

New records of little known deep-sea Echinothambematidae (Crustacea: Isopoda: Asellota) with redescription of *Vemathambema elongata* Menzies, 1962 and description of a new species from the Argentina Basin*

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Abstract

The family Echinothambematidae and the genus *Vemathambema* Menzies, 1962 are rediagnosed. A redescription of *Vemathambema elongata* Menzies, 1962 from the Angola Basin and the description of *Vemathambema argentinensis* sp. nov. from the Argentina Basin of the South Atlantic are presented. The new species can easily be distinguished from *Vemathambema elongata* by its larger opercular pleopods and deeper constrictions of pereonites two to four.

Key words: Crustacea, Isopoda, Asellota, Echinothambematidae, taxonomy, deep-sea, *Vemathambema argentinensis* n.sp., South Atlantic

Introduction

The deep-sea family Echinothambematidae Menzies, 1956 currently includes 2 genera – the type genus *Echinothambema* Menzies, 1956 and *Vemathambema* Menzies, 1962. The genus *Echinothambema* consists of 2 species - *E. ophiuroides* Menzies, 1956, described on the base of an “ambisexual” specimen from the North Atlantic, north of the Puerto Rico Trench, from 5104-5122 m depth and *E. aculeata* Mezhev, 1981 which was described for a single male from the Markus-Nekker mountains in the tropical western Pacific, from 1630 m depth. The genus *Vemathambema* was erected by Menzies (1962) for one female of *V. elongata* Menzies, 1962 from the southwestern

slope of the Angola Basin caught in 4935 m depth. Until the present work it had been a monotypic genus.

Thus, all the information we had about the family was based only on three specimens of different sexes. Moreover, Menzies' descriptions of these species are too brief, with poor illustrations of the dorsal view of the body and few details of appendages. This explains why Wolff (1962) was in doubt about the placement of these two genera in the same family. The phylogenetic origin of the family Echinothambematidae and its relations within the superfamily Janiroidea are still not clear. The present study of this little known family is based on new collections of a Russian expedition with RV “Akademik Kurchatov” (cruise 43, 1985-1986) which were taken along a transect through the South Atlantic from the Argentina Basin in the west to

* Result of the “DIVA 1” expedition (RV “Meteor” cruise M48/1)

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Walfis Ridge in the east, and on material from the German expedition "DIVA 1" with RV "Meteor" (cruise 48, 2000) in the Angola Basin. These samples contain several specimens of *Vemathambema*. A detailed examination of specimens of both sexes in different stages of maturation and comparison with the holotype of *V. elongata* showed that two different species are present.

This paper presents a redescription of *V. elongata* and the description of *Vemathambema argentinensis* sp. nov. New definitions of the genus *Vemathambema* and of the family Echinothambematidae are presented to consider the new information.

The type material is deposited in the Zoological Museum of Moscow University, Moscow, Russia (ZMMU).

Taxonomic results

Asellota, Janiroidea

Family Echinothambematidae Menzies, 1956

Echinothambematidae Menzies, 1956: 9-10; Menzies (1962: 183), Wolff (1962: 49), Mezhev (1981: 66), Wägele (1989: 98).

Type genus: *Echinothambema* Menzies, 1956.

Diagnosis. Body slender, subcylindrical, with fragile but highly calcified integument. Pereonites subequal in length and in width, lateral parts of pereonites protruding. Cephalon without eyes, free, not fused with pereonite 1 in adult specimens, dorsally broader than long, narrower than pereonites, slightly immersed in pereonite 1; frontal margin concave, interantennular distance about half of cephalon width, anterolateral angles with deep notches for antennae, high rounded ridges on both sides of antennal bases. Pereonites 6 and 7 dorsally free in adults and fused in juveniles, pleotelson of juveniles fused with pereonite 7. Pleonites fused with pleotelson, no sutures visible. Pleotelson bell-shaped in dorsal view, vaulted, broadened posteriorly, posterior margin rounded, anus inside branchial cavity, covered by opercular pleopods. Uropods inserted caudolaterally on the broadest part of pleotelson.

Peduncles of both antennae, bases, ischii and meri of all pereonites slightly swollen, with integument calcified; flagella of both antennae, carpi, propodi and dactyli of all pereopods and uropods transparent.

Both antennae shorter than body. Antenna 1 with 7 articles, two basal articles swollen, broader than peduncle articles of antenna 2, article 4 (first flagellar

article) very short, ring-like, much broader than long, flagellum of further 3 elongate articles. Antenna 2 basal article minute, three following articles subequal in size, four short basal articles together slightly shorter than article 1 of antenna 1, third article without squama, article 6 longest, flagellum with 8-12 elongate articles. Molar process of mandibles well developed, cylindrical, broadened and truncated distally; incisor process and lacinia mobilis of left mandible subequal in length, spine rows with 4-6 spines, palp either normal, 3-articulated or reduced.

Maxilliped palp 5-articulated, articles 2 and 3 expanded, article 3 broadest, subequal in width to endite, articles 4 and 5 narrow, subcylindrical; epipod subtriangular, slightly longer and broader than basis.

Bases of all pereopods subequal in shape and size. Pereopod 1 prehensile, carposubchelate, carpus and propodus more robust than in remaining pereopods, somewhat expanded, carpus proximal half broadened ventrally, with 2-3 stout, bifid setae, dactylus with 2 claws; pereopods 2-7 ambulatory, subequal in shape, in adults slightly enlarged from 2 to 6 mainly by elongation of carpi and propodi; dactyli with 1 or 2 claws. Coxae small, ring-like, without projections, not visible in dorsal view.

Operculum of both sexes vaulted ventrally, integument calcified like body integument. Female operculum oval, proximal part swollen, separated from remaining part by deep groove. Pleopod 1 of male elongate, sagittate. Pleopod 2 protopod swollen ventrally, pair of pleopods 2 adjoined with proximomedial lobes (see Figs 21e, g). Pleopod 5 absent. Uropod longer than pleotelson, inserting caudolaterally on protruding parts of pleotelson, cylindrical, uniramous.

Geographic distribution. Two species of *Vemathambema* are known, from the south Atlantic: the deep-sea of the Angola and the Argentina Basins, regions separated by the Mid-Atlantic Ridge. The type species of *Echinothambema* was found north of the Puerto Rico Trench (western tropical Atlantic), another species was described from the Mid-Pacific (Markus-Nekker Mountains) northeast of the Marshall Islands (western tropical Pacific). The known areas of the two *Echinothambema* species are separated by the isthmus of Panama and 120° of longitude, but they are situated on the same latitude.

Remarks. The most conspicuous characters of the Echinothambematidae are the slender, stick-like, cylindrical body; short antennae of similar length; absence of the mandibular palp; a tendency to reduce the ventral dactylar claw and the elongation of the dorsal claw; a swollen pleotelson, the branchial chamber

covered completely by opercular pleopods; long, stout, uniramous uropods, having apparently a good mobility. All these individual features can also be found in other asellotan taxa, but not in the same combination.

The general habitus of the Echinothambematidae is similar to stick-like Nannoniscidae (former Pseudomesidae), Ischnomesidae, some Desmosomatidae and Macrostylidae, as well as the Thambemathidae, Microcerberidae and some janirid species. Menzies, erecting the new family, documented his opinion about the closest relatives (the Thambematidae) by choosing the name Echinothambematidae for the new taxon (Menzies 1956). However, a character distinguishing the Thambematidae is a cephalon at least as broad as the pereonites, not embraced by pereonite 1; a free pleonite, a depressed pleotelson with small opercular pleopods, not covering the following three pleopods; an almost terminal anus outside the branchial cavity, and biramous uropods.

The genera *Micromesus* Birstein, 1963 and *Pseudomesus* Hansen, 1916 (family Pseudomesidae established by Hansen 1916, but according to Wägele 1989 identical with Nannoniscidae, but see also Svavarsson 1984) share with the Echinothambematidae a similar body shape, especially in lateral view, similar antennae of females, a similar armament of anterior pereopods, one dactylar claw in all pereopods, a large female operculum, similar pleopods, especially the absence of pleopod 5. *Micromesus* and *Pseudomesus*, however, are characterized by the modification of the male antenna 2, by mandibles with a very small triangular molar process, dorsally visible coxae, last pereopods provided with long setae, the anus placed outside the branchial chamber, and uropods that are small, two-articulated and inserted ventrally (laterally in *Micromesus*).

The Ischnomesidae share with the Echinothambematidae the slender, cylindrical body, the antennae are inserted in the anterolateral angles of the head, pereonites are convex laterally, in juvenile stages the cephalon is fused with pereonite 1 and the two last pereonites are fused with the pleotelson, all pleonites are fused with the pleotelson. Also, the uropods insert caudolaterally and are uniramous, directed caudolaterally, and there are similar details in the shape and armament of pereopods of species of both families; the opercular pleopods cover the branchial cavity completely. Pleopods are also similar, for example, the exopod of pleopod 3 is narrow and not segmented, ending with one seta, pleopod 4 is a single lobe without setae, pleopod 5 is absent. However, the Ischnomesidae have an apomorphic elongation of pereonites 4 and 5 and

modified antennae (antenna 1 with short and broad, globe-shaped first and very long second article, antenna 2 at least one third longer than antenna 1, with elongate article 3), the anus is not covered by pleopods. The basis of the maxilliped is broad in Ischnomesidae; the exopod of pleopod 3 is rather long and narrow, the uropods are shorter than the pleotelson and usually have two articles (one in *Heteromesus*), a plesiomorphic condition in comparison with the uniramous and elongate uropod of the Echinothambematidae.

Another deep-sea family whose members at first sight resemble the Echinothambematidae are the Macrostylidae. These species also have a narrow body and long uniramous uropods inserted caudolaterally on the telsonic apex, but they possess a number of derived characters absent in Echinothambematidae, such as a pereopod 3 with dorsally bent dactylus and rows of long sensory spines on ischium, merus and carpus, a short first antenna with only 2 flagellar articles, and short pereonites 1-3 which together form a nearly rectangular tagma. A plesiomorphic condition not present in Echinothambematidae is that the uropod has two articles.

We do not attempt here to reconstruct phylogenetic relationships. For taxonomic purposes it is important to note that among similar deep-sea families most features of the Echinothambematidae are shared with the Ischnomesidae, which are, however, easily discerned by their elongated pereonites 4 and 5 and by their shorter uropods.

***Vemathambema* Menzies, 1962**

Vemathambema Menzies, 1962: 183.

Type species: *V. elongata* Menzies, 1962.

Description. Body elongate, stick-like, cylindrical, without any spines, integument reticulated, calcified but fragile, lateral margins of pereonites protruding. Greatest height of body in cephalon, pereonite 1, and in pleotelson. Cephalon vaulted dorsally, length about 0.1 body length, interantennular distance slightly less than half of cephalon width. Pereonites of approximately the same size, more than half as long as wide, slightly increasing in length from pereonite 1 to 4-5 and decreasing from 5 to 7; rounded lateral projections with ventral insertions of pereopods situated on anterior parts of pereonites 1-4 (on pereonite 1 directed forward, on pereonites 2-4 perpendicular to body axis) and on posterior part of pereonites 5-7, directed backwards. Pereonite 1 dorsally with shallow oblique grooves separating anterolateral corners of tergite, and

with protruding midventral part; pereonites 2-4 each dorsally divided by deep transverse groove, this constriction separating two swollen parts: a broad anterior and a narrow posterior region. Pereonites 5-7 of subequal trapezoidal shape. Pleon consisting of pleotelson only, pleonites fused with pleotelson, no sutures present. Pleotelson length nearly one fifth of body length. Male pleotelson broader than in female. Female spermathecal duct situated anterolaterally on pereonite 5, separated from ventral oopore.

Antennae subequal in length, about one third of body length. Antenna 1 two basal articles subequal in size. Antenna 2 narrower and slightly longer than antenna 1, article 1 very short, situated under proximalateral half of next article, flagellum shorter than peduncle in both antennae. Lacinia mobilis of left mandible with 4 teeth and bulb proximally; right molar process ventral margin of triturating surface with row of denticles and 3 setulose setae; condyle conspicuously shorter than molar process; palp absent, one stout seta in its place. Maxilla 1 outer endite distally with 10-11 deeply denticulate, spinelike setae, inner endite with 2 large, finely setulated and 2-3 simple distal setae. Maxilla 2 inner endite with 2 long, densely setulated medial setae, middle endite shortest, outer and middle endites with 2 long and 2 short setulose spine-like setae and dense rows of long medial setules each; basis and medial margin with denticulate combs. Maxilliped endite width 0.6 of basis width, with 2-3 coupling hooks, with wide fan setae distally. Palp inserted after 0.7 of basis length, palp length 0.7 of basis length, articles gradually increasing in length and width from 1 to 3, article 1 short, article 2 trapezoidal, both with 1 distomedial seta, article 3 medial margin rounded, with 2-4 setae; article 5 with 2 long and 2 short distal setae; epipod two times longer than wide, medial margin concave.

Basis in all pereopods the longest article, slightly broadened distally, with sparse whip setae and a few broom setae on dorsal margin. Ischii and meri of all pereopods subequal in shape and length, broadened distally.

Pereopod 1 carposubchelate, basis, ischium and merus with dense hair-like short setae; propodus and carpus with ventral serration, propodus slightly shorter and narrower than carpus, with small, simple setae ventrally; dactylus with 2 ventral rows of small denticles, a ventral seta, and 2 thin lateral setae, a bifurcate ventral claw nearly 0.6 times as long as the dorsal acute one, 2 long setae inbetween.

Pereopod 2 dactylus with long dorsal claw, small accessory ventral spine (claw), and 2 long setae inbetween; pereopods 3-7 dactylus with single long

claw nearly 0.6 of dactylus length and 2 long setae, ventral claw absent. On all pereopods propodus narrower than carpus, on pereopods 2-4 slightly shorter than carpus. Propodi bearing small, serrated, transparent plates, mainly ventrally, and 2-4 spine-like, bifid ventral setae; carpi with serrate combs and 3 spine-like setae ventrally, a pair of prominent combs with high teeth distoventrally.

