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## *FRONTOSEROLIS ABYSSALIS* N. SP. AND *SEROLIS ARNTZI* N. SP. (SEROLIDAE, ISOPODA) FROM THE ANTARCTIC DEEP SEA

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### ABSTRACT

A new collection of Serolidae (Crustacea, Malacostraca) from the deep sea of the West-Atlantic part of Antarctica has been studied. Descriptions of the new species *Frontoserolis abyssalis* n. sp. and *Serolis arntzi* n. sp. are presented. *F. abyssalis* n. sp. is very similar to *F. acuminata* (Sheppard, 1957) and *F. aestimabilis* (Brandt, 1988), but can easily be distinguished from these by its vestigial eyes and a different ornamentation of head and pleotelson. *S. arntzi* n. sp. is most similar to *S. rugosa*, but can be discriminated from this species by the sculpture of the head, the pereonites and the pleotelson.

Key words: taxonomy, new species, Serolidae, Antarctica, deep sea

### INTRODUCTION

The Antarctic deep sea is not well known in terms of species composition, due to a low sampling effort in the past. The expedition ANDEEP (ANTarctic benthic DEEP-sea biodiversity: colonisation history and recent community patterns) onboard of RV 'Polarstern' (January - April 2002) yielded a small collection of Serolidae which belong to the genera *Frontoserolis* and *Serolis*. Two genera of Serolidae were known from the Atlantic deep sea. These are *Atlantoserolis* Wägele, 1994, and *Glabroserolis* Menzies, 1962. A comparison of the newly collected material, however, revealed that the material does not belong to these genera, one of the

species is a new member of *Frontoserolis*, one of *Serolis*. Both species are described here.

### MATERIALS AND METHODS

Specimens of Serolidae were collected during the expeditions ANT XV-3 in February 1998 in the Weddell Sea and ANT XIX-3 + 4 (ANDEEP I & ANDEEP II), from February to April 2002 onboard the RV 'Polarstern' in the Antarctic deep sea off the South Shetland Is. and in the Weddell Sea by means of an epibenthic sledge (Brandt & Barthel, 1995). On deck, the material was fixed in precooled 80% ethanol. In the laboratory, the material was sorted under a Wild M5 dissecting microscope and illustrated using a

Leitz Dialux microscope, equipped with a camera lucida.

The types of the new species are deposited in the Zoological Museum of Hamburg.

The following abbreviations are used in the text and figures: A1 = antennula, A2 = antenna, lMd = left mandible, Mx1 = maxillula, Mx2 = maxilla, Mxp = maxilliped, P1-7 = pereopod 1-7, Plp 1-5 = pleopod 1-5, rMd = right mandible, Urp = uropod, ZMH = Zoological Museum of Hamburg.

## SYSTEMATIC PART

### ***Frontoserolis abyssalis* n. sp.**

Figs. 1-6

**MATERIAL.** - Holotype: ovigerous female, 6.5 mm long (ZMH, K-40217), 46-7-S, 30-I-2002, 60°38.33'S 53°57.38'W - 60°38.17'S 53°57.47'W, 2893-2894 m, suprabenthic net of epibenthic sledge. Allotype, male, 6.5 mm long (ZMH, K-40218), 46-7-S, 30-I-2002, 60°38.33'S 53°57.38'W - 60°38.17'S 53°57.47'W, 2893-2894 m. Paratypes: male, 7.1 mm long, 3 Manca I of 2.5-2.8 mm length (ZMH, K-40219), 46-7-E, 30-I-2002, 60°38.33'S 53°57.38'W - 60°38.17'S 53°57.47'W, 2893-2894 m, epibenthic net of epibenthic sledge; 1 male, 7.2 mm long (damaged), (ZMH, K-40220), 46-8 Agassiz Trawl, 1-II-2002, 60°39.75'S 53°57.44'W - 60°38.79'S 53° 57.42'W, 2886-2895 m.

**DESCRIPTION OF FEMALE HOLOTYPE.** - Greatest width of body (between tips of coxae 2) (Fig. 1) 0.8 of body length (rostrum to end of pleotelson). Head with broad diverging anterolateral lobes lateral to bases of antennae, bluntly produced anterolaterally; continuous obscure transverse ridge at base of antennae; eye small, rounded, with few vestigial ocellae, submarginal near widest part of head (Fig. 1).

Pereonite 1 with anterolateral margin continuously convex; posterolateral corner slightly overlapping coxa 2, smooth. Pereonites 2-4 articulating, with coxal plates marked off by dorsal sutures; pereonites 5-7 free, much shorter than pereonites 2-4. Posterolateral angles of the coxal plates 2-6 protruding posterolaterally, longer than and reaching further posteriorly than those of preceding segments; coxal plate 4 reaching to base of pleotelson, 5 reaching 50% of length of pleotelson, 6 reaching 85% of length of pleotel-

son. Pereonite 7 without coxal plates. Ventral coxal plates 2-4 meeting, swollen and sculptured in mid-line; sternites 5-7 fused and visible; ventral coxal plates 6-7 separated. Pleonite 1 not visible dorsally. Dorsally, pleonites 1 and 2 with narrow epimera, first one reaching 30% of pleotelson length, second one 60% of pleotelson length. Ventrally, pleonites 1-3 similar, with sternal plates broad, prominent, angled sharply at midpoint. Pleotelson slightly less than a third of length of body, 90% as wide as long, lateral margins straight, posterior margin acuminate, tip pointed; with obscure mid-dorsal ridge, seleniform elevations mediolaterally, bearing two curved carinae in proximal half of length, pleotelson widest medially; acute notch after two thirds of length, in which uropods are inserted.

Antenna 1 (Fig. 2) with peduncular article 2 slightly narrower but longer than article 1, with two feather-like setae, article 3 about as long as second; flagellum of 12 articles; flagellar article 1 longest, slightly more than half length of last peduncular article, articles 1-4 without aesthetascs, nine and 10 with one aesthetasc, following two without, last one with on aesthetasc. Antenna 2 (Fig. 2) with short first, almost ring-like peduncular article, second slightly more than twice as long as first, with few lateral short setules, third article slightly shorter than second, almost of triangular shape, with tufts of setae, fourth and fifth articles longest, fourth one broadest, both with tufts of setae, fifth 1.2 times as long as fourth; flagellum of 11 articles, each with group of distolateral simple setae, second flagellar article with one feather-like seta.

Mandibles (Fig. 2) asymmetrical, right lacinia mobilis narrower than on left. Left lacinia mobilis a broad blade, distally serrated, almost as wide as incisor, spine (spine row rudiment) simple and straight. Right lacinia mobilis with five small teeth, spine simple and straight, more slender than in left mandible. Mandibular palp second article 1.4 times as long as first, with 16 short setae along distal part of lateral margin, third article lanceolate, with row of 23 setae, last but one longest. Maxilla 1 (Fig. 2) lateral lobe with 11 strong apical teeth; medial lobe stalked, small, distally rounded, with one short apical seta. Maxilla 2 (Fig. 2) inner lobe with five simple slender setae and medial setules, median and outer

