

## A revaluation of the Eurycopinae (Crustacea, Isopoda, Munnopsidae) with a description of *Dubinectes* gen. nov. from the southern Atlantic deep sea

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### Abstract

A new genus of Eurycopinae (Munnopsidae), *Dubinectes* **gen. nov.**, is described for *Eurycope acutitelson* Menzies, 1962, *E. nodosa* Menzies, 1962 and two new species, collected from the Weddell Sea, Southern Ocean. The new genus is distinguished by the distinctive shape of the pleotelson posterior margin and the uropod protopod angled at midlength, along with the robust,

long rostrum of a large head, overhanging frons, reduced distomedial lobe of article 1 of antenna 1, the produced male pleopod 1 distolateral lobes and the distinct shape of the male pleopod 2. Descriptions of the new genus, two new species and redescrptions of two previously described species are presented, as well as a new diagnosis of the subfamily Eurycopinae, the genus *Eurycope* and a key to the genera of Eurycopinae.

**Key words:** Deep sea, southern Atlantic, Southern Ocean, taxonomy, Munnopsidae, *Dubinectes*

## Introduction

The heterogeneity of the genus *Eurycope* Sars, 1864 has been mentioned by many authors (the major works are: Wolff (1962), Wilson & Hessler (1981), Wilson (1989), Kussakin (2003)), but this large genus has still not been fully revised. Wilson and Hessler (1980) surveyed the genus and redescrbed *E. cornuta* Sars, 1864, the type species of the genus. Later they revised *Eurycope* (Wilson & Hessler 1981) by restricting its definition and described 3 new genera (*Disconectes* Wilson & Hessler, 1981, *Tythocope* Wilson & Hessler, 1981, and *Belonectes* Wilson & Hessler, 1981) for the large group of species they removed from the genus. The authors also presented an additional list of 16 species that they excluded from *Eurycope*. However, these species were not placed into the new genera, but the authors indicated the potential assignment or the nearest relative. New genera were erected within Eurycopinae, for several species from this list, including: *Baeonectes* Wilson, 1982 for *Eurycope mutica* Sars, 1864 (Wilson 1982), *Coperonus* Wilson, 1989, *Lionectes* Wilson, 1989 and *Hapsidohedra* Wilson, 1989 within the newly defined subfamily Lipomerinae for *E. frigida* Vanhoeffen, 1914, *E. sp. cf. frigida* and *Ilyarachna aspidophora* Wolff, 1962 (placed in Eurycopinae by Hessler & Thistle 1975) (Wilson 1989). Despite the list of species to be excluded from *Eurycope* (Wilson & Hessler 1981), nearly half the species, including *E. acutitelson* Menzies, 1962 and *E. nodosa* Menzies, 1962, have remained within this genus.

Currently the subfamily Eurycopinae Hansen, 1916 (Wilson 1989; Kussakin 2003) consists of 5 genera: *Eurycope*, *Disconectes*, *Tythocope*, *Belonectes* and *Baeonectes*. Characters like, articulations of pereonites 5–7, their length ratios, shape of the venter of natasome and rostrum, size of clypeus and labrum, and some mandible and maxilliped characters, are used to distinguish these genera. The main characters that differentiate *Eurycope* from other genera are: dorsally articulated pereonites 5 and 6 and presence of a distomedial lobe in the basal article of antenna 1. Even with the restricted definition (Wilson 1983a, the same in Kussakin 2003) *Eurycope* is still the most complex and species rich of the Eurycopinae. Wilson (1983a, 1983b) identified some of the species subgroups of *Eurycope* as complexes but without assigning their taxonomic status: i.e. the *E. complanata* complex and its relatives, the group C or the *E. inermis* cluster, and the “unusual” *E. longiflagrata* complex. An additional cluster for species related to *E. dahli*

was designated by Svavarsson (1987), which Kussakin (2003) named the *E. producta* cluster. However, we feel this is more correctly named as the *E. dahli* cluster, because *E. producta* differs from this species group. These complexes differ in various characters, such as: the size and shape of the rostrum and the frons, the condyle and molar of the mandible, the epipod of the maxilliped, the distal tip of male pleopod 1, the shape of male and female pleopod 2 and the uropodal protopod; but all of them fall within the definition of the genus.