Operculum of female: oval, proximal narrow part swollen ventrally, separated from the rest by a deep groove, margins with small setae. Pleopod 1 of male: distal sagittal part nearly 1.5 times wider than narrowest part, distolateral lobes bent dorsally, forming stylet guides, lateral margins with ventral rows of short setae. Pleopod 2 of male: protopod more than twice as long as wide, stylet curved, slightly extending beyond distal edge of protopod; exopod knob-like, not hooked, almost as wide as proximal article of endite, with dense, hair-like setules apically. Pleopod 3 length 0.6 of pleopod 1 length; protopod nearly rectangular, slightly longer than wide; endopod not subdivided, longer than wide, with 3 plumose setae distally; exopod a single lobe nearly half as long and as wide as endopod, with 1 distal simple seta; both rami with dense rows of long hairlike lateral setae. Pleopod 4 uniramous, oval, protopod and ramus fused. Pleopod 5 absent.

Uropod of a single article, tapering distally, with small setae along margins and distally.

Geographic distribution. South Atlantic. Only two species are known. They occur in the deep-sea plains of the Angola and the Argentina Basins, separated by the Mid-Atlantic Ridge. Known depth range: 4630-5397 m.

Remarks. This genus differs from *Echinothambema* by a more slender, cylindrical body, lateral spines are absent, the mandibular palp is completely reduced, the maxillipedal palp is broader. The two first articles of antenna 1 differ less in size than in *Echinothambema*, which has article 1 conspicuously longer and broader than article 2. The pereopods 3-7 of *Vemathambema* have 1 long dorsal dactylar claw instead of 2 short ones which occur in *Echinothambema*. Possibly, such a reduction of the ventral claw, as well as the more streamlined body shape and shorter antennae, are adaptations to burrowing.

***Vemathambema elongata* Menzies, 1962 (Figs 1-14)**

Vemathambema elongata Menzies, 1962: 183, figs 62j-m.

Material examined. “Vema” expedition: 2.5.1957, 28°25.2'S, 08°28.5'E, depth 4986 m; holotype female 5.4 mm long (AMNH, No. 12073) and 2 paratypes (AMNH, No. 18276). German expedition “DIVA 1” (“Meteor” cruise 48/1): 22.7.00, St. 338, 18°19.4'S 04°39.7'E, depth 5397 m; 1 female 3.5 mm, St. 340, 18°18.3'S, 04°41.3'E, depth 5395 m; 1 female 3.2 mm; 28.7.00, St. 348, 16°18.1'S 05°27.2'E, depth 5390 m; 1 juvenile female, 1.8 mm. Russian Expedition R/V “Akademik Kurchatov” (cruise 43): 13.1.1986, St. 4912, 26°45.1'S, 06°54.6'E, depth 4910 m, posterior part of male.

Redescription. Body length of holotype (Fig. 1) 6 times pleotelson width, and 9.5 times narrowest central body part width; greatest height of body subequal to width. Cephalon length 0.8 times of width, width 0.7 of pereonite 1 width.

Anterolateral projections of pereonite 2 directed perpendicular to body axis, each with a small tubercle. Pereonites 3-4 of the same shape, anterolateral projections narrower than in pereonites 1 and 2. Anterior parts of pereonites 3 and 4 1.5 times as wide as narrowest middle part.

Pereonites 5-7 separated by sutures, only a groove between 7 and pleotelson. Pleotelson 1.1 times longer than broad, ventral part in front of the insertion of operculum swollen. Dorsal and lateral body surfaces with scattered minute setae.

Immature female from St. 338 (Fig. 2) with pereonite 7 and pereopod 7 not fully developed, body 5.4 times as long as wide. Small juvenile from St. 348 (Figs 3 d,e) with weakly developed pereonite 7, pereopod 7 absent, cephalon fused with pereonite 1, body 4.9 times as long as wide. Shapes of lateral margins of pereonites in immature female in dorsal view same as in holotype. Adult male posterior body part (Figs 3a-c) with similar shapes of pereonites 5-7 and pleotelson as in holotype. Pleotelson as long as wide, opercular pleopods occupying about same area as in female.

Antenna 1 (Figs 5c, 10a) article 1 length 2.6-2.7 width, with distal seta on small triangular distomedial projection. Article 2 slightly shorter and narrower than article 1, length 3 times width (in juvenile subequal to article 1, length/width ratio 2.3); article 3 0.75 times as long and 0.6 times as wide as article 2, four flagellar articles together 0.3 of total antenna 1 (first flagellar article in juvenile fused with article 3, flagellum of 2 free articles). Peduncle articles with a few distal setae, last flagellar article with long aesthetasc and 2 small simple setae.

Antenna 2 (Figs 5b, 14a) article 1 very short, articles 2 and 4 somewhat longer than wide, article 3 slightly shorter than wide, articles 5 and 6 elongate;

each peduncular article with a few whip setae, in juvenile these articles setulose; flagellum of 8 articles, article 1 longest, remaining articles subequal in length, with one small seta each, last article with 5 long simple setae distally.

Mandibles (Figs 4c-h, 10b-f) spine row with 5 and 6 spines in left and right mandibles, respectively (in juvenile 4 and 5), lacinia with larger teeth on left mandible; molar well developed, with broad grinding surface. Palp absent.

Maxilla 1 (Figs 4 a, 11b) outer endite 2 times as broad as inner endite, 10 serrate spines and 2 simple setae apically; inner endite with 3 apical simple setae and 2 medial ones, the latter strongly curved and setulose.

Maxilla 2 outer endite longest, setation as in Figs 4b, 11d.

Maxilliped (Figs 5a, 11a) endite with 2 coupling hooks (in juvenile 1 hook), 2 fan setae and 5-6 setulose setae distally. Palp article 1 length 0.6 of width; article 2 lateral and medial sides subequal in length, length 0.7 of width, article 3 broadest, length 0.75 of width of article 2, medial margin denticulate; article 4 as long and 0.4 times as wide as article 3, with 2 distal setae, article 5 half as long and somewhat narrower than article 4. Epipod 1.1 times as long as wide, distal angle rounded, with minute setules.

Pereopod bases in adult specimens conspicuously elongate, length increasing from 1 to 6; bases 1-7 length/width ratios 4.5, 5.3, 6.3, 7.3, 7.1-7.5, 6.0-7.3, 7.2-7.8, in juvenile 5.3, 5.4, 5.8, 6.3, 6.2, 6.3, respectively; all bases with numerous small, simple setae along article and a few small broom setae dorsally.

Pereopod 1 (Figs 6, 12) length 0.2 of body length and 0.7 of pereopod 6 length, basis length 0.35 of total pereopod length, ischium 1.8 times as long as wide, 0.35 of basis length, merus length 1.2 times width and 0.25 of basis length, carpus length 2.5 times width and half of basis length, propodus width 0.8 of carpus width and 0.9 of carpus length, dactylus length 2.3 of width and 0.38 of propodus length; merus with distoventral spine-like seta and 2 distal whip setae, propodus ventrally with 1 long and 3 short whip setae.

Pereopods 2-7 (Figs 6, 7, 8, 12, 13) bases, ischia and meri in immature females with dense cover of hair-like short setae, and with sparse whip setae mainly distally, the latter being absent in adults. Ischii about one-third as long as correspondent bases, meri 0.6-0.7 times as long as ischii. Carpus length/basis ratios in female 0.71, 0.75, 0.78, 0.93, 0.83, 0.81. Propodus of pereopods 2-4 slightly shorter, of pereopods 5-7 subequal or slightly longer than carpus. Carpi 2-4 with

3 spine-like bifid setae, carpi 5-7 in female with 2, in male with 3 such setae. In adults propodus of pereopod 2 with 3, in remaining pereopods with 2 ventral spine-like bifid setae, propodi 2-4 with one spine-like and one whip seta distoventrally, propodi 5-7 with 3 spine-like setae distoventrally; dactyli 2-7 thin, 3.5-6.5 times as long as wide.

Operculum of female (Figs 1b, 9c, 21f) oval in holotype, more triangular in immature females, length/width ratio 1.4 in holotype, 1.3 in immature females.

Pleopod 1 of male (Fig. 9) 3.3 times as long as narrowest width and 2 times as long as greatest width proximally, sagittal part slightly narrower than proximal part, distolateral lobes bent dorsally, reaching one quarter of total pleopod length, lateral margins with ventral rows of short setae. Pleopod 2 of male (Fig. 9): protopod length 2.4 width, obliquely truncated apically, proximomedial lobe length 0.3 protopod length, width 0.6 of protopod width, endite proximal article twice as broad as distal article in ventral view, stylet curved, only slightly extending beyond distal edge of protopod, exopod about as long as wide, distally covered with many fine hair-like setae. Pleopod 3 (Figs 9, 14) endopod length 1.3 width, exopod width 0.4-0.45 of endopod width, exopod length 0.6 of endopod length. Endopod with 3 apical swimming setae, exopod distally a simple seta. Pleopod 4 (Figs 9, 14) length 2.7 width, uniramous, without setae.

Uropod (Figs 5d, 14g): in female length 12.7 times width and 1.6 of pleotelson length, in male 16 times as long as wide, length 2.7 of pleotelson length, and in juvenile female length 9.6 times of width, 1.1 pleotelson length and 0.13 of body length.

Geographic distribution. South Atlantic: south-western part of Angola Basin, depth 4910-5397 m.

***Vemathambema argentinensis* sp. nov.** (Figs 15-21)

Material examined. Expedition with RV "Akademik Kurchatov" (cruise 43), St 4893, 26.12.1985, 36°12'S, 49°09'W, depth 4630 m, holotype male 4.6 mm long, (ZMMU Mc 1322a). Paratypes: female allotype with oostegites on first pereopods, 4.7 mm long; female 4.2 mm; 2 adult males 4.7 and 4.3 mm; 2 immature males in stage IV 3.2 and 3.1 mm (see Wolff, 1962); pleotelson of a male (ZMMU Mc 1322b-c).

Description. Body (Figs 15 b-d) length in male 5.3 times width of pleotelson and 10.7 times width of narrowest central body part, height 0.15 of length. Cephalon midlength 0.6 times width, width 0.7 of

pereonite 1 width; pereonites 2-4 of the same shape, anterolateral rounded projection a little wider than in pereonite 1, with rough margins, anterior parts of pereonites 3 and 4 twice as wide as narrowest middle parts. Pereonites 5-7 and pleotelson all separated by distinct sutures. Pleotelson 1.1 times longer than broad. Dorsal and lateral body surfaces with scattered minute setae.

Antenna 1 (Fig. 19) article 1 length 2.2 times width, small distomedial projection with 2 distal setae; article 2 slightly shorter and narrower than article 1, length 2.3 times width; article 3 0.8 times as long and 0.6 times as wide as article 2; article 4 ring-like, length 0.06 of article 3 length; remaining flagellum length 0.4 of total antenna 1 length; second flagellar article length half of flagellum length; flagellar articles 2-4 each with 1 aesthetasc.

Antenna 2 (Fig. 19) peduncle article 1 tiny, short; articles 2-4 of similar width, almost half as wide as article 1 of antenna 1, with whip setae and setules; article 5 as long as articles 1-4 together, article 6 1.4 times longer than article 5. Flagellum of 8 articles, length 0.45 total antenna length.

Mandibles (Figs 16a-e): lacinia mobilis of left mandible slightly longer than incisor process; spine row with 4 and 5 members in left and right mandibles, respectively. Palp absent, a single seta in its place; molar strong, grinding surface broad.

Maxilla 1 (Fig. 17e) outer endite 2.7 times as broad as inner endite, with tufts of long setae laterally and 11 spines apically, some deeply serrated; medial endite distally with 2 short simple setae and 2 longer, strongly curved and setulose setae.

Maxilla 2 (Fig. 16f) outer and inner endites subequal in length, medial endite shortest, setation as in figure. Note the 2 curved setulose setae on medial margin of medial endite.

Maxillipedal (Fig. 17 a-d) endite with 3 coupling hooks (in immature male third hook visible only in lateral view (Fig. 17 c)), distal margin with 3-4 fan setae and 5-7 setulose setae. Palp article 1 length 0.5 of width, article 2 midlength 0.7 of width, laterally 1.5 times as long as medially; article 3 slightly longer than article 2, slightly broader than endite, with 3-4 setae medially on convex margin; article 4 slightly shorter and half as wide as article 3, with 2 distal setae. Epipod 1.2 times as long as basis, distal angle acute.

Pereopods 1-7 with basis length/width ratios 3.7, 6.1, 5.5, 5.4, 5.9, 7.0, 6.0, respectively, all bases with numerous small simple setae.

Pereopod 1 (Fig. 18) carposubchelate, length 0.25 of body length and 0.5 of pereopod 6 length, basis 0.3 of total pereopod length, ischium 1.7 times as long as

wide and half of basis length, merus length 0.7 times width and 0.2 of basis length. Bases, ischia and meri with dense cover of hair-like short setae and with mainly distal, sparse whip setae; carpus larger than ischium, propodus as long and half as wide as carpus and 0.8 basis length, dactylus twice as long as wide, 0.35 times as long as propodus.

Pereopods 2-7 (Figs 18b-c, 19a,b) ischii nearly one-third length of corresponding bases, meri 0.6-0.7 times as long as ischii. Carpus/basis length ratios in female 0.53, 0.73, 0.74, 0.97, 0.89, 0.84. Propodus on all pereopods slightly shorter than carpus. Carpi 2 and 5-7 with 3, carpi 3,4 with 4 spine-like bifid setae ventrally. Propodus of pereopod 2 with 3, on remaining pereopods with 2 ventral spine-like, bifid setae, propodi 2-4 with one spine-like and one whip seta, propodi 5-7 with 3 spine-like setae distoventrally. Dactyli of pereopods 3-7 very thin, 5.5-8.3 times as long as wide.