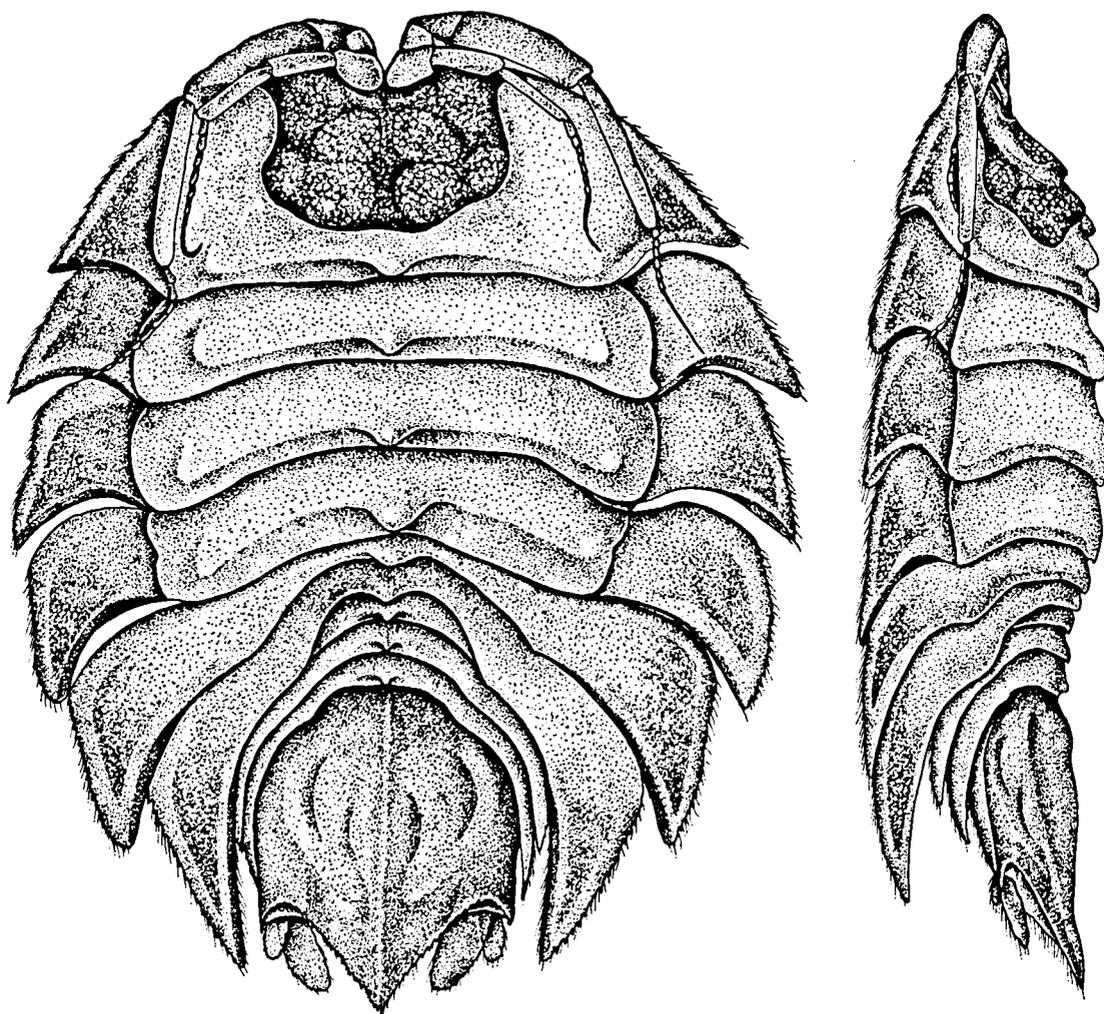


Fig. 1. *Frontoserolis abyssalis* n. sp., holotype female. Left, dorsal view. Right, lateral view.

lobes each with three setae. Maxilliped (Fig. 2): coxa and epipod lateral to it separated by suture; basis separated by suture from lateral rounded lamella; basis with facial setae and small setules near mesial face; endite with transverse distal margin bearing two spiniform setae mediolaterally, medially simple setae and fine, small setules; palp with short, ring-like first article, second article with three laterodistal setae, long medial setae and three ventral ones, third article with distal tuft of setae.

Pereopod I (Fig. 3) basis to merus with simple setae and setules; carpus quadrangular, with two simple and two strong sensory setae mediolaterally; propodus long-oval, widest at 50% of length,

curved palm with row of alternating fan-shaped setae and spiniform setae, each with apical projection, and submarginal lateral row of short simple setae; dactylus evenly curved and tapering, unguis differentiated. Pereopod 2 (Fig. 3) with basis slightly longer than of ischium; ischium with row of ventral simple setae; merus about half as long as ischium, with a more dense row of ventral simple setae, carpus slightly longer than ischium, also with ventral simple setae; propodus about as long as carpus, palm with lateral row of two long tapered setae, ventral row of simple setae, dactylus more than three thirds of length of propodus, curved, just surpassing heel of palm, unguis not differentiated.

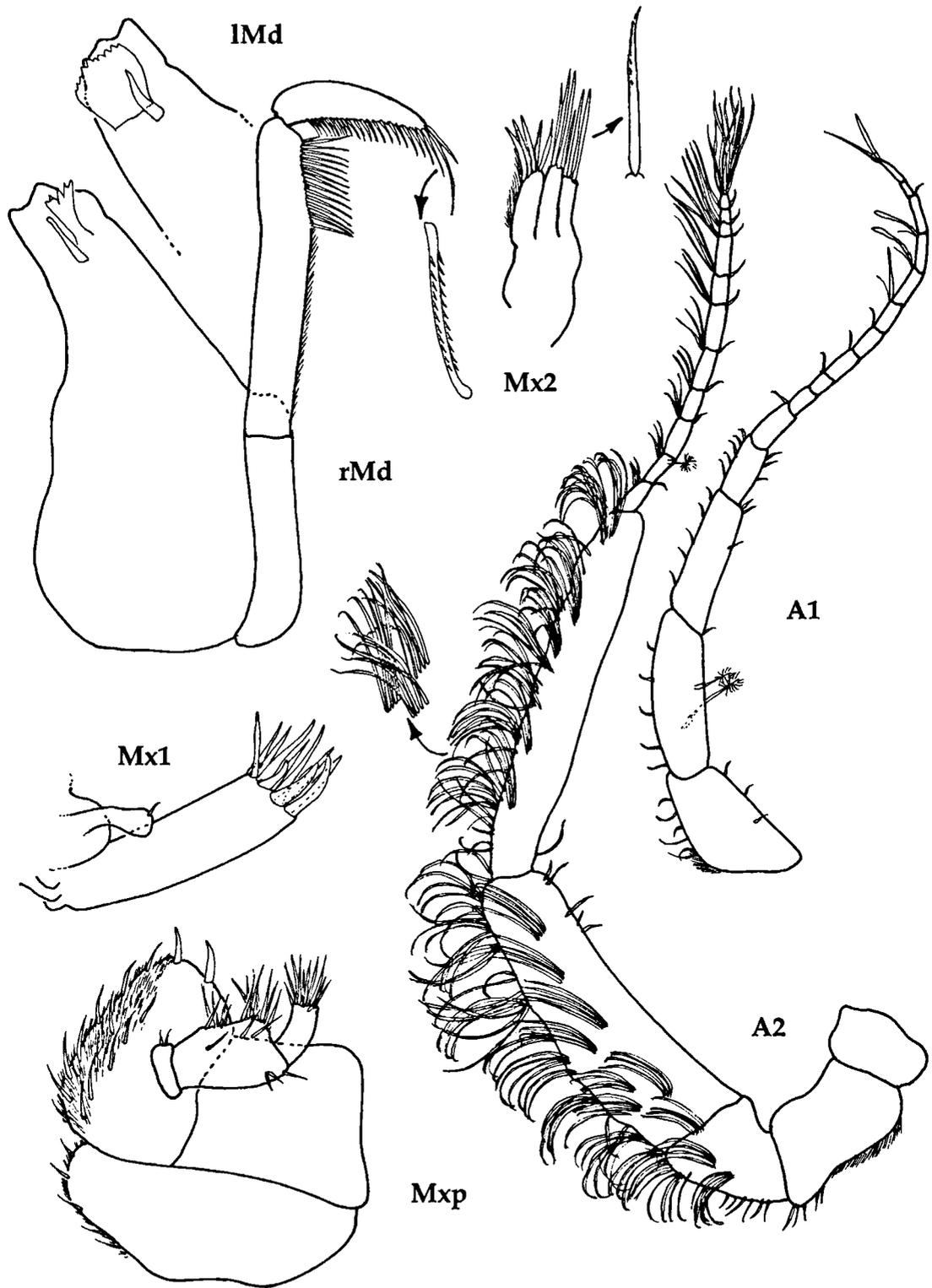


Fig. 2. *Frontoserolis abyssalis* n. sp., holotype female, antennula, antenna, both mandibles, maxillula, maxilla, maxilliped.