During the Antarctic expeditions ANDEEP II in 2002 and ANDEEP III in 2005 (ANTarctic benthic DEEP-sea biodiversity: colonisation history and recent community patterns) in the Weddell Sea and in the Cape Basin many specimens of “*Eurycope*”, including *E. nodosa* and *E. acutitelson* were collected. As mentioned above, Wilson and Hessler (1981: Table 2) excluded these species from *Eurycope*. Menzies's brief descriptions and limited illustrations did not draw attention to characters that were unusual for *Eurycope*, (e.g. the peculiar shape of the pleotelson and uropod protopod, the large head with robust rostrum bearing 2 stout distal setae, the reduction of the distomedial lobe on the article 1 of antenna 1). Studying the new collections and type material, we concluded that these species belong to a new genus within the subfamily Eurycopinae. The description of the new genus *Dubinectes*, with descriptions of two new species and a redescription of two previously reported species being moved into this genus, are presented below. We also present the diagnoses for the subfamily Eurycopinae, the genus *Eurycope* and a key to the genera of Eurycopinae.

## Methods

Specimens were collected by epibenthic sledge (Brenke 2005) from the Weddell Sea, Southern Ocean and Cape Basin, South Atlantic during the expeditions ANDEEP II (2002) and ANDEEP III (2005), and fixed in pre-cooled 96% ethanol. In the laboratory, the material was sorted and identified using a Wild M5 dissecting microscope and illustrated using a Leitz Dialux microscope, equipped with a camera lucida.

The terminology and measurements mostly follow Wilson (1989). The total body length was measured medially from the tip of the rostrum to the posterior tip of the pleotelson. We used the dorsal view for measuring width, while the length of the body segments was measured in lateral view.

Redescription for *D. nodosus* (Menzies, 1962) is presented for the holotype, with the average measurements for all the specimens examined given in parentheses. Additional specimen details are described from examples in the ANDEEP collection. Scale bars for total body figures are 1 mm.

## Abbreviations

The following abbreviations are used in the text and figures: AMNH—American

Museum of Natural History; ZMH—Zoological Museum, Hamburg. An1—antenna 1, An2—antenna 2, f—female, lMd—left mandible, rMd—right mandible, m—male, Mx1—maxilla 1, Mx2—maxilla 2, Mxp—maxilliped, P1–7—pereopods 1–7, bP—basis of pereopod, Plp 1–5—pleopods 1–5, Ur—uropod.

## Taxonomy

### Munnopsidae Lilljeborg, 1864

Eurycopinae Hansen, 1916

Synonymy according to Kussakin 2003: 20

*Diagnosis* (modified from Kussakin 2003)

Body oval, smooth, with no spines, natasome broader than ambulosome, close packing, with nearly uninterrupted lateral outline; rostrum present, article 1 of antenna 1 broad distally, anteriorly from article 2 insertion divided on medial and lateral lobes; squama on article 3 of antenna 2 articulated. Mouthparts not modified, mandible with well-developed palp, terminal article somewhat flattened, curled laterally, incisor and molar processes subequal in size. Bases of pereopods 1–4 of similar length, longer than bases of pereopods 5–7, pereopod 7 similar to pereopods 5 and 6, pereopods 5–7 carpus and propodus expanded, dactylus present. Uropod inserting ventrally, short, biramous, protopod stout, not flattened.

### *Dubinectes* gen. nov

Type species: *D. acutitelson* (Menzies, 1962).

Species included: *D. acutitelson* (Menzies, 1962), *D. nodosus* (Menzies, 1962), *D. acutirostrum* sp. nov. and *D. intermedius* sp. nov.

### *Etymology*

From Latin *dubius*, meaning doubt and Greek *nectes*, meaning swimmer, because these animals, as it might be assumed, are not only adapt for swimming, but also for digging. The strong calcified integument, the large, heavy and deep head with the stout rostrum, with mouthparts very tightly closed by maxillipeds, and posteroventral projection related with the peculiar shape of uropods seem to be adapted for digging in soft sediments. Gender masculine.

### *Diagnosis*

Pleotelson posterior margin surrounded with rim: additional structure, running perpendicular to the margin, projecting ventrally and raising over dorsal surface. Uropod

protopod bent at midlength, both margins angled: concave lateral corner and projected medial corner, bearing long setae. Body with strong calcified integument, deepest at the head. Head not narrower than ambulosome; rostrum long and robust, larger than article 1 of antenna 1, with 2 robust distal setae. Distomedial lobe of article 1 of antenna 1 reduced, shorter than distolateral projection. Pereonites 1–4 subequal in width, loosely packed, pereonite 1 longest, pereonite 4 nearly a third the length of pereonite 1, pereonite 7 not longer than pereonite 6. Mandible with longitudinal outer keel, high sharp ridge between short spine row and broad molar; condyle longer than molar. Pereopods 1–4 subequal in length. Male pleopod 1 distolateral lobes produced, longer than tiny distomedial lobes. Male pleopod 2 protopod distal margin truncated; exopod inserting close to distal margin and emerging posteriorly; endopod basal article twice as broad as stylet; stylet approximately two times longer than protopod.