Operculum of female (Fig. 21d) 1.4 times as long as wide, 0.83 of pleotelson length, proximal swollen part 0.2 of total operculum length. Pleopod 1 of male (Fig. 20): length 0.9 of pleotelson length, 3 times as long as narrowest width, 2.6 times as long as proximal width and 2.1 times as broadest distal sagittal part width, distolateral lobes bent dorsally, reaching 0.15 of total pleopod length, ventral and lateral margins with sparse setules. Pleopod 2 of male (Fig. 20): protopod 3 times as long as wide in ventral view, truncated apically, proximomedial lobe length 0.15 of protopod length and 0.75 of protopod width; endite proximal article subequal in width to distal article, stylet very thin, curved, longer than protopod; exopod situated distally, longer than wide, covered apically with hair-like setae. Pleopod 3 (Fig. 20) endopod length 1.4 width, exopod 1.4 times as long as wide and half of endopod length. Endopod apically with 3 swimming setae, exopod with a single simple seta. Pleopod 4 (Fig. 20i) length 2.8 width. Pleopod 5 absent.

Uropod (Fig. 15b) 15.8 times width, 2.1 of pleotelson length and 0.4 of body length, conspicuously tapering distally.

Geographic distribution. South Atlantic: north-western part of Argentina Basin, depth 4630 m.

Etymology. The species is named after the type location.

Remarks. The new species is very similar to *V. elongata*, but can easily be distinguished by the relatively large operculum in both sexes (Figs 21 d-g). In a male of *V. argentinensis* sp.nov. it occupies almost the whole ventral area of the pleotelson, in *V. elongata* it covers only nearly 70% of the ventral area. Male pleopods 1 of the new species are more slender,

distolateral lobes are less curved dorsally. All parts of pleopod 2 are more slender. The new species is distinguished also by a thinner body, pereonites 1-4 with more pronounced anterolateral projections which in pereonite 2 have the same shape as in the two following pereonites, without tubercles. The central constriction on pereonites 3 and 4 is narrower in the new species. Pereopod 1 is stouter, but we could examine it only in a male whereas for *V. elongata* the pereopod 1 is known only for a female, the difference could be due to sexual dimorphism. The epipod of the maxilliped in *V. argentinensis* sp. nov. is longer than in *V. elongata* in relation to the basis. The two first articles of antenna 1 are somewhat stouter in the new species. In males with the same size of pleotelson the uropods are shorter in the new species (the uropod/pleotelson length ratio is 2.2 in *V. argentinensis* sp. nov. and 2.9 in *V. elongata*).

Acknowledgements

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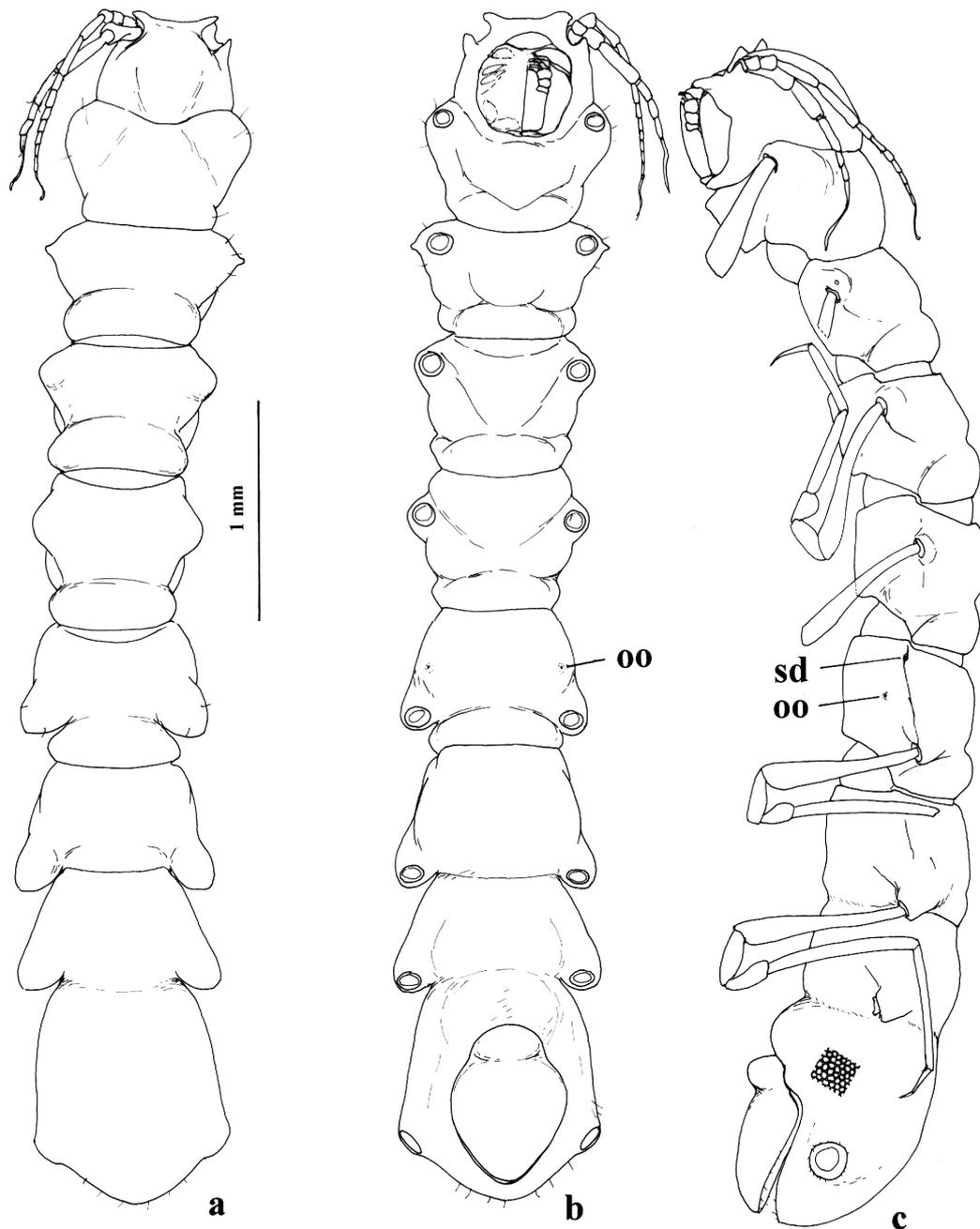


Fig. 1. *Vemathambema elongata* Menzies, 1962, female, holotype (5.4 mm): a, dorsal view; b, ventral view; c, lateral view of body; oo: oopore; sd: spermathecal duct. Texture of cuticle indicated on pleotelson in Fig. 1c.

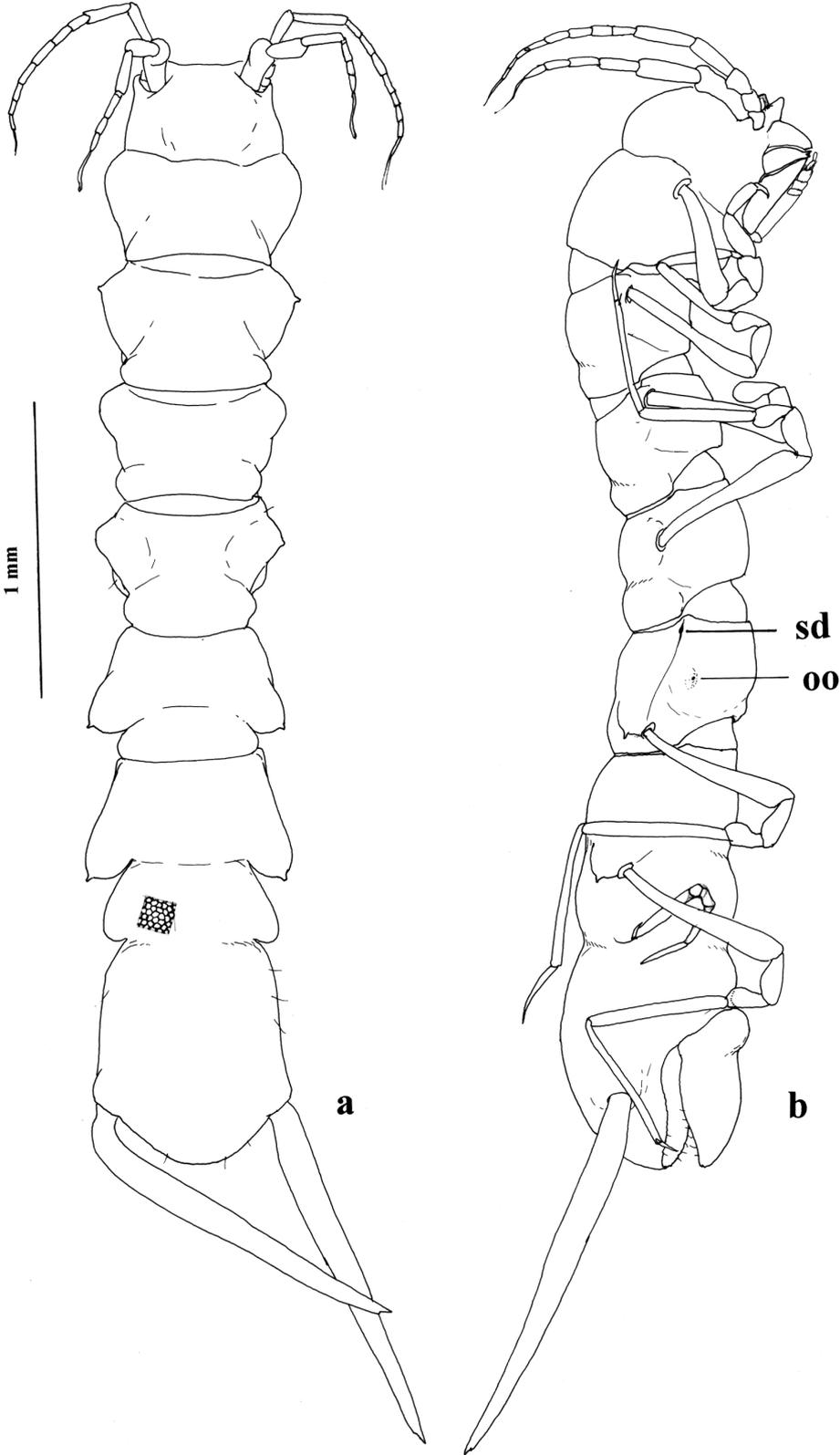


Fig. 2. *Vemathambema elongata* Menzies, female, St. 338 (3.5 mm): a, dorsal view; b, lateral view; oo: oopore; sd: spermathecal duct.

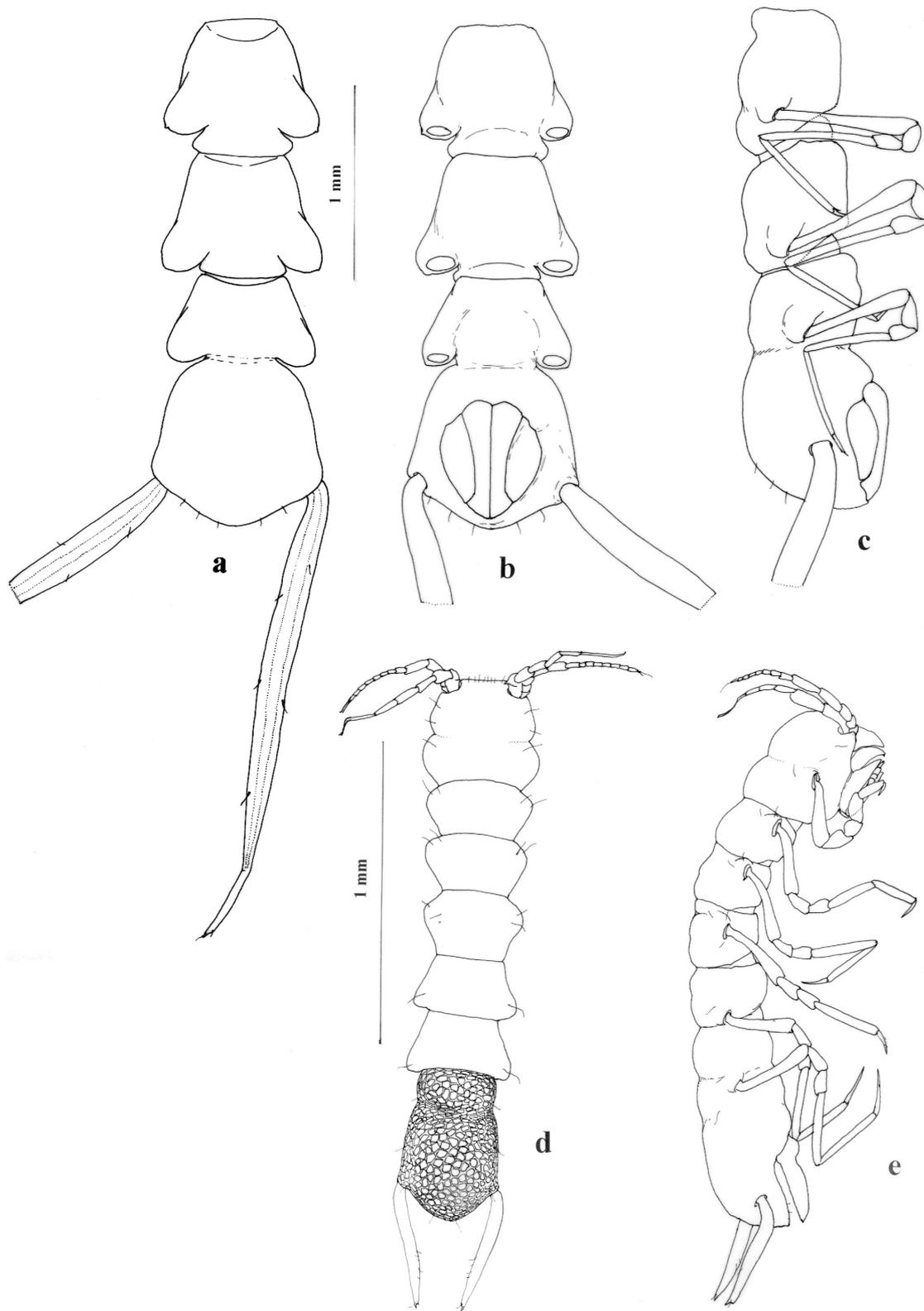


Fig. 3. *Vemathambema elongata* Menzies. Male, posterior part of body, St 4912: a, dorsal view; b, ventral view; c, lateral view. Juvenile, St. 348 (1.8 mm): d, dorsal view; e, lateral view.

