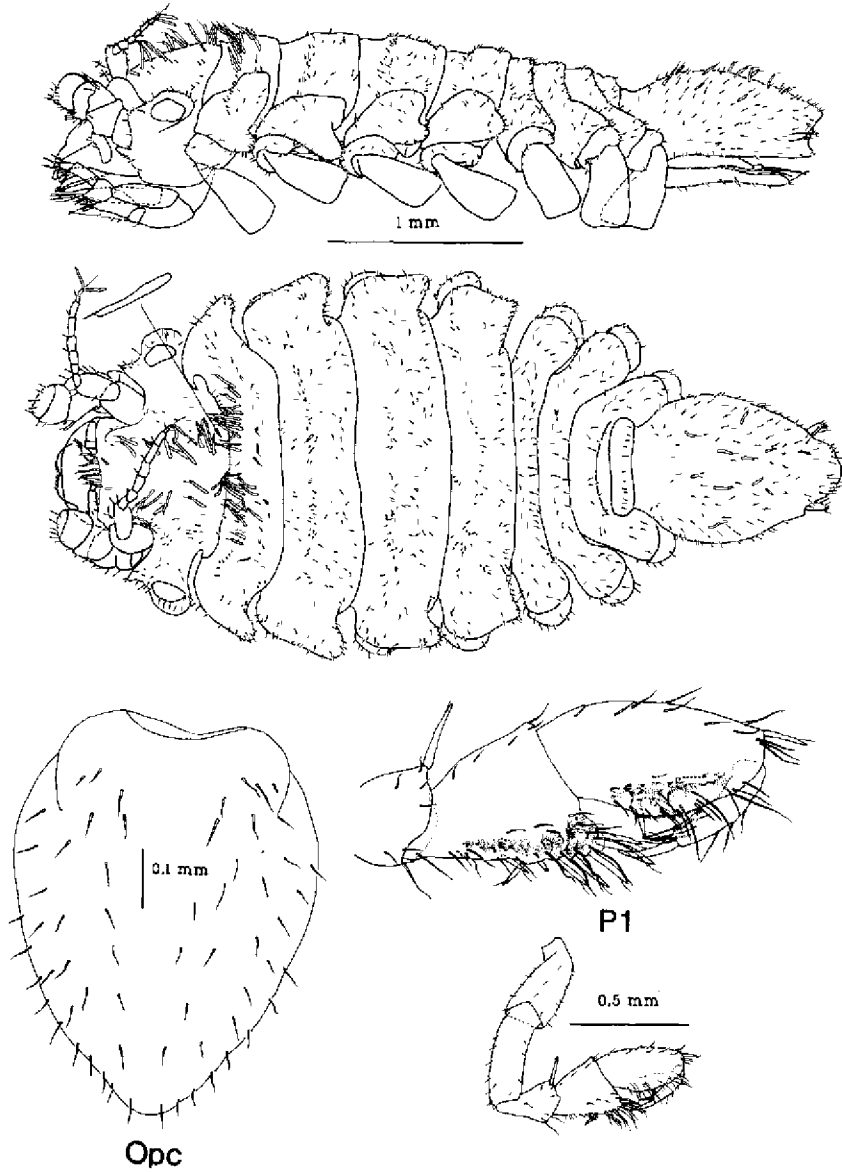


FIG. 53. — *Mumna neglecta* Monod, 1931, from King George Island : dorsal and lateral view of mature female (4 mm) ; Opc and P1 of this same specimen.

Male Plp2 (fig. 50) protopod with several setae on lateral margin and two longitudinal rows of setae on ventral surface. Medial margin slightly concave in distal part, tip pointed.

Plp3 (fig. 50) with exopod surpassing endopod, on lateral margin of first article row of small cuticular hairs. Plp4 (fig. 50) endopod oval, exopod consisting of two articles with two plumose setae apically. Plp5 (fig. 50) almost twice as long as endopod of Plp4. Urp (fig. 50) with two simple setae laterally and four feather-like bristles distally.

Female

Body somewhat broader than in male (figs. 53, 54). On each segment of pereon small setae, furthermore on cephalothorax and on first pereon segment many blunt sensory spines, on cephalothorax arranged in two rows (fig. 53). These sensory spines also visible on dorsal surface of pleotelson. Postero-lateral edges of pereonites 1-4 acute and distinctly directed posteriorly.

A1 (fig. 55) consisting of 8 articles (in figure 55 first article invisible). P1 much smaller than in male, with trapezoidal carpus bearing 6 sensory spines on ventral margin and two on postero-ventral edge. Propodus long oval bearing on palm 2 sensory spines. On carpus and propodus groups of small setulated cuticular scales, setation as in figure 53.

Opc (fig. 53) oval with many setae on margins and ventral surface.

Further variations : Very characteristic for large females are acute and posteriorly directed lateral edges of the anterior pereonites. This character is not very conspicuous in immature females smaller than 2 mm (e.g. in samples nr. OC-337, OC-325 from Admiralty Bay). In these, spines on the first pereonite are usually absent. Among small animals of both sexes we found specimens with relatively small eyelobes, like those seen in *M. pallida*.

REMARKS : The species seems to be frequent in the subantarctic areas. It differs from the other frequent species *M. antarctica* and *M. bituberculata* by its smooth, not pointed coxae (dorsal view), but this feature can not be used for a determination of the species because it is very common in the genus. *M. neglecta* does not have a conspicuous feature that allows a quick determination. Adult females have a peculiarly shaped lateral margin of the first tergite, males show a pointed apex of Plp 2 with a distally slightly concave lateral margin (see fig. 50 ; also illustrated by KUSSAKIN, 1982) ; the single spine on the ventral surface of Plp2, seen in the rather similar *M. jazdzewskii* n. sp. is absent. The latter species has a smoother dorsal surface with fewer short cuticular hairs (visible in fresh material under a microscope).