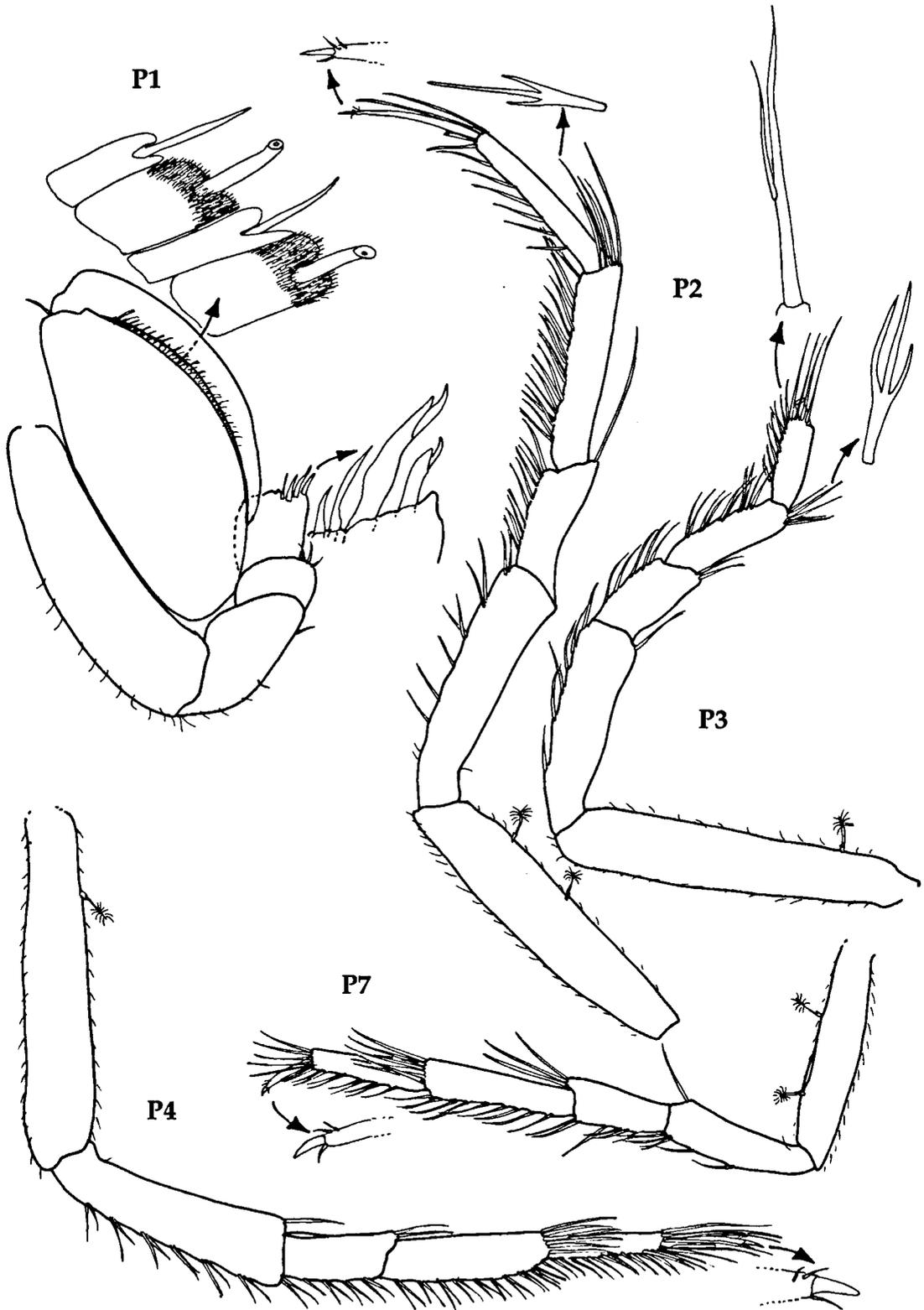


Fig. 3. *Frontoserolis abyssalis* n. sp., holotype female, pereopods 1-4, and 7.

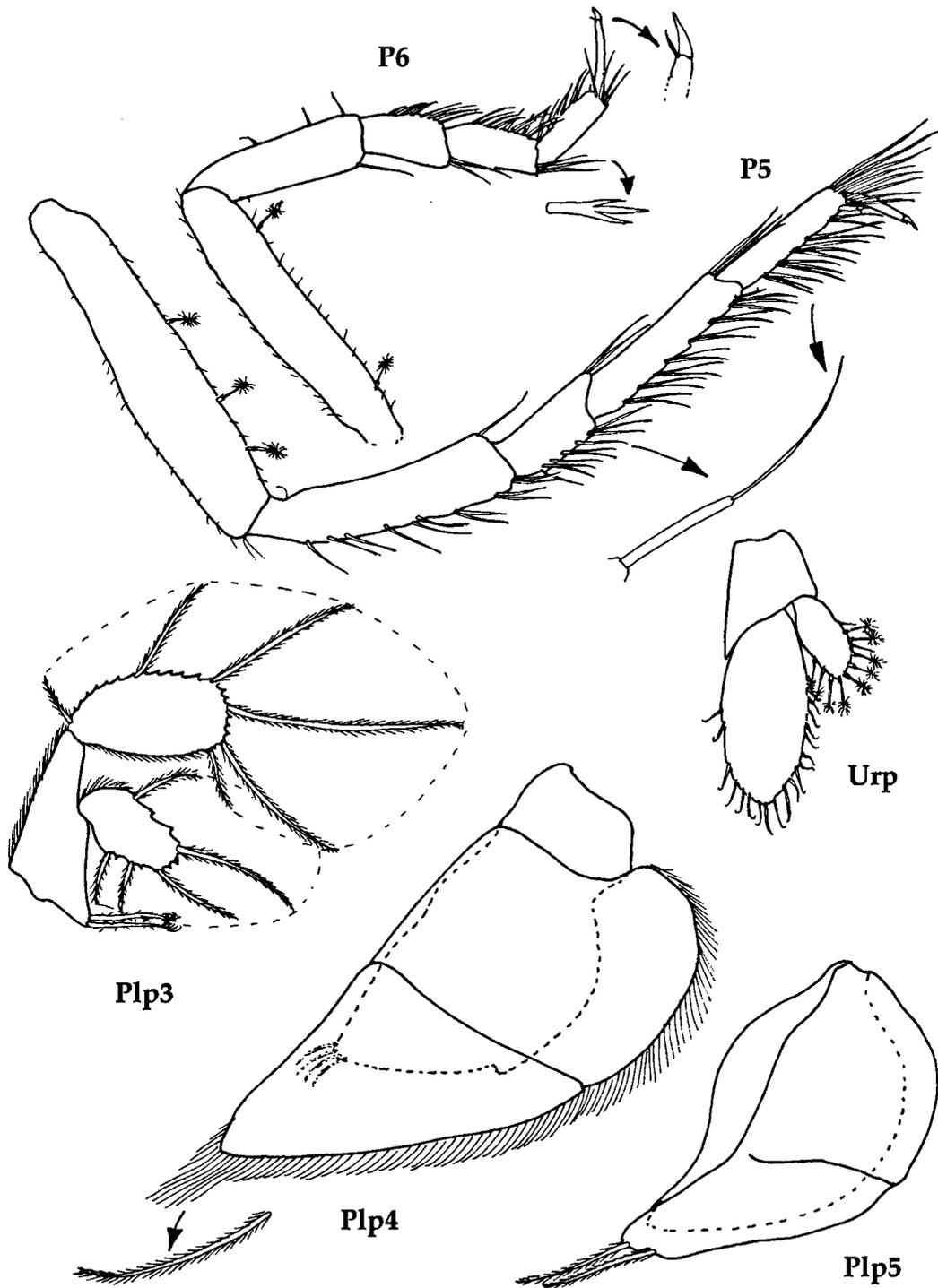


Fig. 4. *Frontoserolis abyssalis* n. sp., holotype female, pereopods 5, 6, pleopods 3-5, uropod.