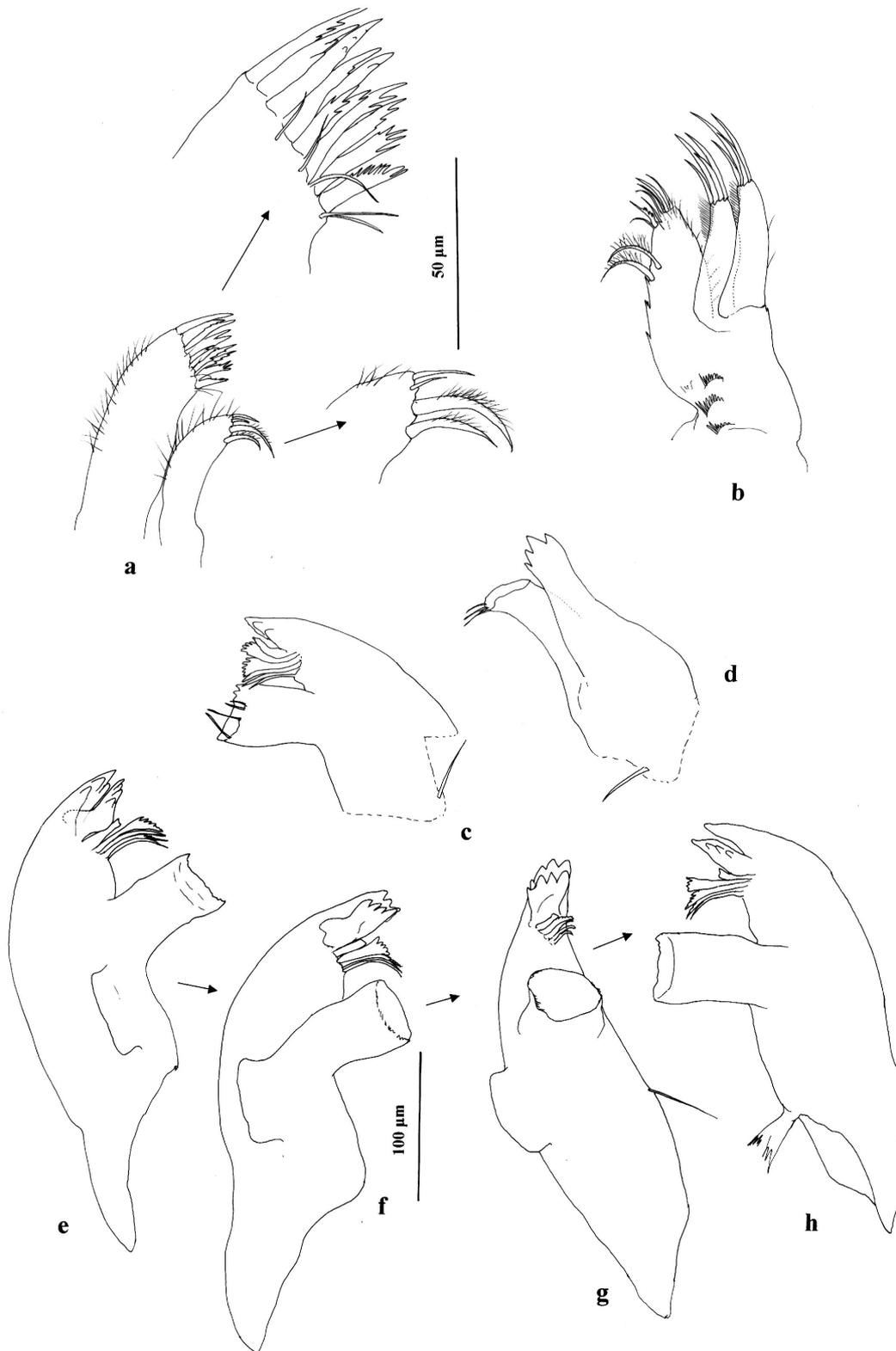


Fig. 4. *Vemathambema elongata* Menzies, female, St. 338 (3.5 mm): a, right maxilla 1, dorsal view and distal parts of endites; b, right maxilla 2, ventral view; c, d, distal part of right mandible; e-h, left mandible, turning from dorsal to ventral side.

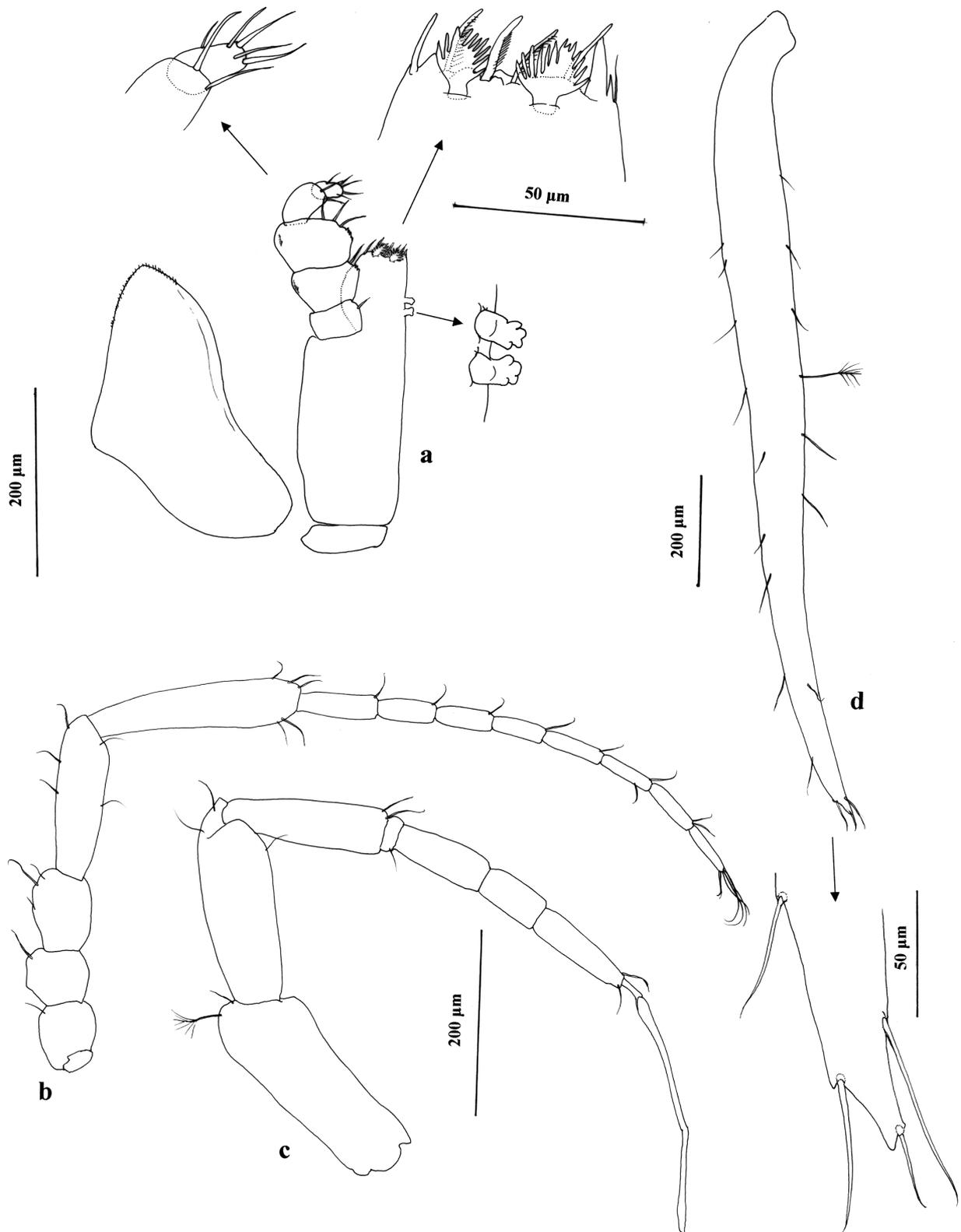


Fig. 5. *Vemathambema elongata* Menzies, female, St. 338 (3.5 mm): a, maxilliped with enlarged details; b, antenna 2; c, antenna 1; d, uropod.

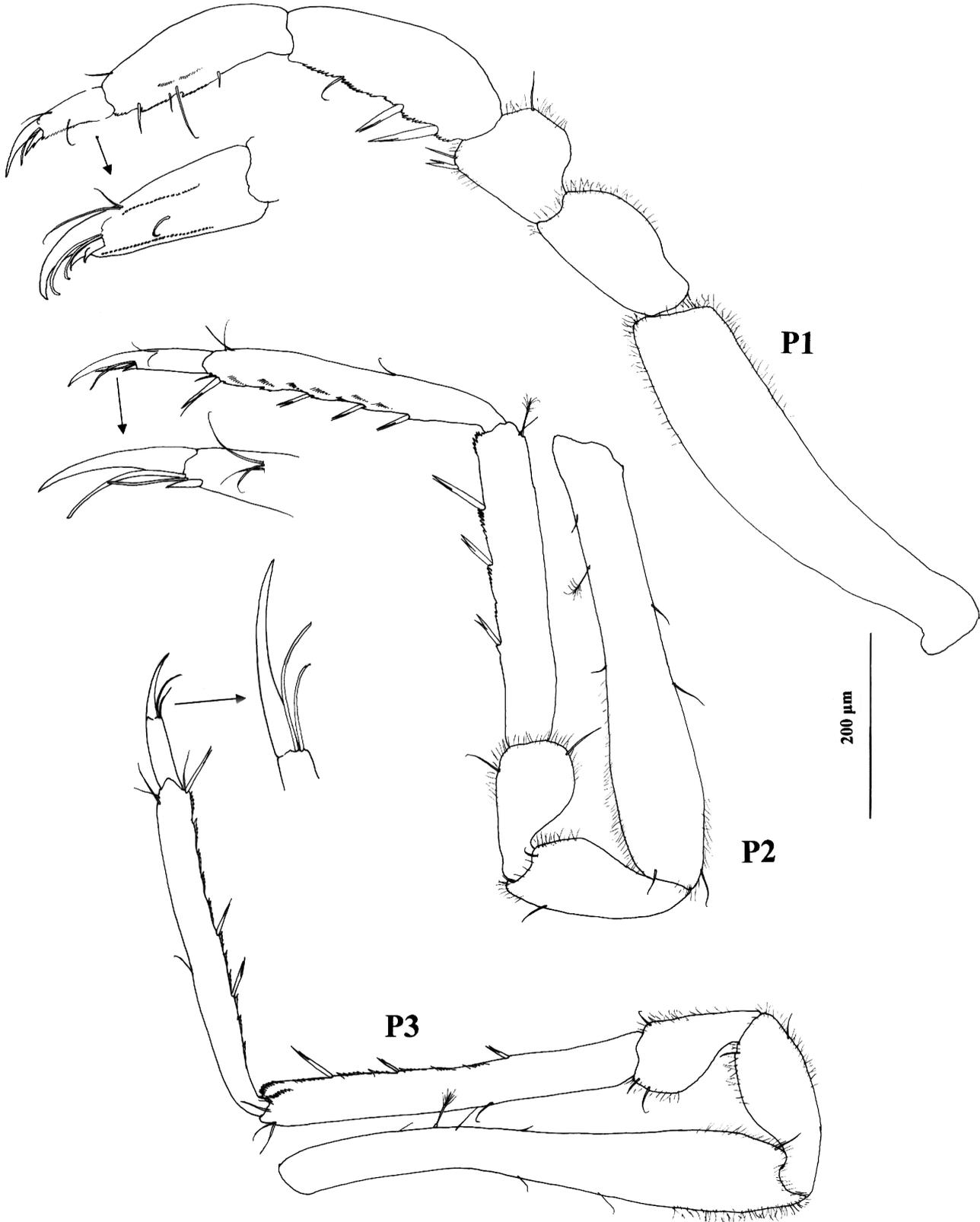


Fig. 6. *Vemathambema elongata* Menzies, female, St. 338 (3.5 mm). P1-3: pereopods 1-3.