Munna neglecta belongs to those species, where the largest males do not have a markedly elongated first pereonite, but a very long and slender ischium and merus of P1 (see MONOD, 1931 ; AMAR & ROMAN, 1973 ; and figs. 50, 55). This male morphology is noted also in *M. maculata* and *M. affinis*. Functional males of smaller size already have a large P1, but with shorter articles.

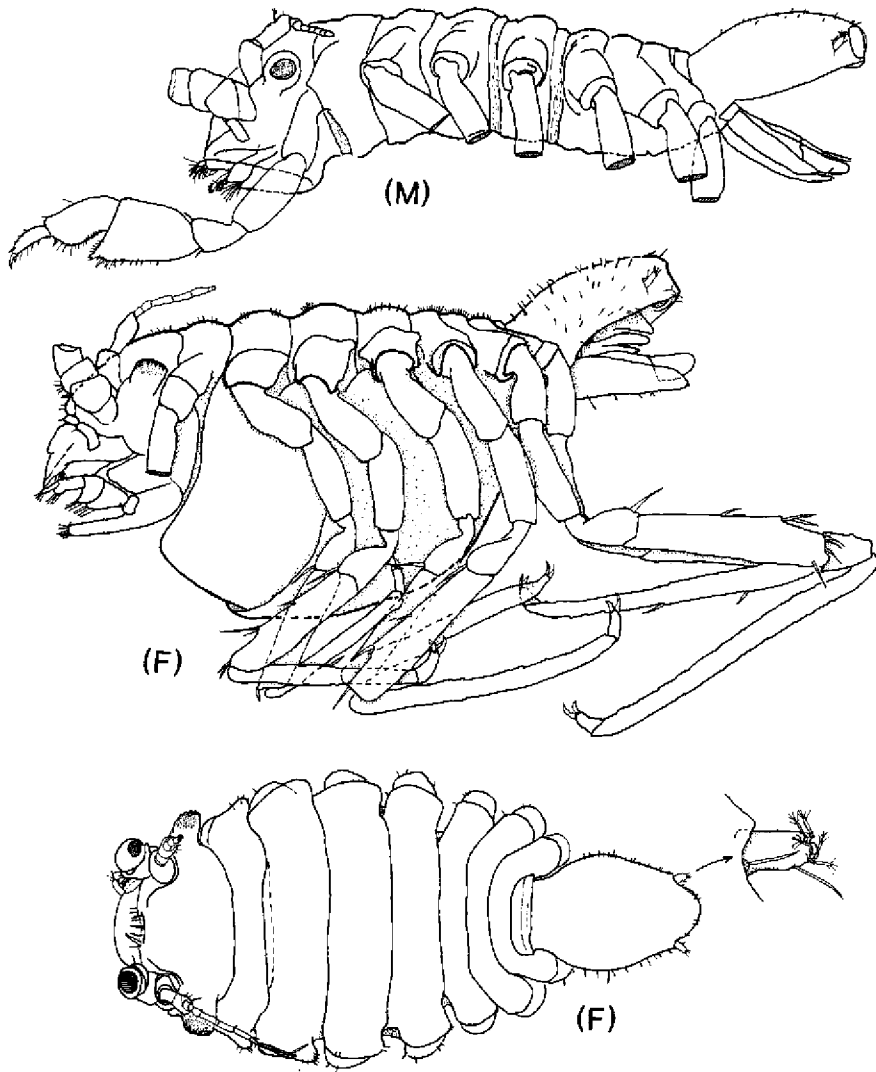


FIG. 54. — *Munna neglecta* Monod, 1931. Above : lateral view of 3.2 mm male from Peterman Island (MNHN Paris Is. 2931); below : 2.9 mm ovigerous female from the same locality in lateral (center) and dorsal view (below).