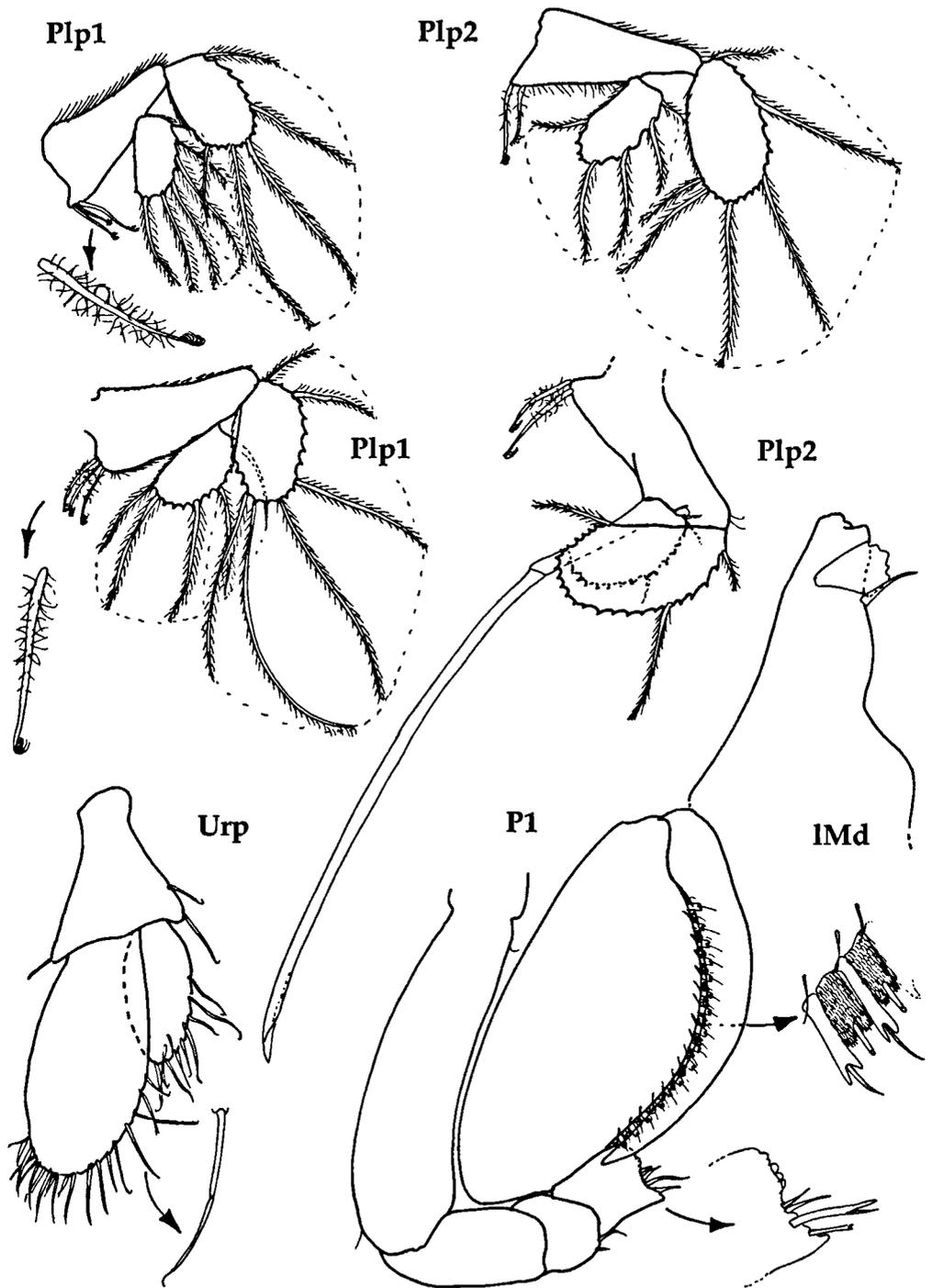


Fig. 5. *Frontoserolis abyssalis* n. sp., holotype female, pleopods 1, and 2 (uppermost illustrations), allotype male, pleopods 1, and 2, uropod, tip of left mandible, pereopod 1.

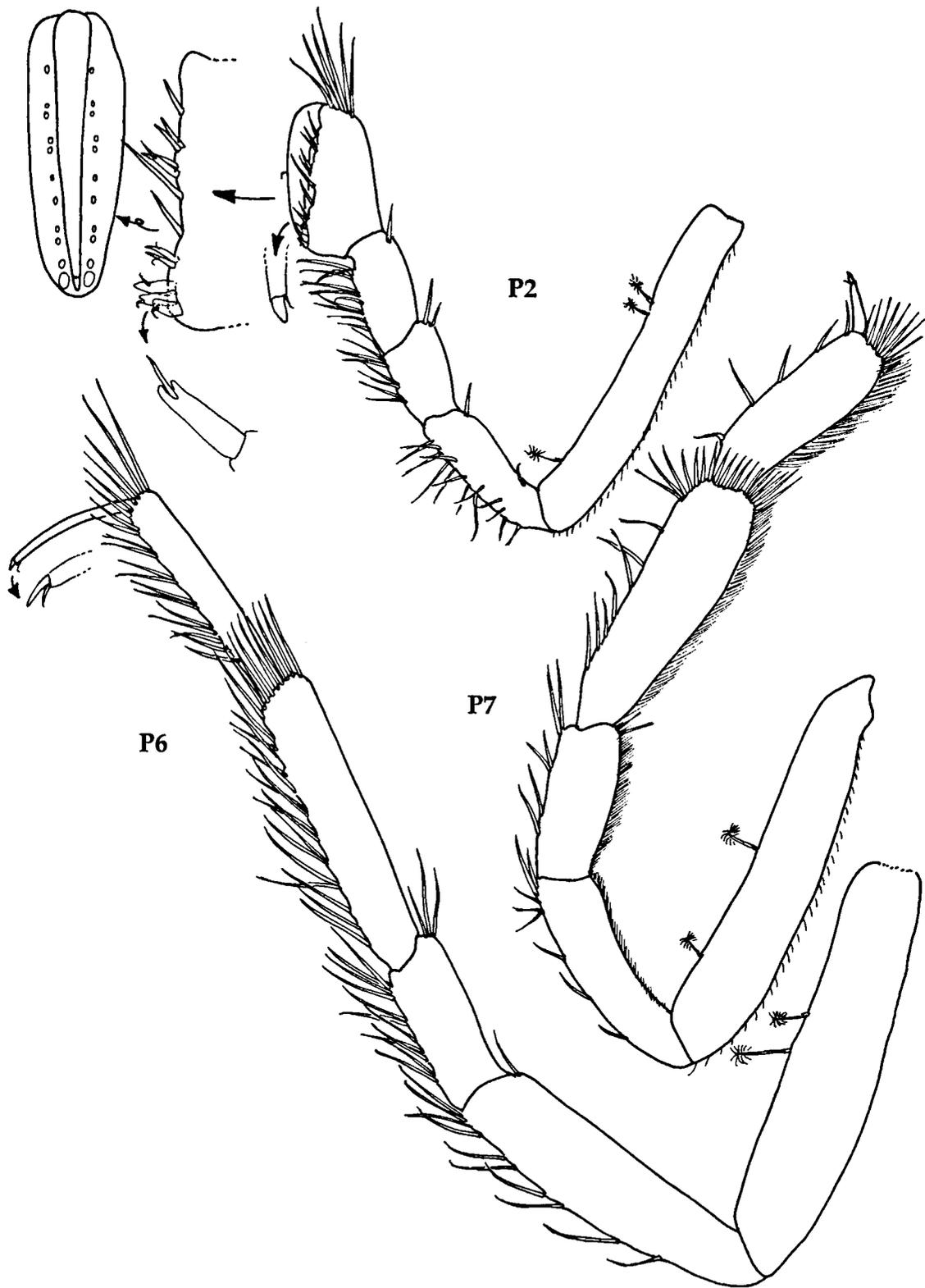


Fig. 6. *Frontoserolis abyssalis* n. sp., allotype male, pereopods 2, 6, and 7.

Pereopods 3-5 (Figs. 3, 4) similar, distal articles longer in posterior limbs. Basis, ischium and merus progressively shorter; carpus longer than merus, setose on ventral margin; propodus shorter than carpus, setose on ventral margin, merus, carpus, and propodus with long setae on palm; dactylus very slender, 0.4 length of propodus, tapering. Pereopods 6 (Fig. 4) and 7 (Fig. 3) about three-quarters length of pereopod 4; setation similar; dactylus half to two-thirds length of propodus, as slender as in pereopods 3-5.

Pleopods 1-3 (Figs. 4, 5) peduncle broad, almost triangular, with medial lobe bearing two-three setulate setae; endopod round oval, with marginal plumose setae; exopod long oval, also surrounded with marginal plumose setae. Pleopod 4 (Fig. 4) exopod operculiform, chitinized, 2-articulate, with lateral row of more than 100 short marginal plumose setae; endopod smaller, distally with four setae. Pleopod 5 (Fig. 4) smallest, exopod weakly 2-articulate; exopod with two distal plumose setae; endopod almost as long as exopod, without setae.

Uropod (Fig. 4) attached after two thirds of pleotelson length, not reaching distal tip, with subtriangular peduncle; rami oval, exopod 0.4 length of endopod, distally rounded, with nine distal feather-like and two simple setae; endopod 2.5 times as long as wide, distally rounded, distal half surrounded by 19 simple setae.

**MALE.** - Left mandible and pereopod 1 (Fig. 5) very similar to female, but pereopod 2 differs from female (Fig. 6), subchelate, with long and slender basis, bearing three dorsal feather-like setae; ischium about half as long as basis, merus and carpus slightly shorter, all three articles with ventral simple setae; propodus almost triangular, proximally widest, distally slightly narrowing, with proximoventral strong sensory setae, medio- and distoventrally more slender setae; dactylus fitting between ventral row of setae, reaching tip of propodus protrusion in ventral view, palm of propodus with six long simple setae. Pereopods 6 and 7 (Fig. 6) are very similar and differ only in the number of setae, except for pereopod 7 dactylus, which is too short and small for this male and probably is a regenerated article in this specimen.

Pleopod 1 (Fig. 5) peduncle subtriangular, with

strong medial lobe bearing three setulate setae; both endopod and exopod surrounded with many marginal plumose setae. Pleopod 2 (Fig. 5) peduncle more elongate and broader than in pleopod 1, with narrow medial lobe bearing two setulate setae; endopod broader than in pleopod 1, with many marginal plumose setae, with long apical slender appendix masculina, more than 5 times as long as endopod; exopod larger, broader, also with marginal plumose setae.

Uropod (Fig. 5) with larger exopod, exopod not with feather-like, but with simple setae distolaterally.