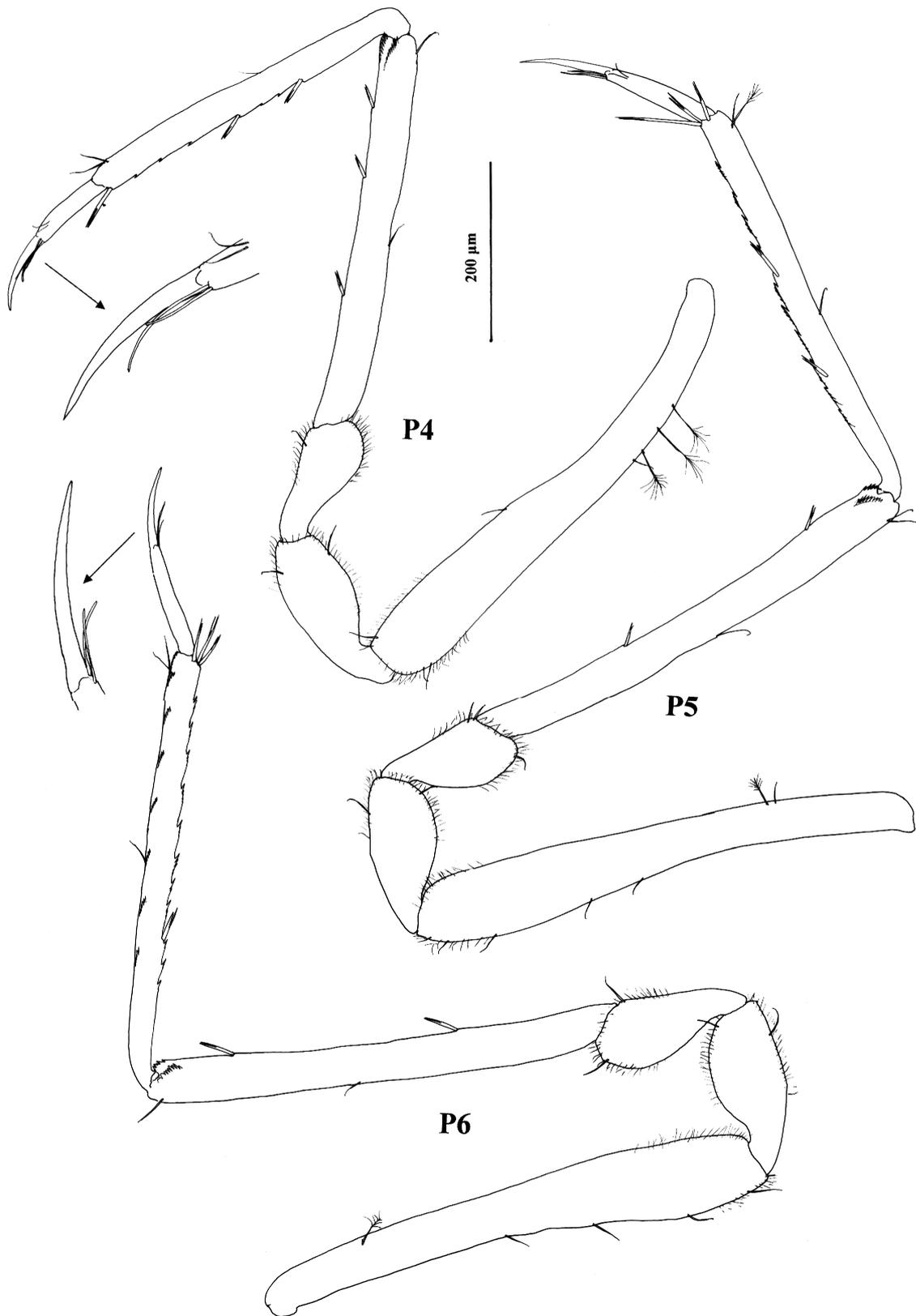


Fig. 7. *Vemathambema elongata* Menzies, female, St. 338 (3.5mm). P4-7: pereopods 4-6.

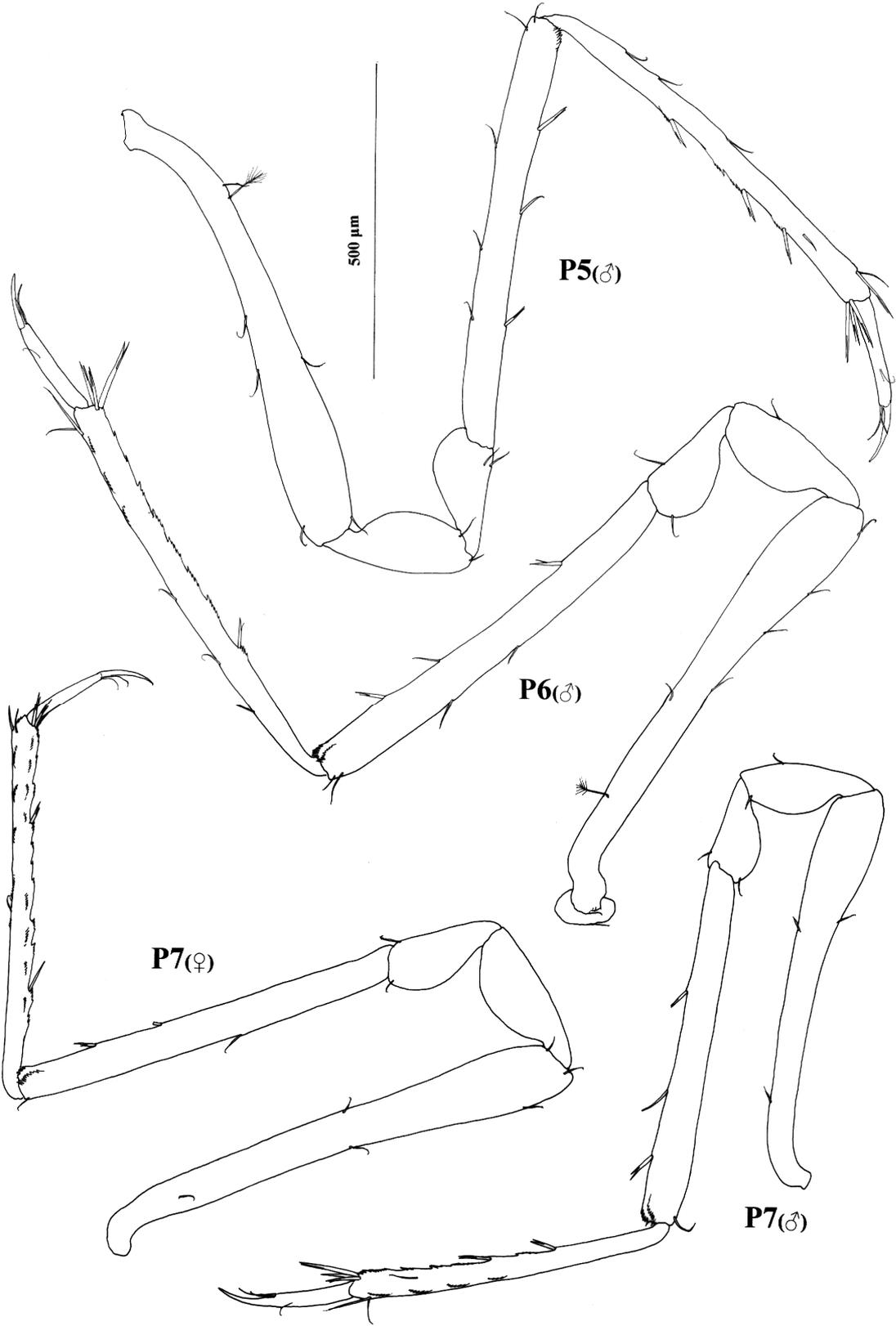


Fig. 8. *Vemathambema elongata* Menzies, male, posterior body part, St 4912: pereopods 5-7. Female holotype (5.4mm): pereopod 7.

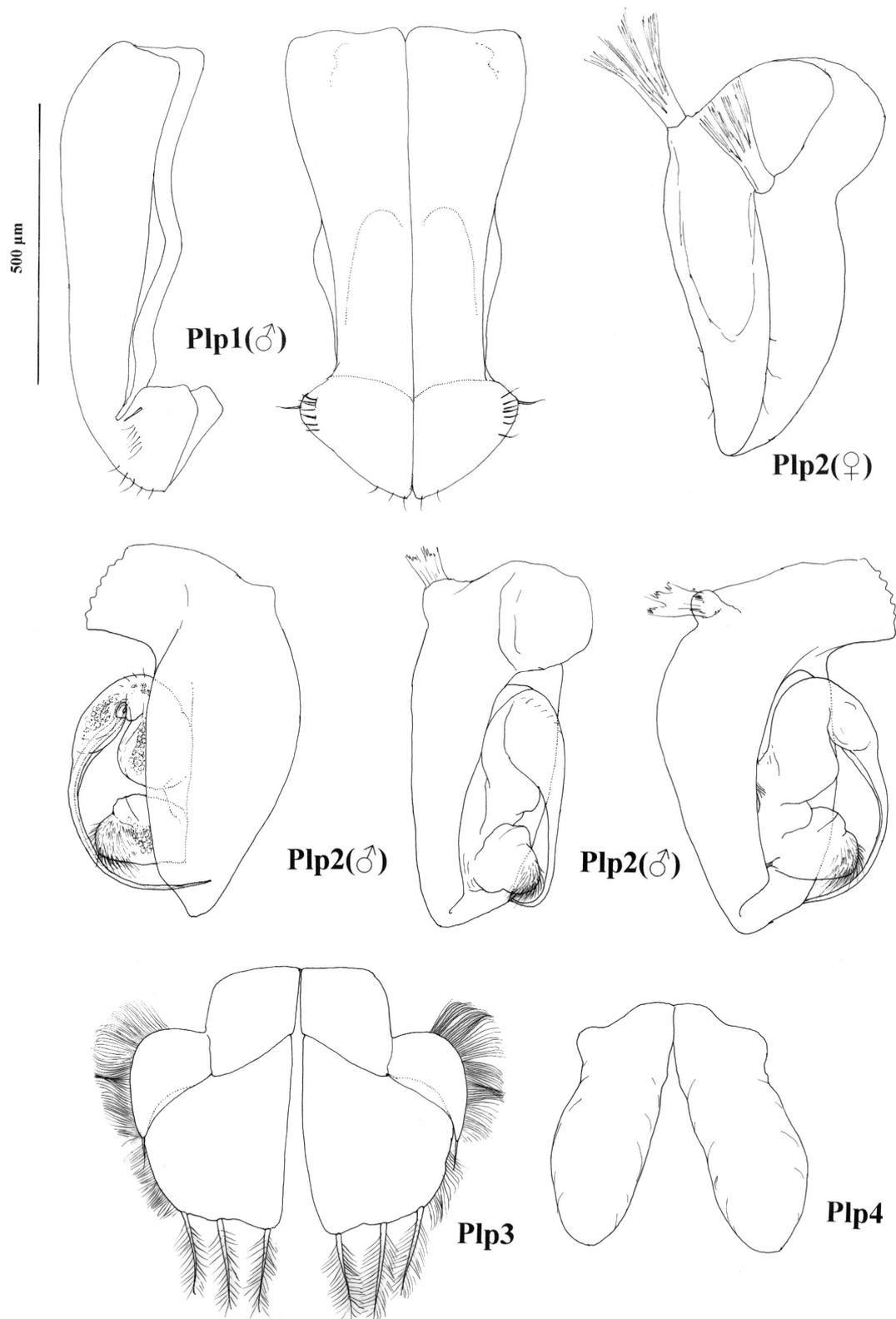


Fig. 9. *Vemathambema elongata* Menzies. Pleopod 2 of female in oblique lateral view (female St. 338, length 3.5 mm). Male pleopods (specimen from St. 4912), drawings of male pleopod 2 turning from ventral (left drawing) to dorsal position (right).

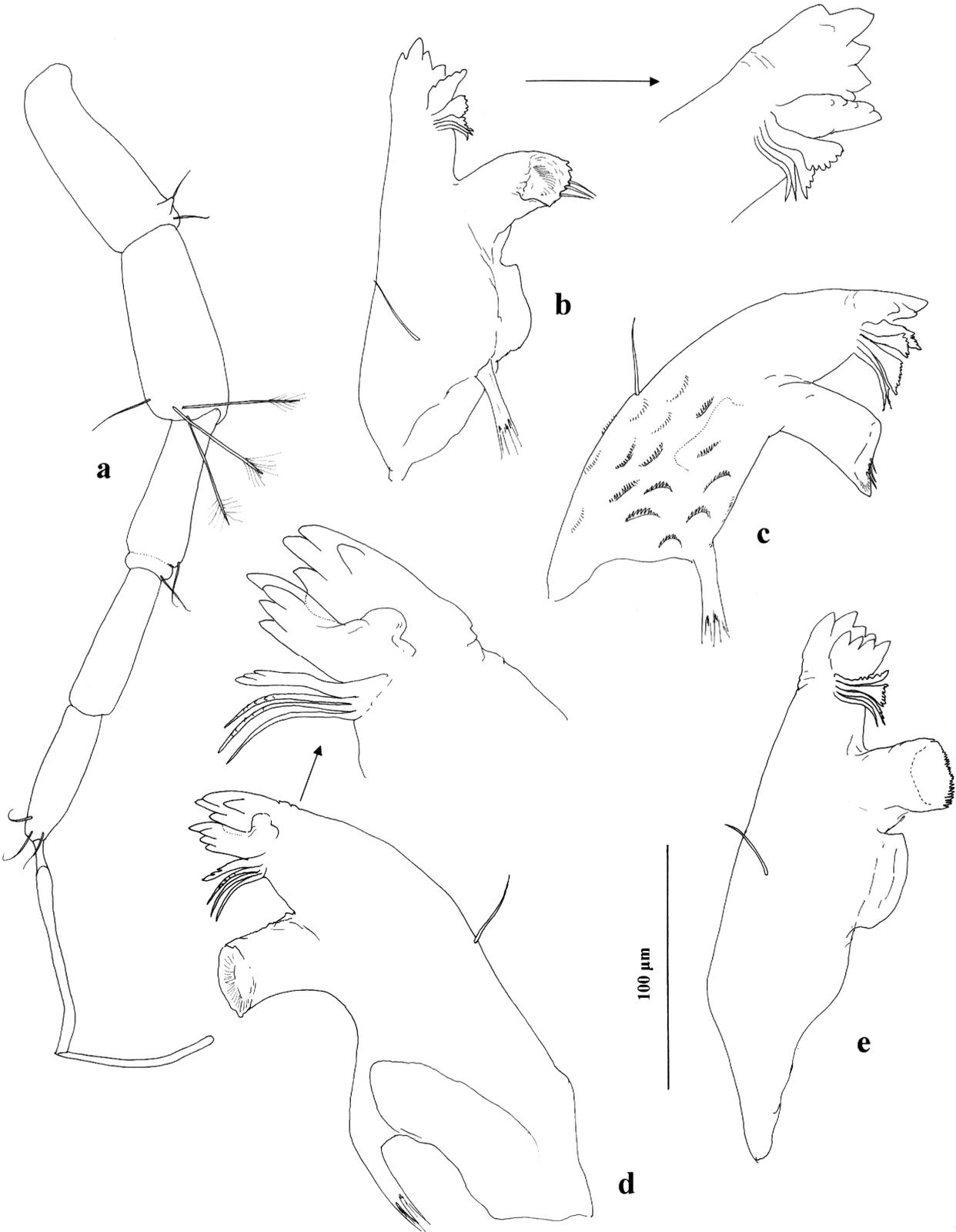


Fig. 10. *Vemathambema elongata* Menzies, juvenile, St. 348 (1.8 mm): a, antenna 1; b, c, right mandible; d, e, left mandible.