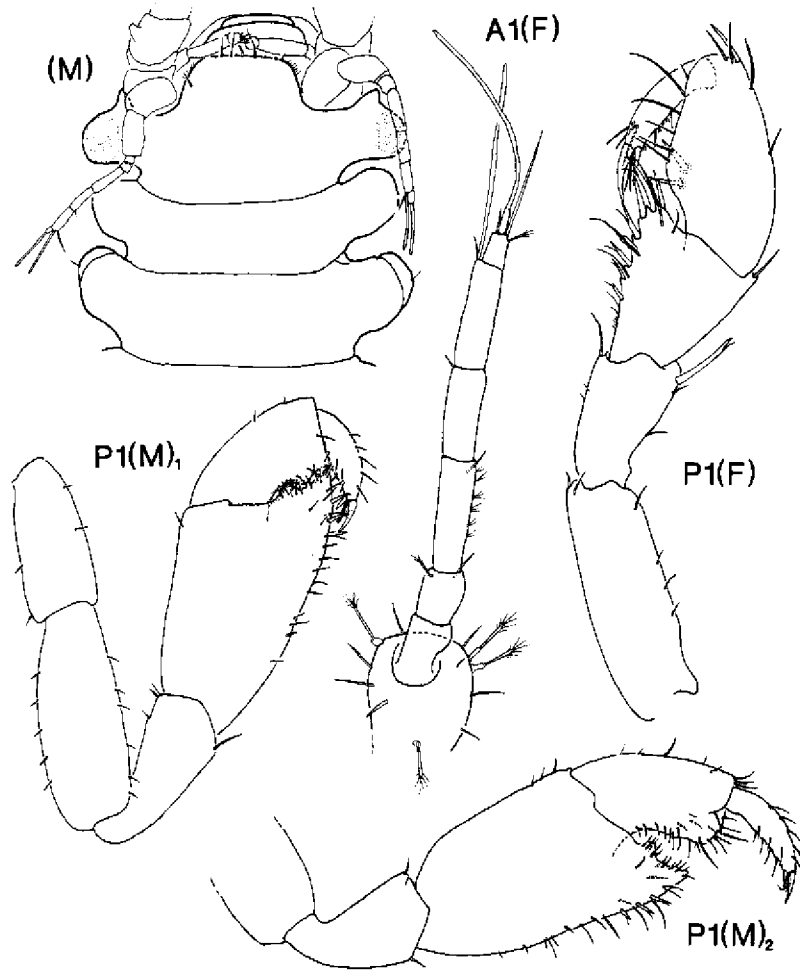


FIG. 55. — *Munna neglecta* Monod, 1931 : anterior body of 3.2 mm male from Peterman Island (MNHN Paris Is. 2931) ; A1 and P1(F) of the female specimen illustrated in figure 54. P1 (M)₁ of male from TATTERSALL's "*Haliacris antarctica*" (NHM London 1921.11.29.17-18), P1(M)₂ of the male from Peterman Island illustrated in figure 54.

15. *Munna psychrophila* Vanhöffen, 1914

(Figs. 56-59)

MATERIAL : Syntypes from the Gauss station, Deutsche Südpolar expedition 1901-1903, Posadowsky Bay (66°29' S 89°38' E, 385 m), Zoologisches Museum Berlin no. 17723; EPOS material : EPOS St. 224, sample MG 2 (71°15.1'S 12°59.8'W, 193 m) (2 immature females 1.4 mm) (MNHN Is 3033); EPOS St. 245, sample AGT 9 (74°39.7'S 29°41.6'W, 483 m) (2 immature females 1.8 — 2.1 mm); EPOS St. 248, sample MG 9 (74°38.4'S 29°40.4'W, 610 m) (1 immature female 1.7 mm); EPOS St. 250, sample AGT 11 (74°35.1'S 29°39.9'W, 799 m) (1 immature female 2.9 mm); EPOS St. 252, sample AGT 12 (74°28.2'S 29°41.9'W, 1153 m) (1 immature female 2.5 mm); EPOS St. 274, sample MG 15 (71°37.1'S 12°10.9'W, 211 m) (6 specimens 1.4-1.6 mm); EPOS St. 274, sample AGT 18 (71°38.8'S 12°9.4'W, 196 m) (5 immature females 1.2-2.0 mm); EPOS St. 278, sample MG 20 (71°29.3'S 12°32.1'W, 537 m) (imm. female 2.1 mm); EPOS St. 284, sample GSN 14 (71°12.0'S 13°14.0'W, 402 m) (2 immature females 1.8-2.0 mm); EPOS St. 290 (71°5.9'S 12°34.0'W, 522 m) (ovigerous female 4 mm, 1 male 4 mm); EPOS St. 292 sample MG 21 (71°3.8'S 12°42.1'W, 561 m) (young male 1.5 mm) (material deposited : MNHN Is 3033-3043).

DISTRIBUTION : Gauss Station (type locality, see material), Weddell Sea, 193-1153 m depth (see above), according to KUSSAKIN (1982) also further localities in the Davis Sea (10-45 m).

REDESCRIPTION

Body dorsally convex, in dorsal view slightly ovate, outline varying with sex and age (compare figs. 56, 59). Cephalothorax dorsally convex, smooth, without ridges, bearing few short setae. Eyes comparatively large, well pigmented (brownish black), laterally protruding, but only slightly stalked (fig. 56). Anterior spine-like protrusion on eyelobe (ocular spine) reduced to a blunt protuberance, in some specimens inconspicuous. Rostral margin straight or slightly convex, less than 1/3 of width of cephalothorax, bearing some elongated, slender spine-like setae. The pattern varies between individuals due to losses and regeneration. Pseudorostrum length about 1/2 of length of cephalothorax. Pereonites 2 and 3 longest in all studied stages, last 3 pereonites narrower than pereonites 1-4, lateral parts caudally directed. Tergites dorsally with few short hairs. Coxae in dorsal view without lateral points or spines. Pleotelson dorsally convex, outline ovate, in most specimens less than 1/3 of total body length, dorsally few simple setae, sometimes a pair of dorsolateral slender sensory spines. Uropods inserting subterminally in shallow concavities, uropodal endopod reduced to a single seta. Anus terminal, not covered by pleopods.

Females broader than males, males without enlarged pereonite 1, thus similarly shaped as immature specimens.

A1 with 7 (small specimens, females) to 10 articles (male), apical 2 articles each with a single long aesthetasc; setation as in figure 59. Mandibles with several slender setae on palpal articles 1 and 2, the number varying with age; further features (figs. 57, 60) not different from other species: left mandible with stronger, distally broadened and dentated lacinia mobilis, lacinia of right mandible of similar size as first (distal) spine-like seta of spine row. The latter on both mandibles of 4 spine-like setae. Lateral endite of Mx1 with 12 partly serrated strong spines and an additional small spine (fig. 60), medial endite with 4 apical spines and an