**ETYMOLOGY.** - For the Antarctic abyss.

**DISTRIBUTION.** - Antarctica, Elephant Island; 2886-2895 m depth.

**REMARKS.** - *Frontoserolis abyssalis* n. sp. is most similar to *Frontoserolis acuminata* (Sheppard, 1957) in terms of body morphology (compare also Brandt, 1988) and *Frontoserolis aestimabilis* (Brandt, 1988). Head of *F. abyssalis* n. sp. only with vestigial eyes, and two mesiodorsal rounded elevations, that of *F. acuminata* with long, narrow seleniform eyes, only one mesiodorsal rounded elevation.

*F. abyssalis* n. sp. can also easily be distinguished from *F. acuminata* by its broader pleotelson, which becomes acuminate only after two thirds of its length, whereas that of *F. acuminata* becomes acuminate after half length and is more pointed than that of *F. abyssalis* n. sp., whose pleotelson is characterised by two mesiodorsal short ridges, whereas that of *F. acuminata* bears one long mesiodorsal ridge, which is not extending to caudal tip, and a mesiolateral ridge on both sides extending transversely from proximal to mesiolateral (less than one third of pleotelson length).

*Frontoserolis aestimabilis* differs from the new species also in the fact that it has well developed seleniform eyes; further, it does not bear medio-caudal or mesiolateral blunt spines on pereonites and it is characterised by a less strongly acuminate pleotelson.

Both *F. acuminata* and *F. aestimabilis* were transferred from *Serolis* into *Frontoserolis* by Wägele (1994).

**Serolis arntzi** n. sp.

Figs. 7-13

**MATERIAL.** - Holotype: 1 preparatory female, 11.5 mm long, (ZMH, K-40221), station 133-3-E, 7-III-2002, 65°20.17'S 54°14.30'W - 65°20.05'S 54°14.46'W, 1121-1119 m, epibenthic net of epibenthic sledge, Northwestern Weddell Sea. Paratypes: 4 manca I of 5.5, 5.5, 5.5, and 6.2 mm length, (ZMH, K-40417), station 131-3-E, 5-III-2002, 65°19.83'S 51°31.62'W - 65°19.95'S 51°31.41'W, 3049-3050 m, Northwestern Weddell Sea; 2 females of 8.8, and 9.0 mm length (ZMH, K-40222), 43-8-E, 3-II-2002, 60°27.13'S 56°05.12'W - 60°27.25'S 56°05.25'W, 3962 m, epibenthic net of epibenthic sledge, South Shetland Trench.

**DESCRIPTION OF FEMALE HOLOTYPE.** - Greatest width of body (between tips of coxae 3) 0.8 of body length (rostrum to end of pleotelson) (Fig. 7). Head with broad diverging anterolateral lobes lateral to bases of antennae, bluntly produced anterolaterally; continuous obscure transverse ridge at base of antennae; eye large, seleniform, submarginal near widest part of head. Medio-caudally two rounded sculptured elevations, medially of these an almost triangular elevation with rounded edges, frontomedially on top of these another two smaller rounded sculptured elevations (Fig. 7).

Pereonite 1 with anterolateral margin continuously convex; posterolateral corner slightly overlapping coxa 2, smooth, only bearing caudolateral ridge. Pereonites 2-4 articulating, with coxal plates marked off by dorsal sutures; pereonites 5-7 free, much shorter than pereonites 2-4, especially pereonites 5 and 6. Posterolateral angles of the coxal plates 2-6 protruding posterolaterally, longer than and reaching further posteriorly than those of preceding segments; coxal plate 4 reaching to base of pleotelson, 5 reaching 50% of length of pleotelson, increasing in lateral extension from 2-6, 6 reaching 50% of length of pleotelson. Pereonite 7 without coxal plates. Ventral coxal plates 2-4 meeting, swollen and sculptured in mid-line; sternites 5-7 fused and visible; ventral coxal plates 6-7 separated. Pleonite 1 not visible dorsally. Pleonites 2 and 3 with narrow epimera, almost reaching length of pereonite 6, second on slightly shorter than third. Pleonites 1-3 ventrally similar, with sternal plates broad, prominent, angled sharply at midpoint. Pleotelson about a third of length of body, as wide as long, widest

medially, lateral margins straight, acuminate and narrowing after half length, tip rounded; with obscure mid-dorsal ridge, mediolateral ridges on proximal part, almost forming a triangular mediofrontal elevation mediolaterally with two curved carinae in proximal half of length, forming a semi-halfcircular elevation, extending into a ridge reaching to caudal margin continuing in a slightly opposite curve. Uropods not visible dorsally.

Antenna 1 (Fig. 8) with peduncular article 2 slightly narrower but longer than article 1, with one feather-like seta, article 3 about 1.5 as long as second; flagellum of 22 articles; flagellar article 1 longest, slightly more than half length of last peduncle article, last nine articles with aesthetascs, flagellar articles generally decreasing in length and width, last article small, minute. Antenna 2 (Fig. 8) with first and second articles broken off, third and fourth articles about subequal in length, fifth and sixth also about subequal in length, more than three times longer than fourth, with tufts of slender simple setae. 15 flagellar articles with three-four simple setae.

Mandibles (Fig. 8) asymmetrical, right lacinia mobilis narrower than on left. Left lacinia mobilis a broad blade, distally serrated, almost as wide as incisor, spine (spine row rudiment) simple and straight. Right lacinia mobilis with three small and a fourth longer teeth, spine simple and straight. Mandibular palp second article almost twice as long as first, with many small short setules distolaterally, third article lanceolate, with row of 27 setae, last ones longest. Maxilla 1 (Fig. 8) lateral lobe with 11 strong apical teeth; medial lobe stalked, small, distally rounded, with one short apical seta. Maxilla 2 (Fig. 9) inner lobe with many simple slender setae and medial setules, median and outer lobes each with three serrated setae. Maxilliped (Fig. 9): coxa and epipod lateral to it separated by suture; endite with transverse distal margin bearing one distal and one lateral spiniform seta, medially long simple setae and fine, small setules; palp with short first article bearing only four simple setae, second article with many long mediolateral and -lateral setae, third article with lateral and distal tuft of setae.

Pereopod 1 (Fig. 9) basis and merus with simple seta, ischium without, basis almost as long as propodus, carpus almost quadrangular, with

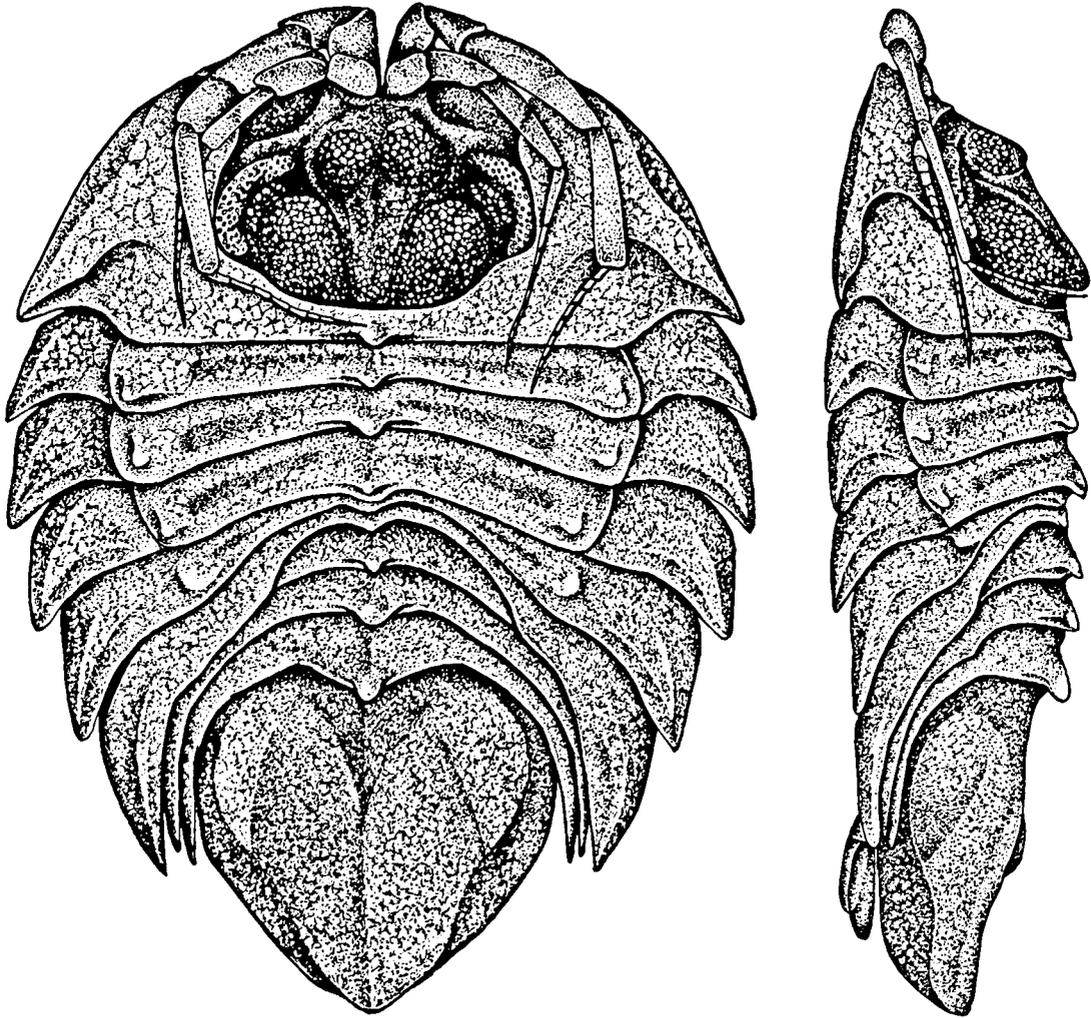


Fig. 7. *Serolis amtzii* n. sp, holotype female. Left, dorsal view. Right, lateral view.