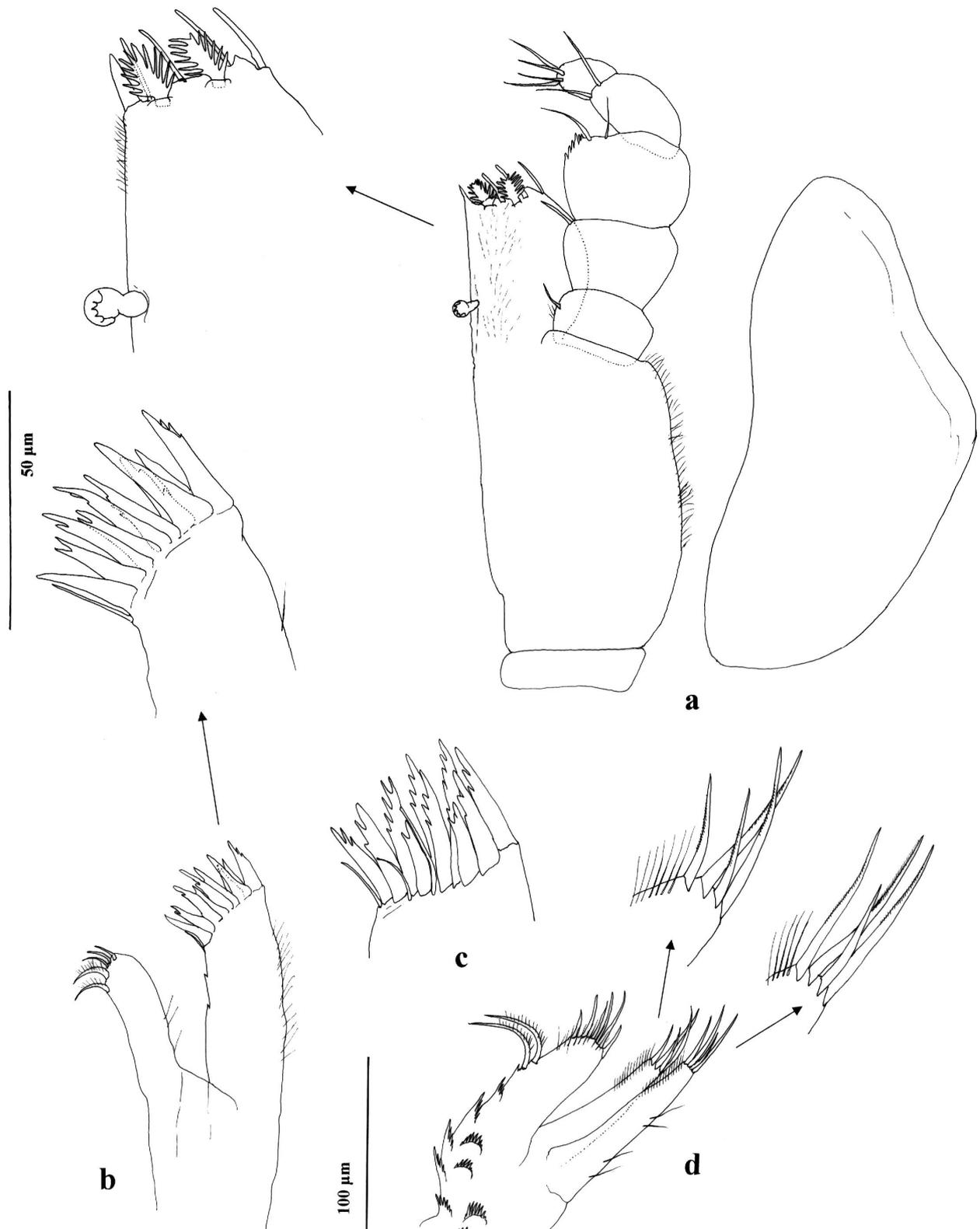


Fig. 11. *Vemathambema elongata* Menzies, female, juvenile St. 348 (1.8 mm): a, left maxilliped, with enlarged endite; b, left maxilla 1, ventral view; c, distal part of right maxilla 1, dorsal view; d, right maxilla 2.

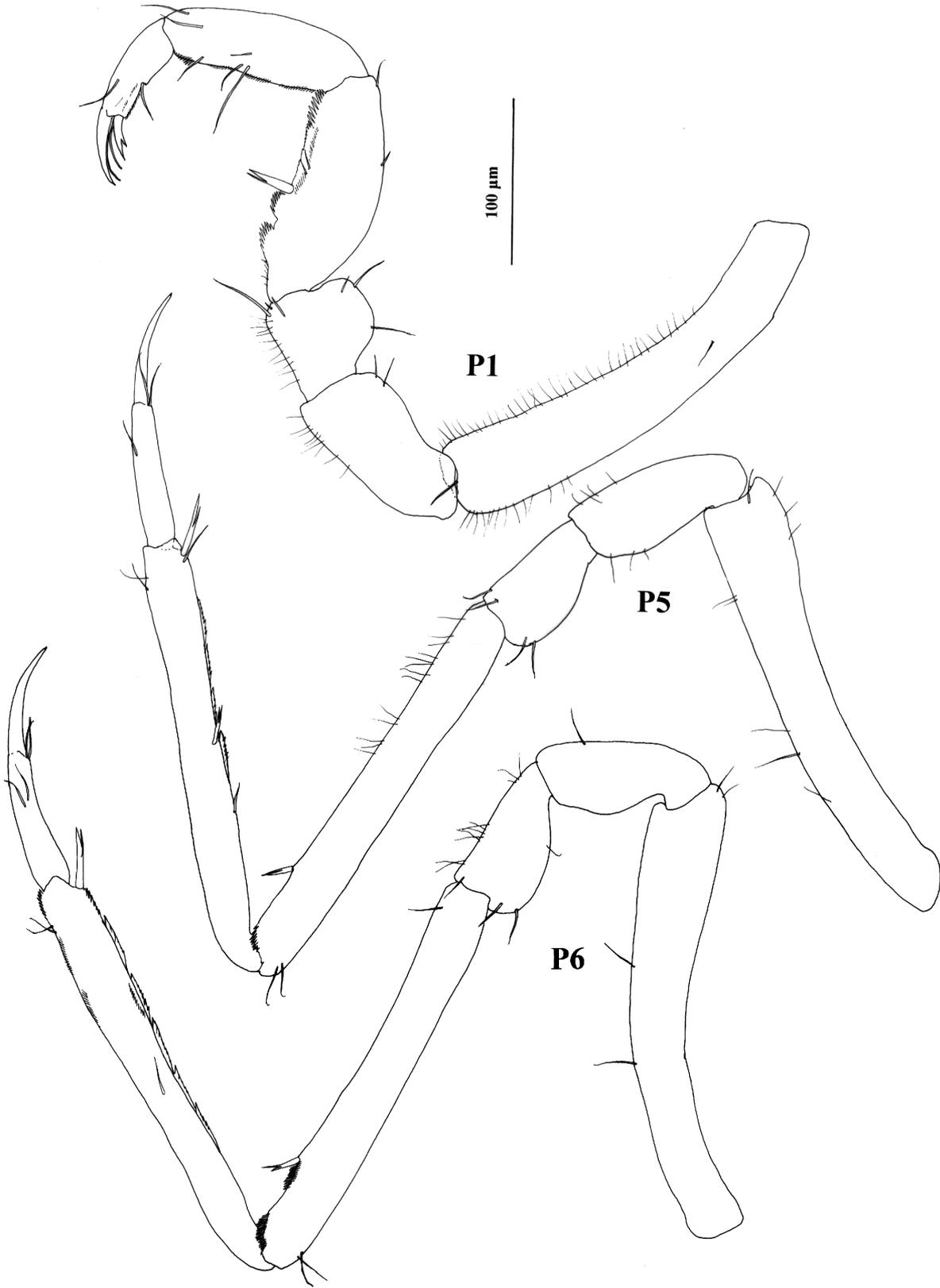


Fig. 12. *Vemathambema elongata* Menzies, female, juvenile St. 348 (1.8 mm): pereopods 1, 5 and 6.

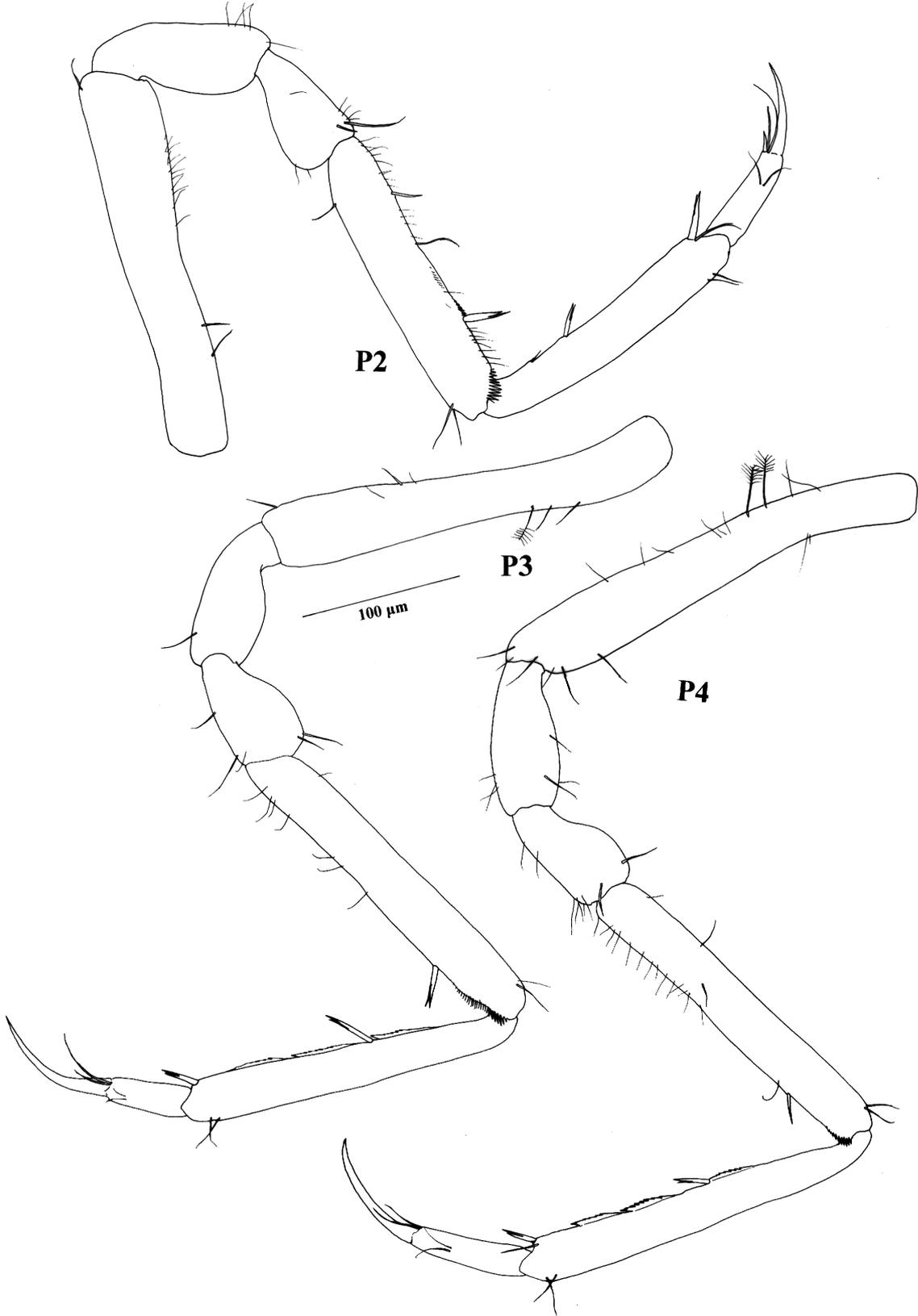


Fig. 13. *Vemathambema elongata* Menzies, female, juvenile St. 348 (1.8 mm): a, pereopod 2; b, pereopod 3; c, pereopod 4.