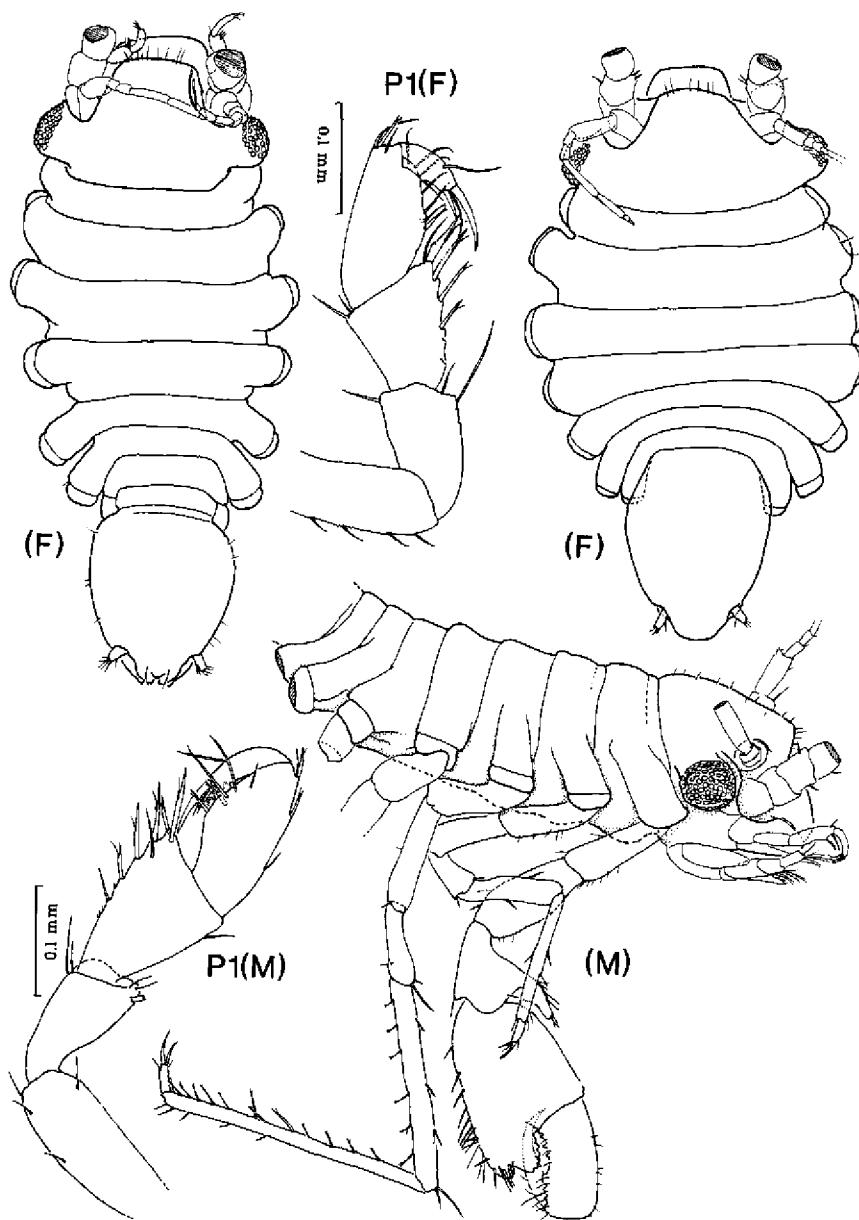


FIG. 56. — *Munna psychrophila* Vanhöffen, 1914, syntypes (ZM Berlin no. 17723) : dorsal view of immature 1.7 mm female (left) and of ovigerous 1.8 mm female (right), below lateral view of small 1.3 mm male (the specimen illustrated by VANHÖFFEN, 1914); P1(F) of 1.7 mm female, P1(M) of immature 1.2 mm male.

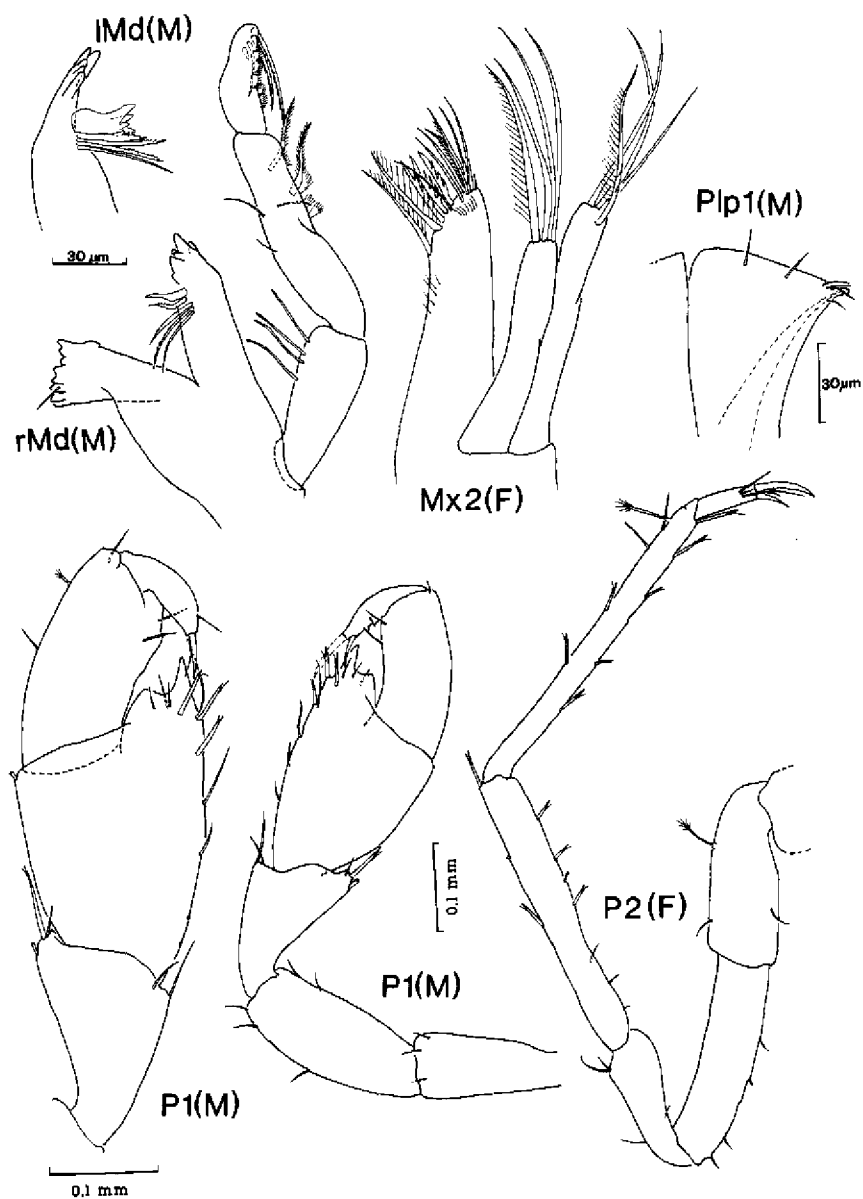


FIG. 57. — *Munna psychrophila* Vanhöffen, 1914, syntypes (ZM Berlin no. 17723) : left and right Md(M) and P1(M)₂ of 1.5 mm male ; P1 (M)₁ of 1.8 mm male ; Mx2 (F) and P2 (F) of 1.7 mm female ; detail of Plp1 (M) of small 1.2 mm male.