three sensory setae of different lengths mediolaterally; propodus long-oval, widest at 50% of length, curved palm with row of alternating fan-shaped setae and spiniform setae, each with apical projection, and submarginal lateral row of short simple setae; dactylus evenly curved and tapering, unguis not differentiated. Pereopod 2 (Fig. 10) with basis 1.5 as long as ischium, with three feather-like and one simple setae; ischium with row of ventral simple setules and one long distal simple seta, merus slightly more than half as long as ischium, with two simple dorsal setae, carpus about as long as merus, with ventral row of simple setae and one distodorsal simple seta;

propodus slightly longer than carpus, palm with lateral row of two long tapered simple setae, ventral row of simple setae, dactylus about three thirds of length of propodus, slightly curved, not surpassing heel of palm, unguis not differentiated.

Pereopods 3-7 (Figs. 10, 11) similar decreasing in lengths, distal articles longer in posterior limbs. Basis, ischium and merus progressively shorter; carpus longer than merus, setose on ventral margin; propodus about as long as carpus, setose on ventral margin, merus, carpus, and propodus with long setae on palm, most on propodus; dactylus very slender, 0.5-0.4 length of propodus,

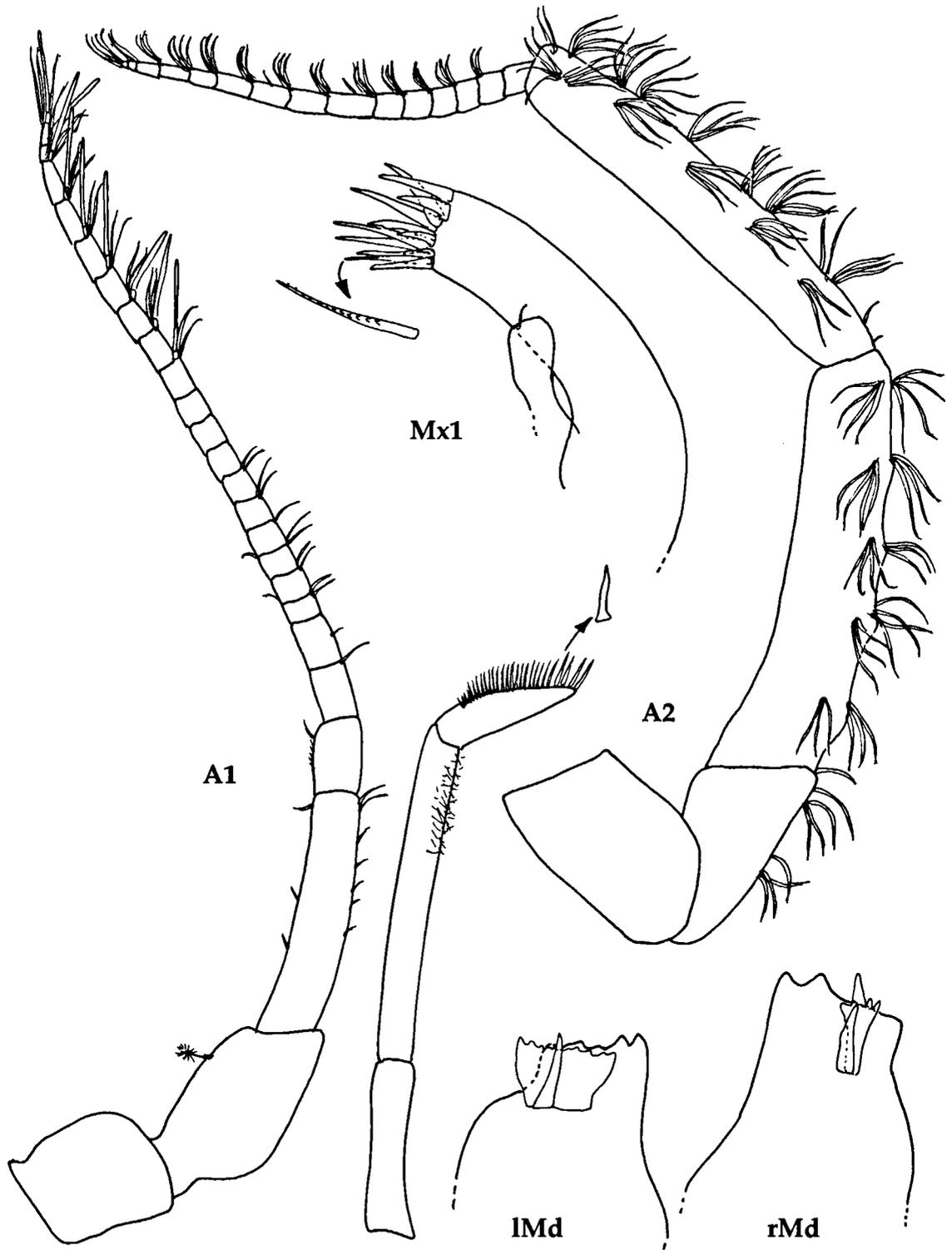


Fig. 8. *Serolis arntzi* n. sp., holotype female, antennula, antenna, tips of both mandibles and mandibular palp of left mandible, maxillula.