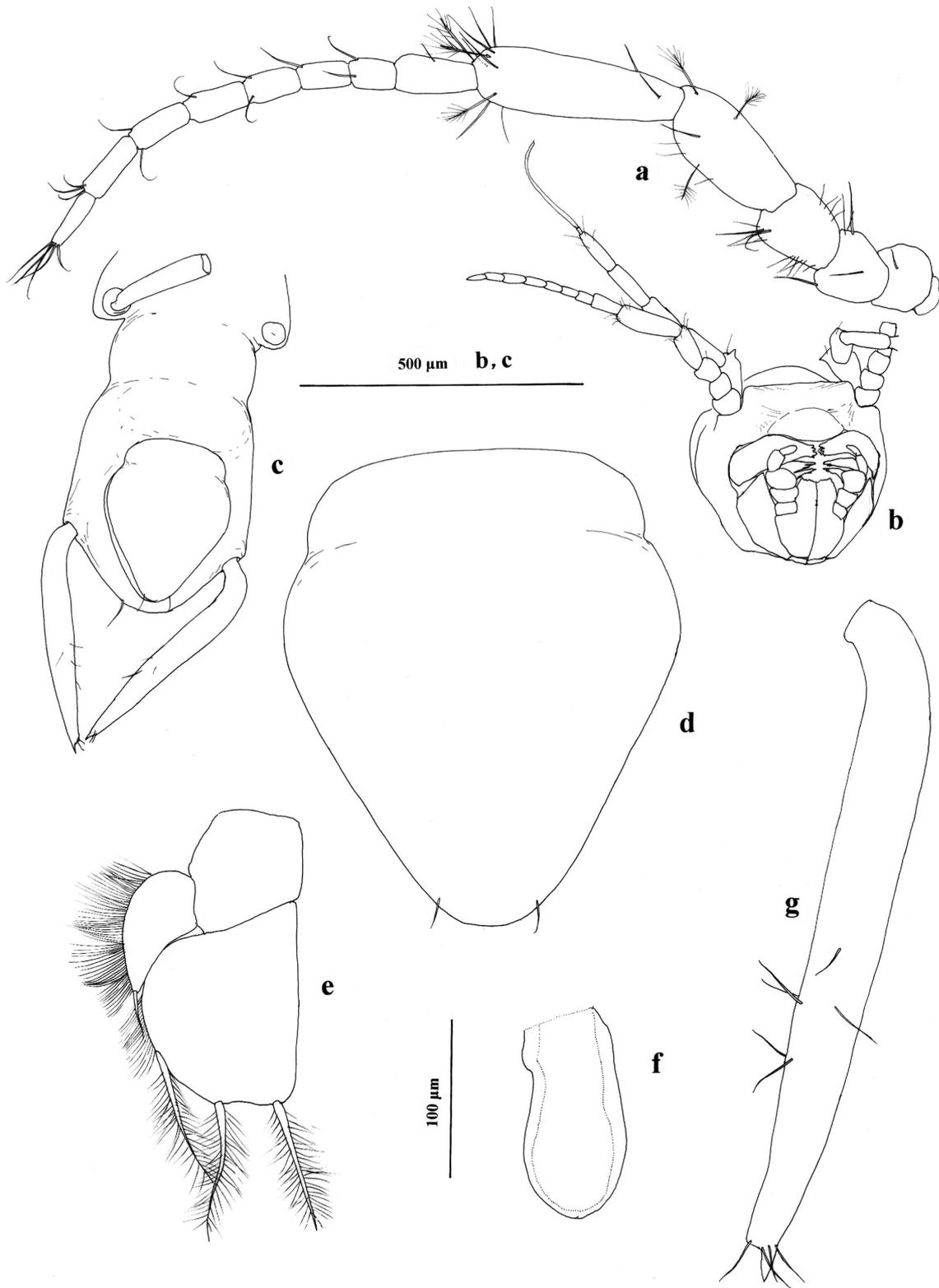


Fig. 14. *Vemathambema elongata* Menzies, female, juvenile St. 348 (1.8 mm): a, antenna 2; b, cephalon, ventral view; c, pleotelson and pereopods 6,7, ventral view; operculum ventral view; e, pleopod 3; f, pleopod 4; g, uropod.

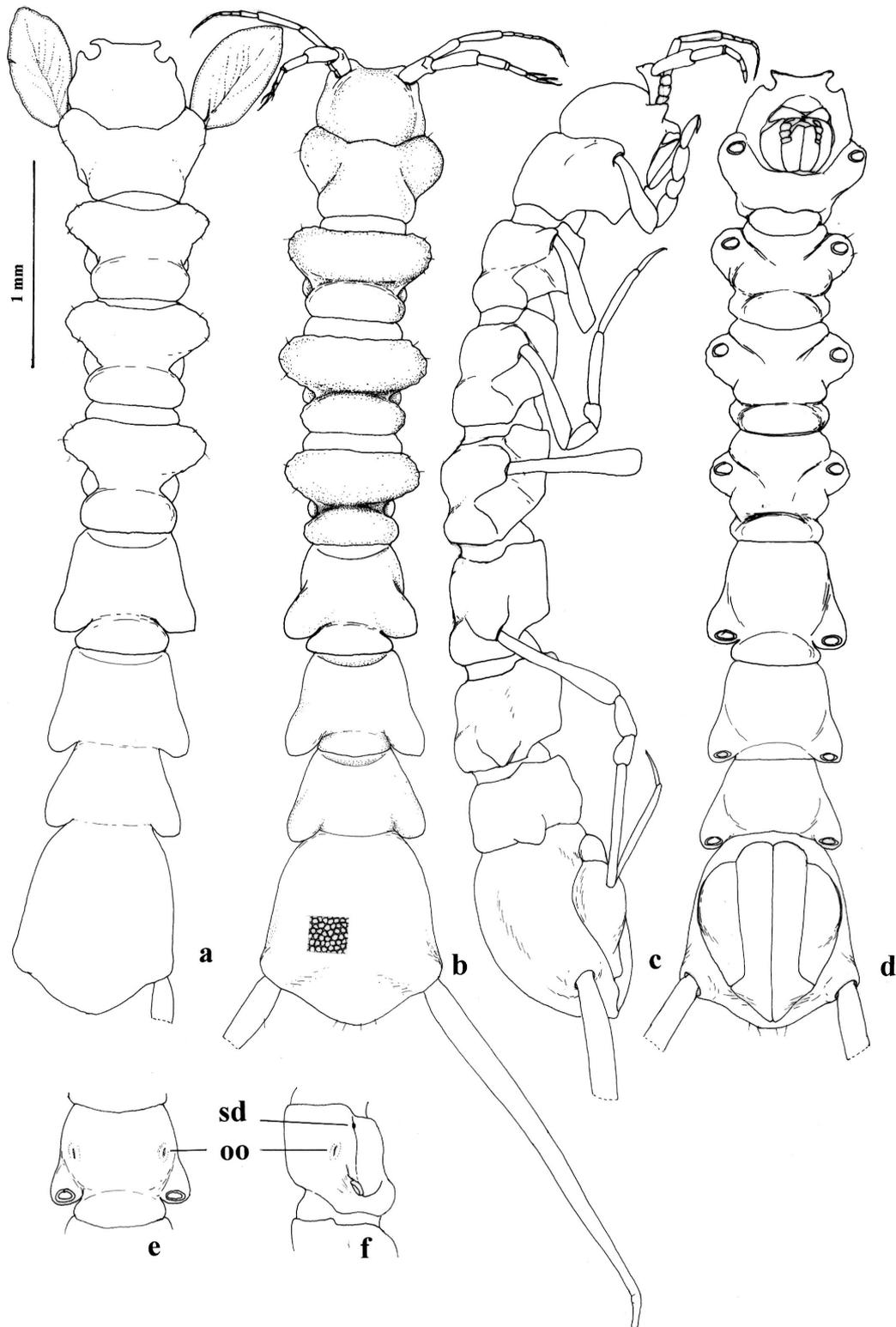


Fig. 15. *Vemathambema argentinensis* sp. nov.: a, female, paratype (4.7 mm) with oostegites on pereonites 1, dorsal view; b-d, male, holotype (4.6 mm): b, dorsal, c, lateral, d, ventral view, e, f: details of pereonites 5 of female; oo: oopore; sd: spermathecal duct. Texture of cuticle indicated on pleotelson in Fig. 15b.



Fig. 16. *Vemathambema argentinensis* sp. nov., female, paratype (4.7 mm): a-c, left mandible, turning from dorsal to ventral sides; male, holotype (4.6 mm): d, right mandible, dorsal view; e, left mandible, ventral view; f, maxilla 2.

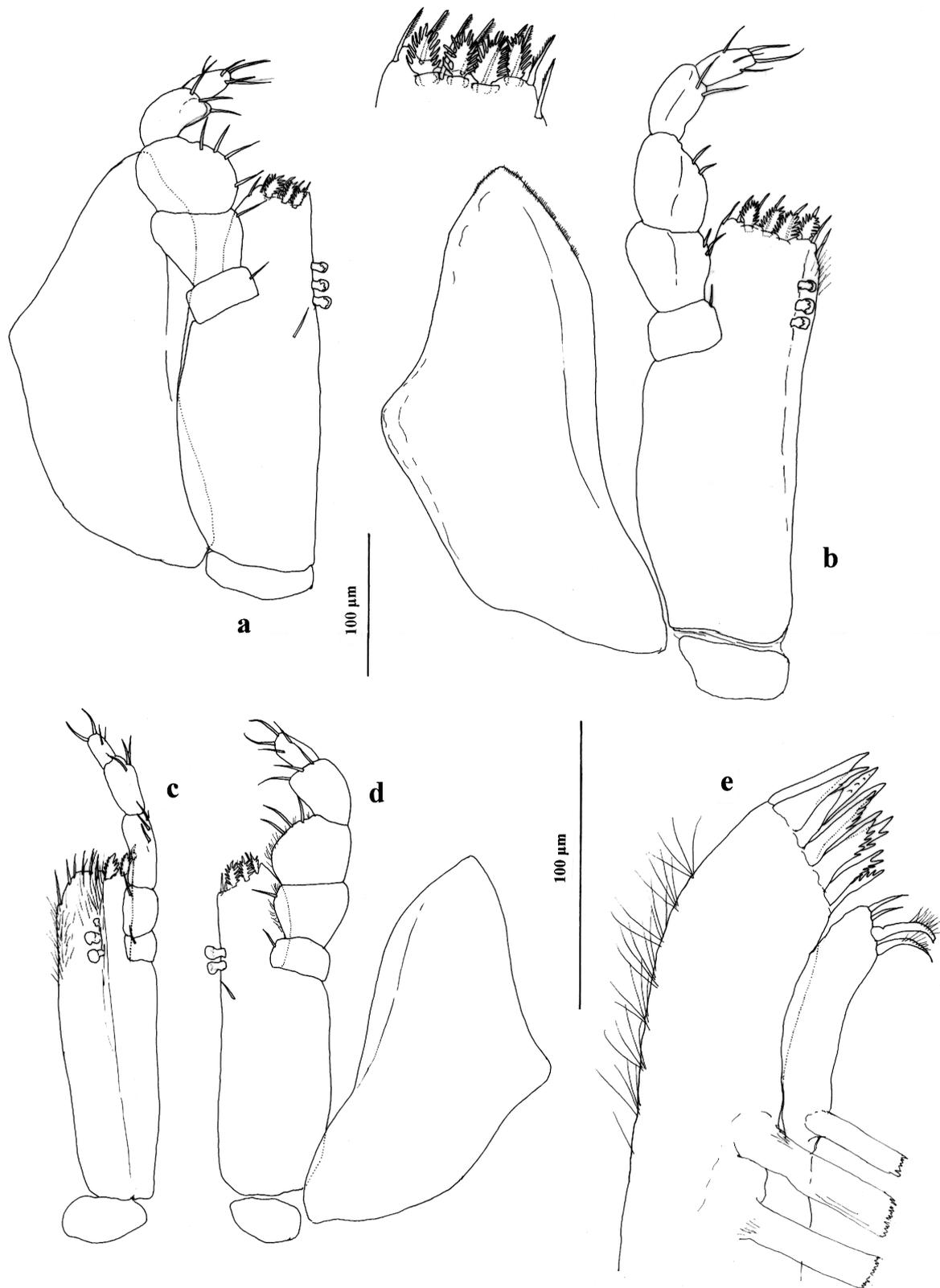


Fig. 17. *Vemathambema argentinensis* sp. nov.: a-d, maxilliped : a, male, holotype (4.6 mm), b, female, paratype (4.7 mm), palp slightly turning laterally; c, d, immature male on IV stage (3.2 mm): c, lateral view, d, ventral view; e, maxilla 1 of male, holotype.

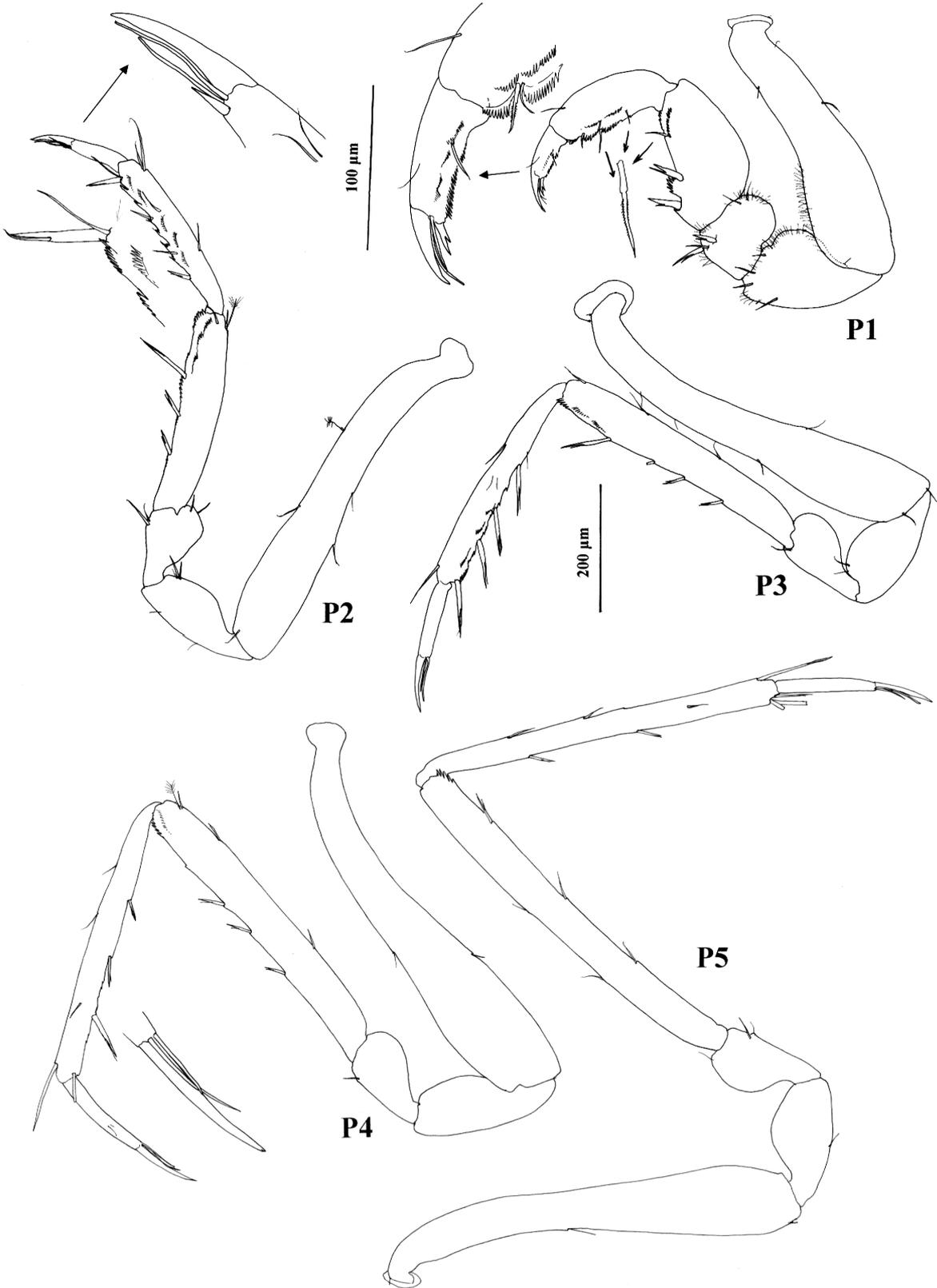


Fig. 18. *Vemathambema argentinensis* sp. nov., male, holotype (4.6 mm): pereopods 1-5.