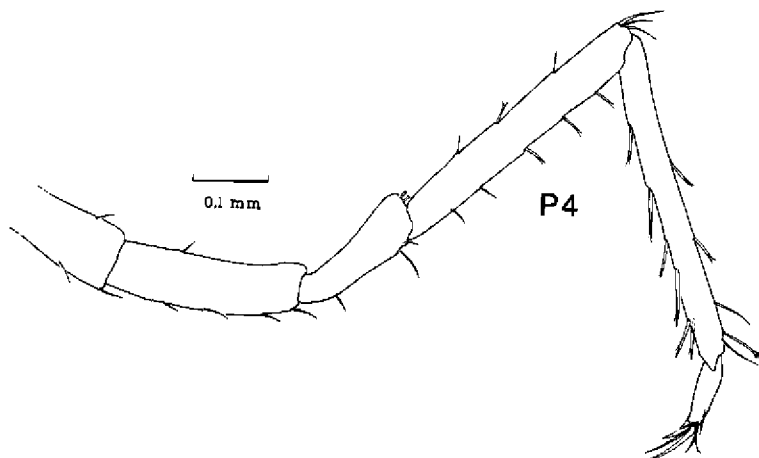


FIG. 58. — *Munna psychrophila* Vanhöffen, 1914 : syntypes (ZM Berlin no. 17723); P4 of 1.7 mm female.

additional small one. Mx2 lateral endite and middle endite each with 4 very long spine-like setae, partly finely setulated or combed; medial endite apically with 2 slender and long combed setae on medial margin, followed laterally by 3 shorter and thicker serrated spines, at least 7 slender, partly combed setae. Mxp as in figure 60.

P1 of immature females with trapezoidal carpus, medial margin of carpus distally acute and protruding, bearing 3-4 sensory spines and distally 2 further spines, palm of propodus proximally slightly concave, distal half more convex, 2 central sensory spines; 2 spines also on distal half of lateral margin. P1 of mature male with comparatively broad carpus (width about 1/2 of length of ventral margin); distal ventral edge elongated to an acute tip, proximally of it a group of 3 sensory spines; for variations of morphology of male P1 see also figures 56, 57 and 61. Remaining pereopods (lost in most specimens): see figures 57, 58 and 61; setation sparse in comparison with other antarctic species.

Male Plp1 with several slender setae on ventral surface (figs. 57, 61), distal margin nearly straight, with 2 to 3 setae on each pleopod, a group of 3 short setae on lateral edge, lateral horns inconspicuous. Male Plp2 also with slender setae ventrally, shape as in figure 61; in larger males sympod margin laterally less convex. Female operculum ovate, short setae ventrally (fig. 62), no spines present.

REMARKS: This is the most frequent species of the genus *Munna* in our samples from the Weddell Sea, it is absent in the South Shetlands. *M. psychrophila* was first described by VANHÖFFEN (1914) from eastern Antarctica and compared with the rather similar, also small species *M. cryophila*; the latter has a differently shaped male Plp1, with more protruding distolateral edges and a partly concave apical margin. Since this early record no further descriptions have been published. Though at first sight without conspicuous characters the large eyes are helpful to sort out this species.