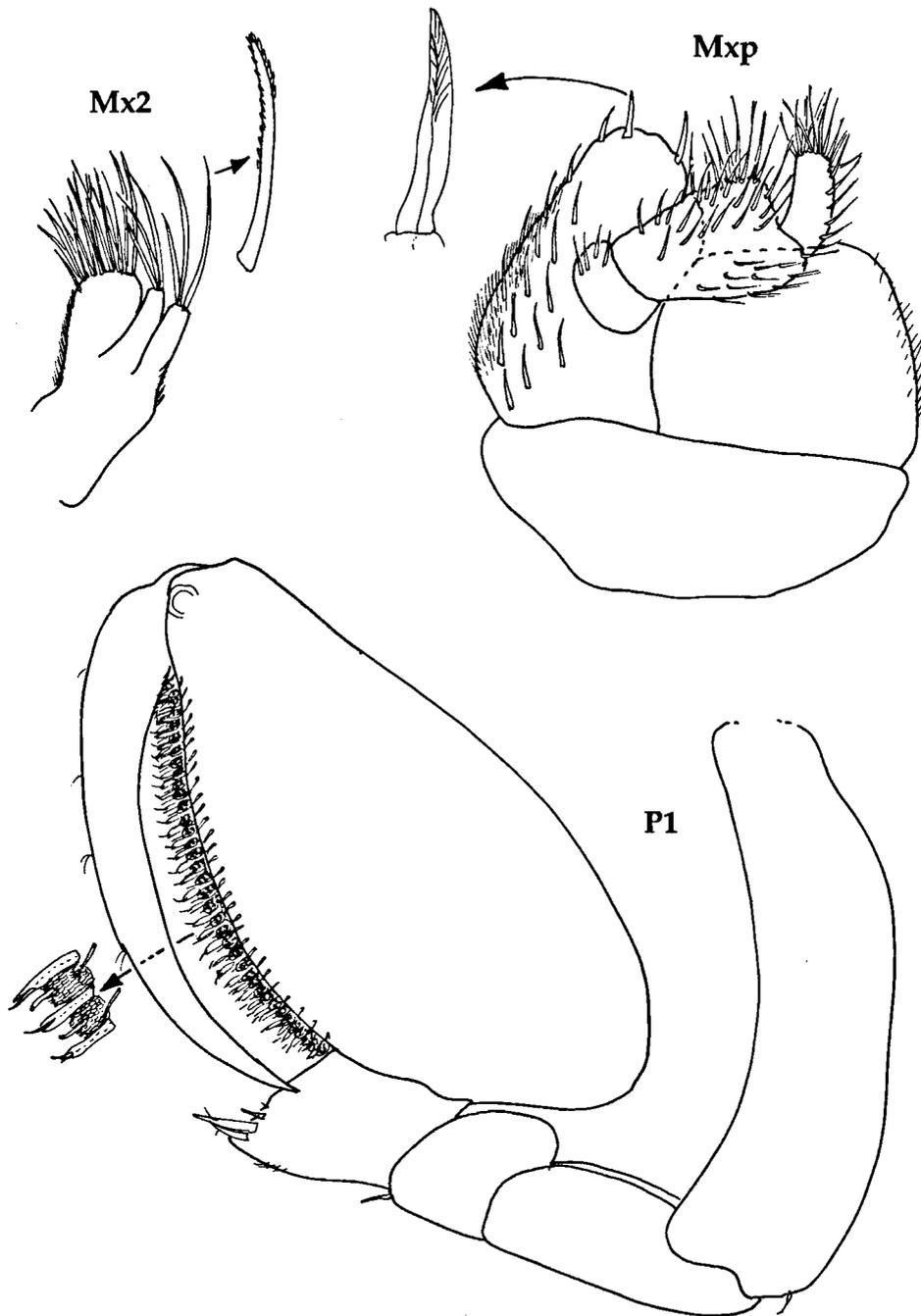


Fig. 9. *Serolis amtzi* n. sp., holotype female, maxilla, maxilliped, pereopod 1.

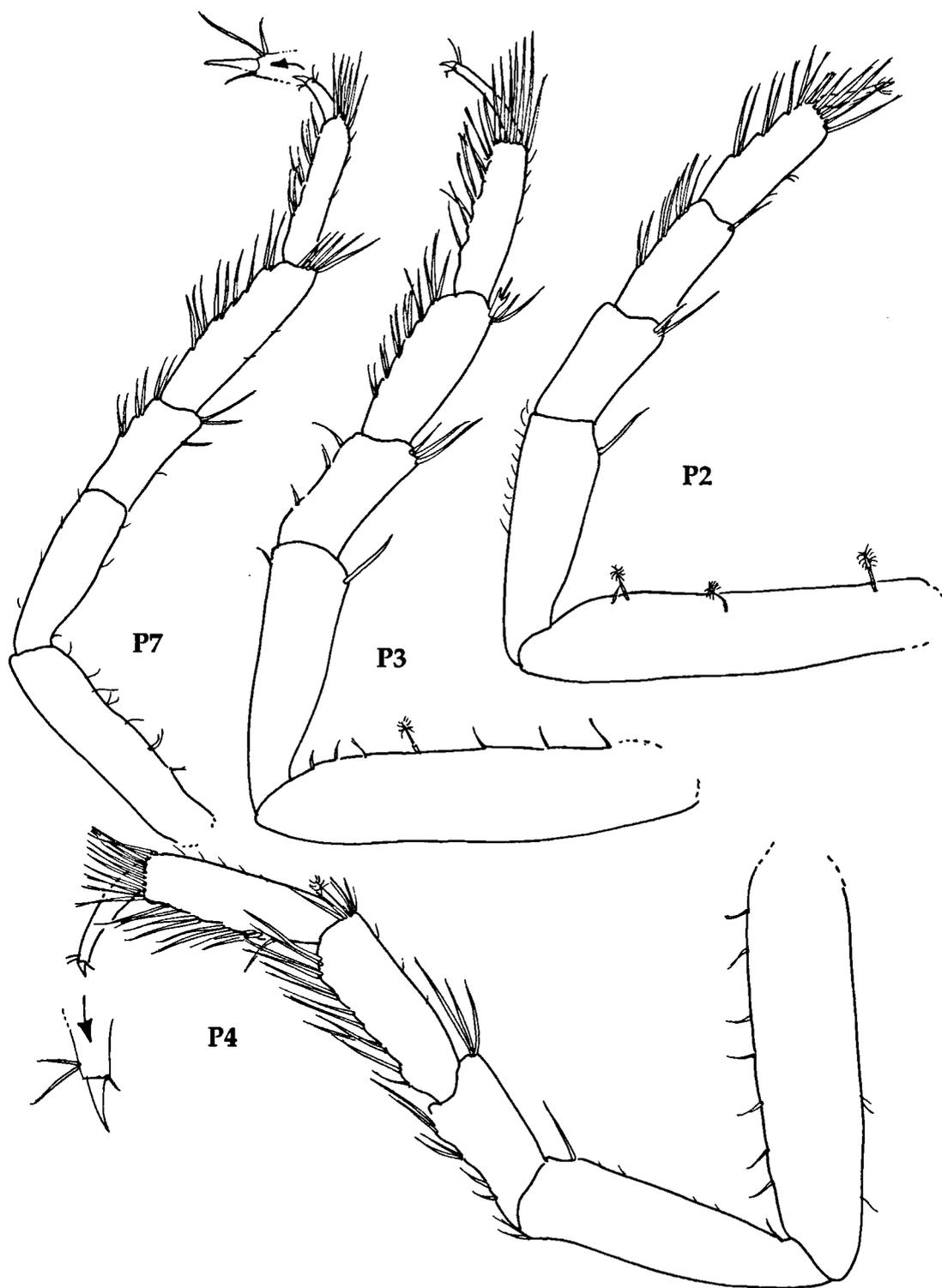


Fig. 10. *Serolis amtzi* n. sp., holotype female, pereopods 2-4, 7.

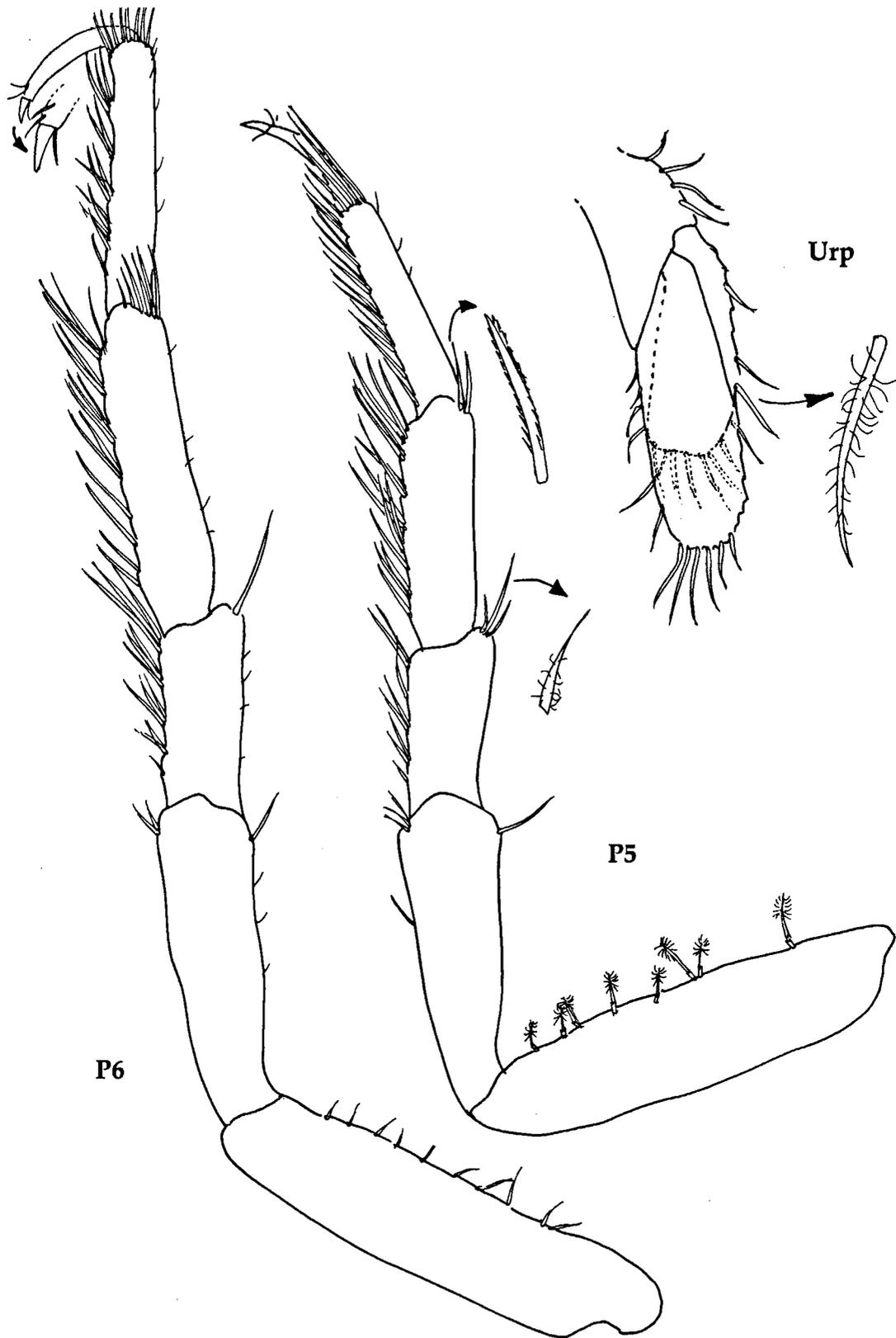


Fig. 11. *Serolis arntzi* n. sp., holotype female, pereopods 5, 6, uropod.