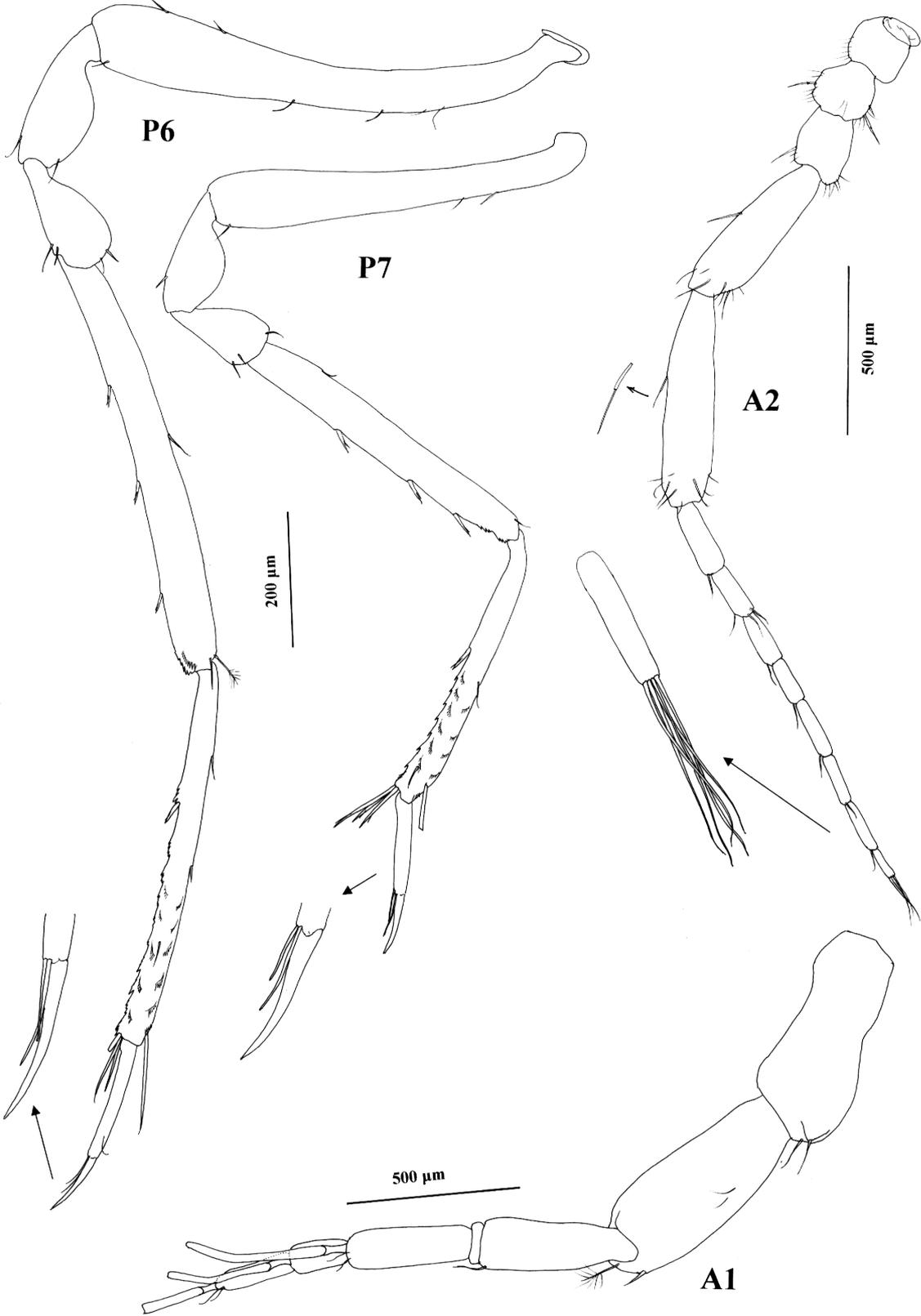


Fig. 19. *Vemathambema argentinensis* sp. nov., male, holotype (4.6 mm): A1, antenna 1; A2, antenna 2; P6, pereopod 6; P7, pereopod 7.

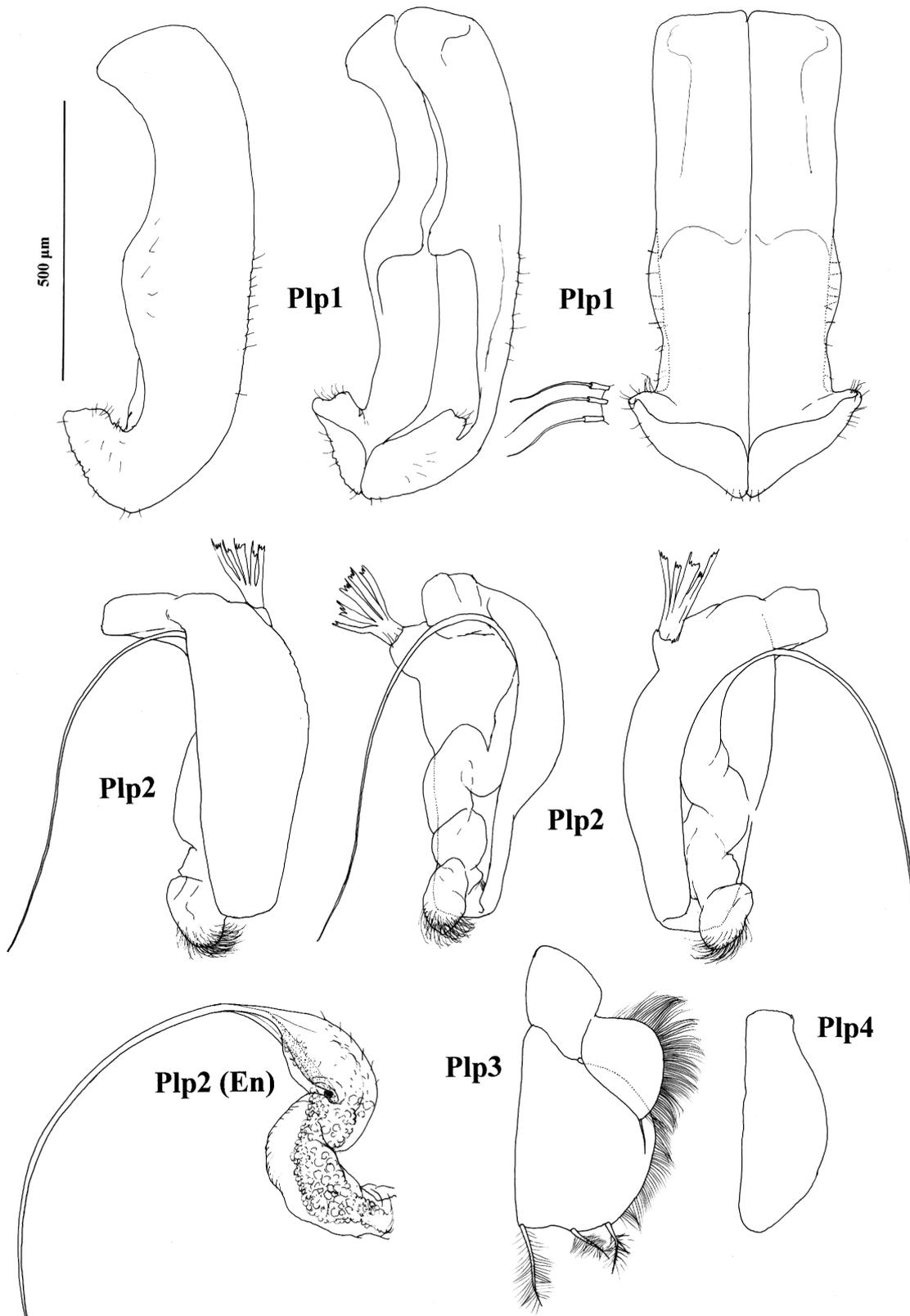


Fig. 20. *Vemathambema argentinensis* sp. nov., male, holotype (4.6 mm): pleopod 1, turning from lateral to dorsal positions (left to right drawing); d-f, pleopod 2, turning from ventral to dorsal position; g, endopod of pleopod 2 ventral view; pleopod 3; pleopod 4.

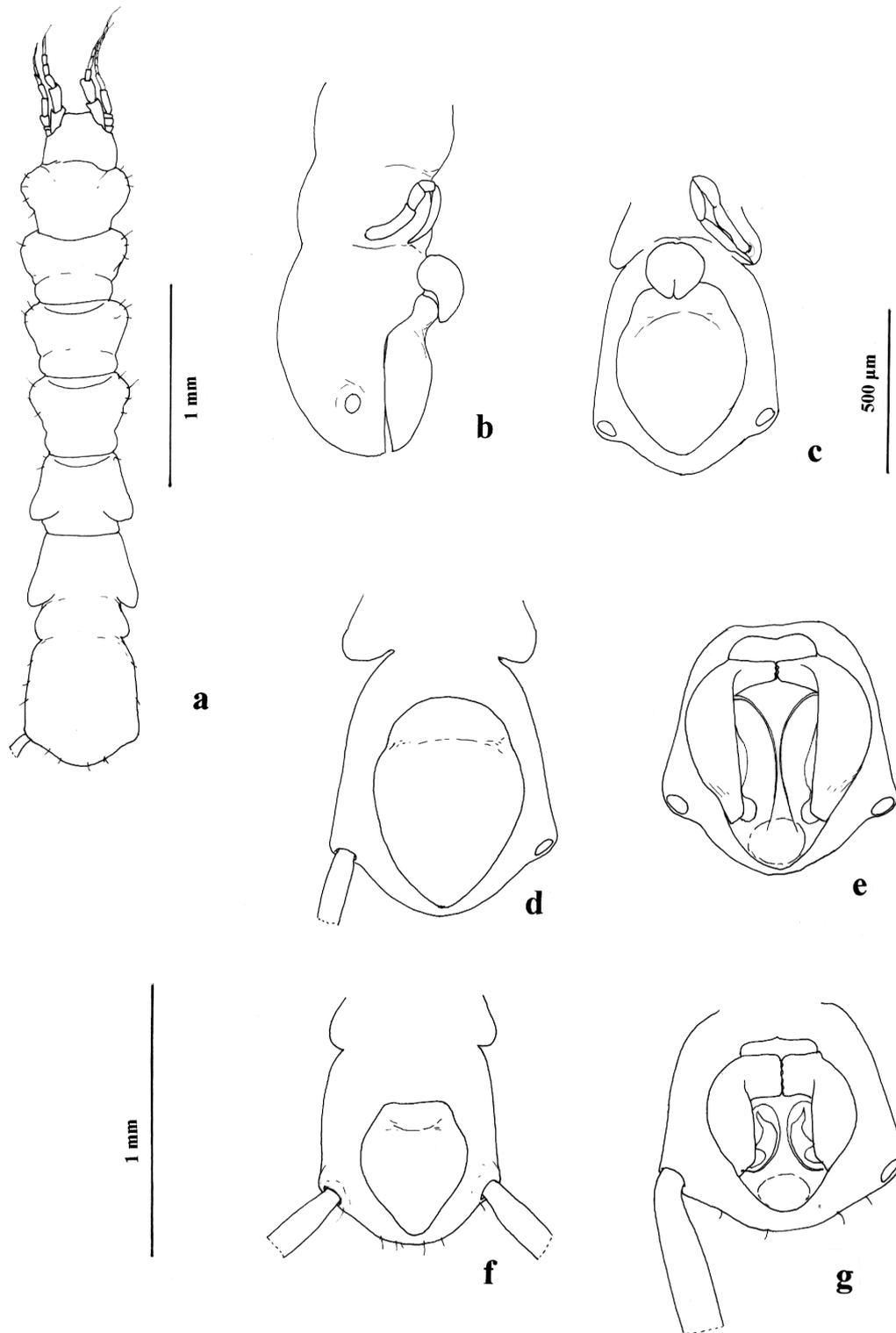


Fig. 21. *Vemathambema argentinensis* sp. nov., immature male (3.2 mm) in stage IV: a, dorsal view; b, pleotelson and pereonites 6,7, right lateral view; c, pleotelson and pereonite 7 ventral view; d, pleotelson of adult female, ventral view; e, pleotelson of adult male, ventral view, pleopods 1 dissected; *Vemathambema elongata* Menzies: f, pleotelson of female, ventral view; g, pleotelson of male, ventral view, pleopods 1 dissected.