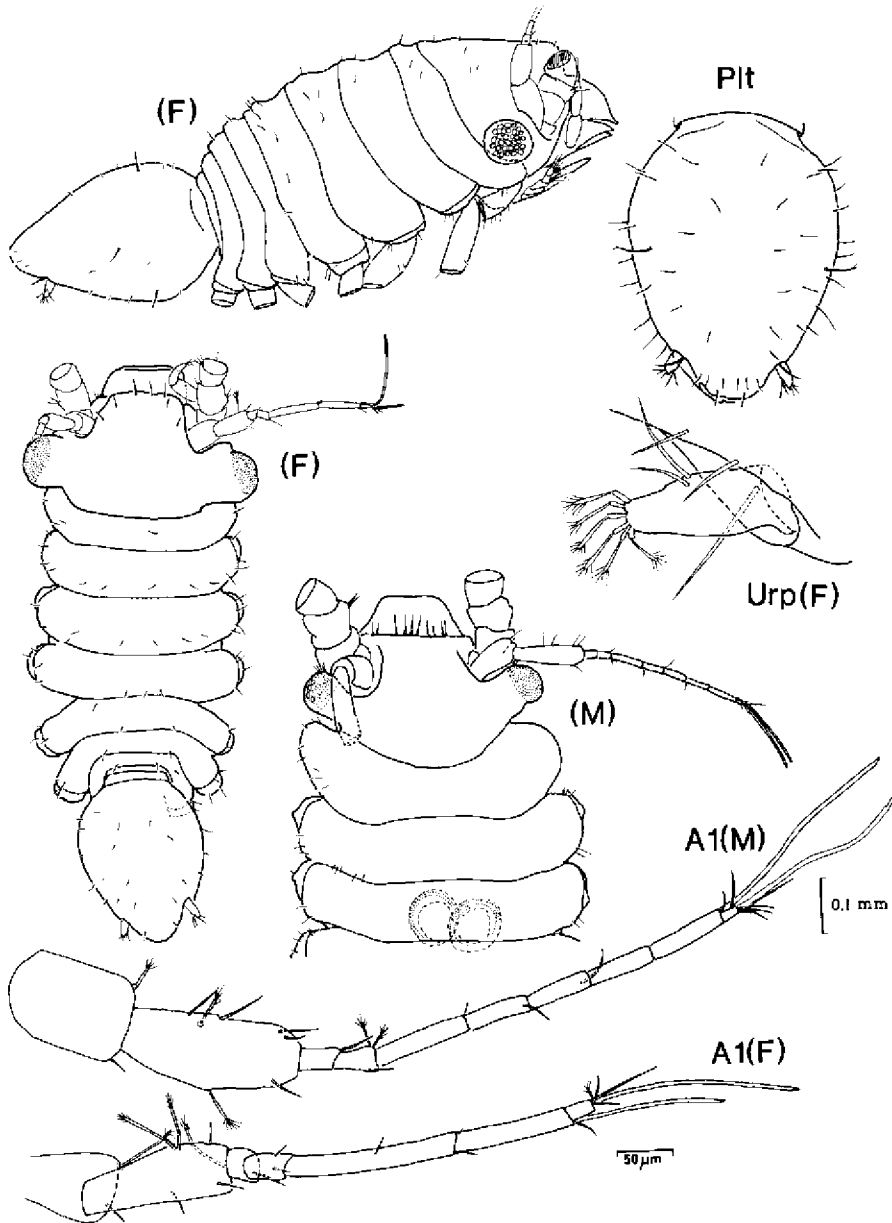


FIG. 59. — *Muna psychrophila* Vanhöffen, 1914, EPOS-collection from the Weddell Sea (see material). (F) : 1.8 mm non-ovigerous female in dorsal and lateral view ; (M) : anterior body of large 4 mm male in dorsal view ; Plt : dorsal view of pleotelson of 2.1 mm immature female ; Urp of 4 mm female. Below : A1(M) of 4 mm male, A1(F) of 2 mm immature female.

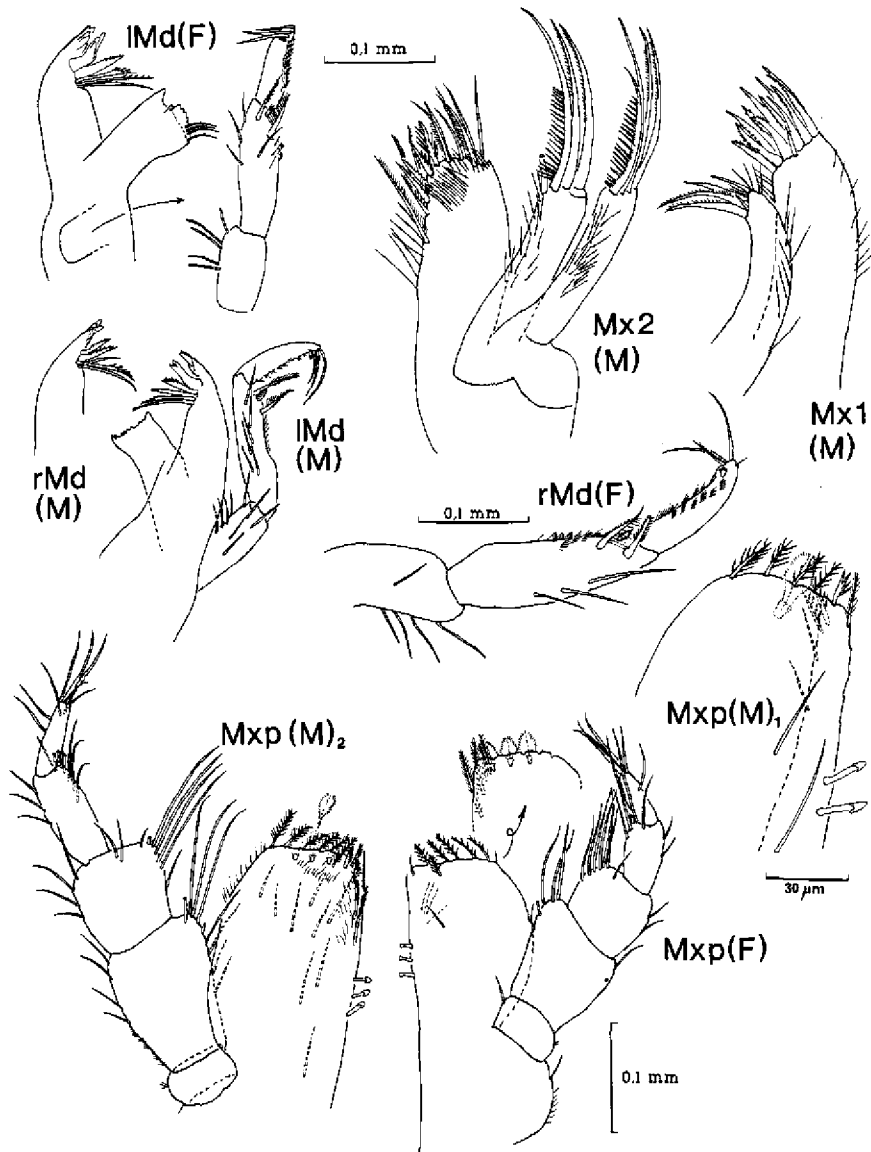


FIG. 60. — *Munna psychrophila* Vanhöffen, 1914, EPOS-collection from the Weddell Sea (see material) : mandibles of 2 mm immature female (F) and 4 mm male (M) ; Mx1 (M), Mx2 (M) and Mxp (M)₂ of large 4 mm male ; Mxp (M)₁ endite of 1.5 mm male ; Mxp (F) of 2 mm female.