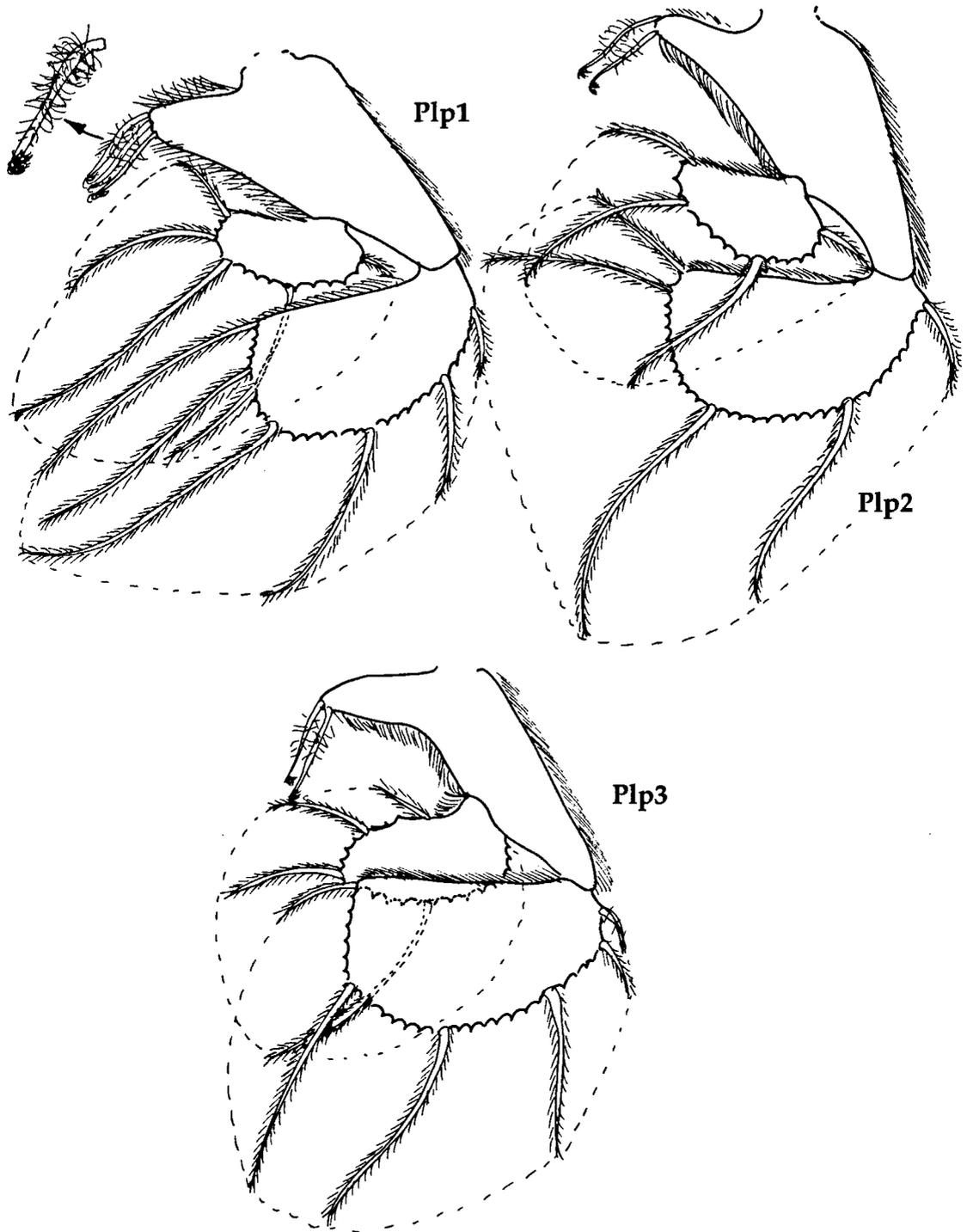


Fig. 12. *Serolis arntzi* n. sp., holotype female, pleopods 1-3.

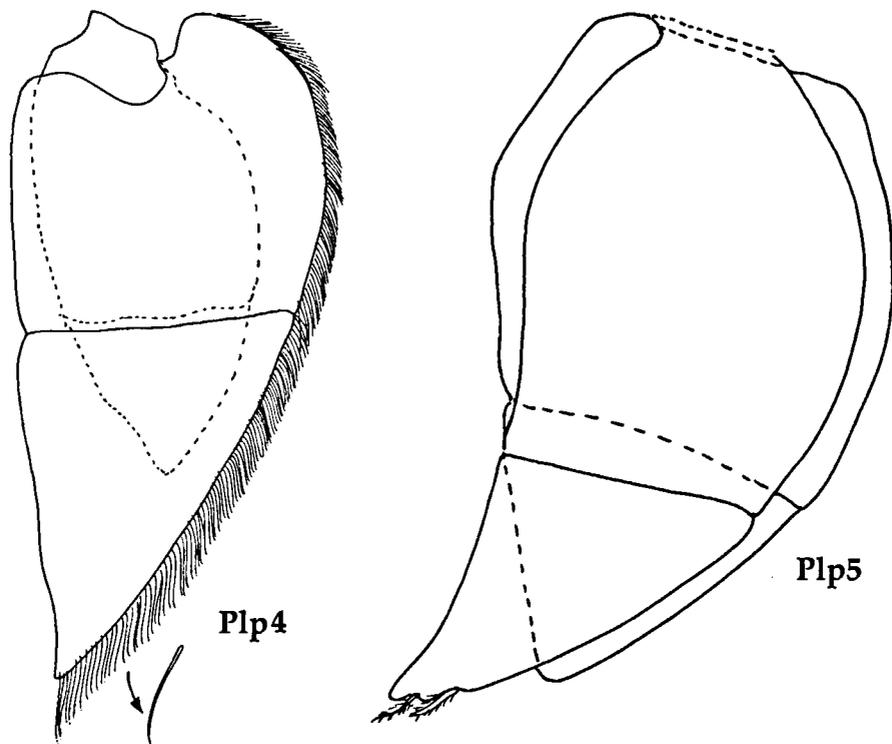


Fig. 13. *Serolis amtzi* n. sp., holotype female, pleopods 4 and 5.

tapering. Pereopod 5 basis distally with many feather-like setae, other pereopods with simple setae or one feather-like seta.

Pleopods 1-3 (Fig. 12) peduncle broad, almost triangular, with medial lobe bearing two-three setulate setae; endopod round oval, with marginal plumose setae; exopod long oval, also surrounded with marginal plumose setae. Pleopod 4 (Fig. 13) exopod operculiform, chitinized, 2-articulate, with lateral row of more than 200 short marginal plumose setae; endopod smaller, also 2-articulate, distally without setae. Pleopod 5 (Fig. 13) smallest, exopod weakly 2-articulate; exopod with two distal short plumose setae; endopod almost as long as exopod, also weakly 2-articulate, without setae.

Uropod (Fig. 11) attached about after two thirds of pleotelson length not visible in dorsal view and not reaching distal tip, with subtriangular peduncle bearing lateral simple setae; rami long-oval, exopod 0.6 length of endopod, distally rounded, with some distal and lateral plumose setae; endopod 4 times as long as wide, distally rounded, distally and medially surrounded by plumose setae.

ETYMOLOGY. - For my colleague Wolf Arntz, who loves Serolidae and supported ANDEEP very much.

DISTRIBUTION. - Southern Ocean, Northeastern Weddell Sea and South Shetland Trench.

REMARKS. - *Serolis amtzi* n. sp. is in terms of sculpture of dorsal body surface, most similar to *Serolis rugosa* Kussakin, 1982. The sculpture of the head is very similar, however, pereonites 3-5 of *S. rugosa* bear another shallow elevation mesiodorsally between the caudomedial blunt spine and the small blunt spine-like elevation of the pereonites besides dorsal sutures of coxal plates, which are absent in *S. amtzi* n. sp. Moreover, the pleotelson of *S. rugosa* is slightly smaller though similar in shape, moreover, it is covered with small blunt tubercles, which are missing in *S. amtzi* n.sp. All other species of *Serolis* can very easily be distinguished from *S. amtzi* n. sp. by their completely different body outlines.

## ACKNOWLEDGEMENTS

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