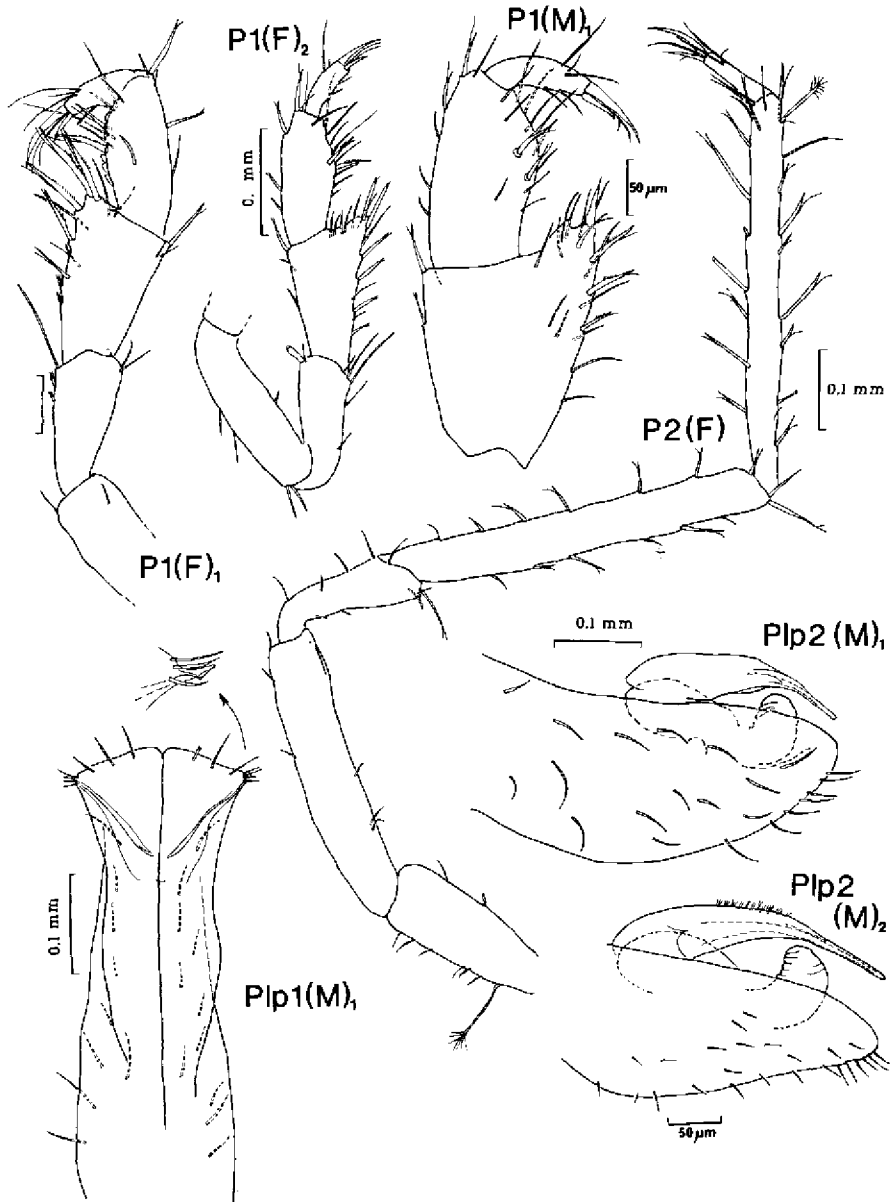


FIG. 61. — *Munna psychrophila* Vanhöffen, 1914, EPOS-collection from the Weddell Sea (see material) : appendages of 1.8 mm immature female (F)₁, 2.9 mm female (F)₂, 1.5 mm male (M)₁ and 4 mm male (M)₂.

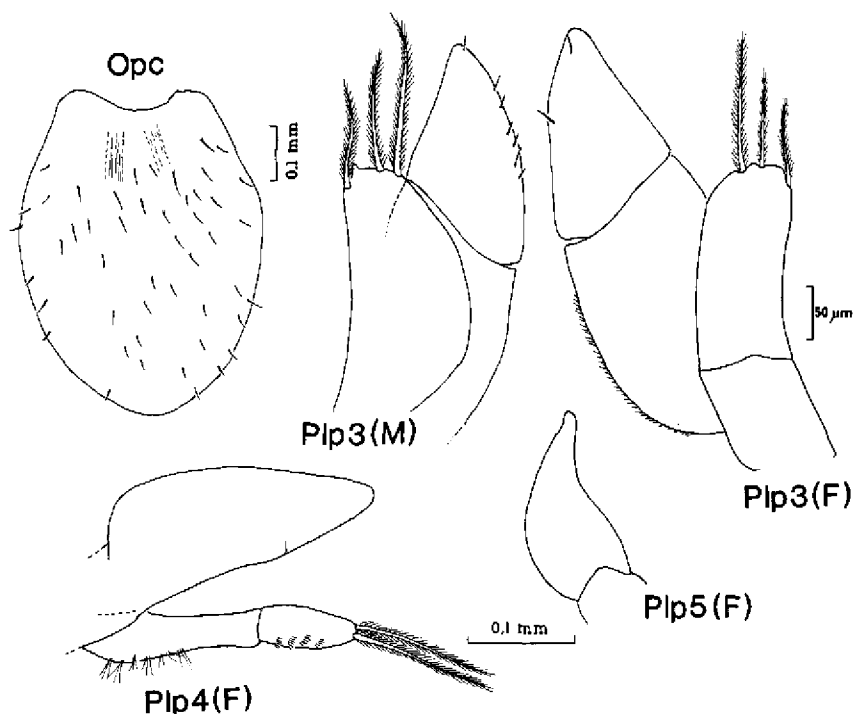


FIG. 62. — *Munna psychrophila* Vanhöffen, 1914, EPOS-collection from the Weddell Sea (see material) : pleopods of immature 2 mm female (F) and of 4 mm male (M); operculum of 2.9 mm non-ovigerous female.

16. *Munna cryophila* Vanhöffen, 1914

(Fig. 63)

MATERIAL : Syntypes : Zoologisches Museum Berlin no. 17725 ; largest specimen : 1.8 mm (immature female).

DISTRIBUTION : Antarctica : Gauss Station of the German Südpolarexpedition 1901-1903, 66°2'9"S, 89°38'5"E, 46 m depth (type locality) ; further records not documented by drawings : Davis Sea, 15 to 55 m (KUSSAKIN, 1982)

REMARKS

To complete VANHÖFFEN's data and for comparison with the new material some drawings of the syntypes were prepared without dissecting the material (fig. 63). The dorsal surface of the body has no conspicuous spines and is strongly convex in lateral view. Frontal rostral margin about 1/3 of total width of cephalothorax, eyes protruding little, no frontal point or spine-like protuberance on eyelobe. Coxae 2-7 with smooth lateral margins, visible in dorsal view. Pereonites 5-7 comparatively narrow, together about 1/6 to 1/7 of total pereon length,

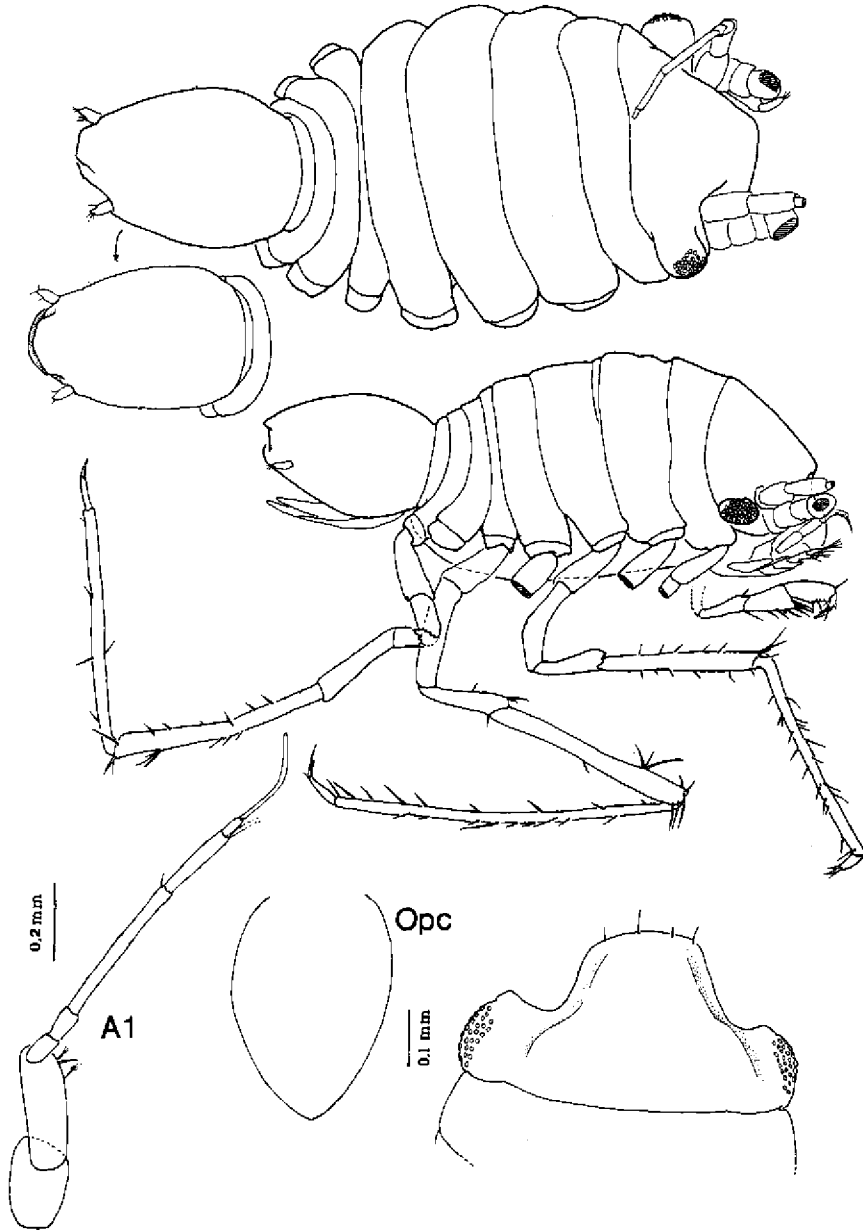


FIG. 63. — *Munna cryophila* Vanhöffen : immature female syntype (ZM Berlin 17715, 1.8 mm length), whole animal and in situ drawings of antenna 1 (setation not completely preserved), operculum, and cephalothorax in dorsal view.

pereonite 5 shortest. Pleotelson long-oval as seen in figure 63, dorsally convex, without spines. Antenna 1 with 7 articles in both sexes (not known in large males), female operculum (Plp2) oval, with smooth surface.

VANHÖFFEN (1914 : 567) only published drawings of male pleopods 1 and 2, a sketch of mature male P1 and of female P1. According to VANHÖFFEN this species is very similar to *M. psychrophila*, but with characteristic male pleopods and P1, the latter with acuter and more protruding ventrodiscal edge of carpus than in *M. psychrophila*. Comparing the P1 of *M. psychrophila* in figures 56, 57 of the present study with the drawings of VANHÖFFEN it seems that the most reliable difference is the apically broader propodus of *M. cryophila*. Important is also the different shape of the male Plp1, which in *M. psychrophila* is apically slightly convex, nearly straight, while in *M. cryophila* with a marked distolateral sinuosity of the apical margin. In *M. cryophila* pereonites 5-7 are narrower than in *M. psychrophila*.

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