#### *Description*

Body length approximately 3 times width, with strong calcified integument, deepest at head. Rostrum broad, stout, exceeding article 1 of antenna 1, terminating with 2 robust setae, tip overhanging high frons; lateral margin of head with ledge; in dorsal view forming a step with a stout seta; in lateral view lateral spine blunt. Head and ambulosome of the equal width, pereonites shortening from 1 to 4; coxae of pereopod 4 broadest in lateral view. Natasome with dorsal articulations; venter with medial keel; pereonite 5 longest and broadest, pereonite 7 shorter or subequal to pereonite 6; anterolateral corners of pereonites 6, 7 and pleotelson acute and bent dorsally. Pleotelson with pair of dorsal tubercles on anterior part; posterior margin surrounded by outer rim with shorter dorsal part and longer ventral section, which may be pronounced into ventral projection; preanal ridge pronounced.

*Antenna 1* nearly one third of body length, inserted deeply into the antennal socket, article 1 distomedial lobe reduced, shorter than distolateral acute projection, article 3 length nearly twice the length of article 2. *Antenna 2* article 1 triangular; article 2 laterally shorter than article 1, scale on article 3 nearly half the length of article 4. *Mandibular body* with longitudinal outer keel, molar process broadening distally, ventral margin of triturative surface with row of denticles and few setulose setae; spine row with few spines, high acute ridge between spine row and molar, condyle 0.3 times body length, longer than molar; palp 0.9 times body length, article 2 broadened at midlength. *Maxilla 1* lateral endite nearly 1.5 times as wide as mesial endite, with 12 distal stout setae, mesial endite distally with tuft of small slender setae and 2 long setulate setae. *Maxilla 2* middle endite shortest, mesial and lateral endites of the same length, mesial endite with dense tuft of distal setae, some of them comb-like; lateral and mesial endites each with 2 long and 2 shorter distal setae. *Maxilliped* epipod subequal to basis, sub-triangular, with lateral angled extension, tip pointed.

*Pereopods 1–4* similar in length, becoming more slender from 1 to 4; bases of

pereopods 1–4 subequal in length, basis 1 broadest; carpi of pereopods 2 and 3 and propodus of pereopod 2 with stout, flagellate ventral setae; propodi of pereopods 2–4 with tuft of distal long simple setae. Pereopods 5–7 strong, of similar shape, pereopod 5 longest, basis 5 about quarter basis 4 length, bases becoming longer, ischii shorter, carpi and propodi decreasing in size from pereopods 5 to 7, dorsal margin of carpi more convex than ventral margin, propodi shorter and about half carpi width, ventral margin more convex than dorsal margin; dactyli almost as long as propodi width, with stout acute dorsal claw and ventral slender seta.

*Male pleopod 1* length nearly 2.5 times width, with greatest volume ventrally; distal margin of sinuate shape: lateral lobes produced posteriorly, with acute distodorsal projections, medial lobes somewhat reduced, narrow and shorter than lateral lobes. Male pleopod 2 protopod length 0.7 times pleopod 1 length, distal margin truncated, exopod very prominent behind protopod distal margin, and with projected distal section; endopod basal article swollen, stylet slender, about twice as long as protopod, sperm duct opening after basal fourth of stylet.

*Uropod* protopod bent at midlength, with both margins angled: concave lateral corner and projected medial corner, bearing long setae, endopod longer than protopod, exopod less than a half endopod length.

#### Remarks

The key characters for the new genus are the distinctive shape of the posterior margin of the pleotelson, related to the unique shape of the uropod protopod. Many species of *Eurycope*, and especially some species of *Munneurycope* Stephensen, 1912, have the posterior part of the pleotelson to some extent bent downwards. Thus the line of the posterolateral margin angles downward in lateral view but in all these cases this line is just a clear, sharp border between the dorsal surface and ventral side of the pleotelson (Fig. 2). The shape of the pleotelson posterior margin in the new genus is characteristic and unique within Eurycopinae. The pleotelson edge has an additional structure, which appears to be a rim with an outer ring running perpendicularly to the edge. This has a short dorsal section rising over the dorsal surface and a protruding ventral section. The shape of the bent uropod protopod, divided into two parts by a middle angle, is also unusual among Munnopsidae. In some *Eurycope* species, (e.g. species of the *E. complanata* complex, some species of the *E. longiflagrata* complex and in some species of *Coperonus*) the short and broad protopod also has a medial extension. However, but the protopod has a different shape, resembling a shoe, with a short straight lateral side and long distal and medial sides (Fig. 4).

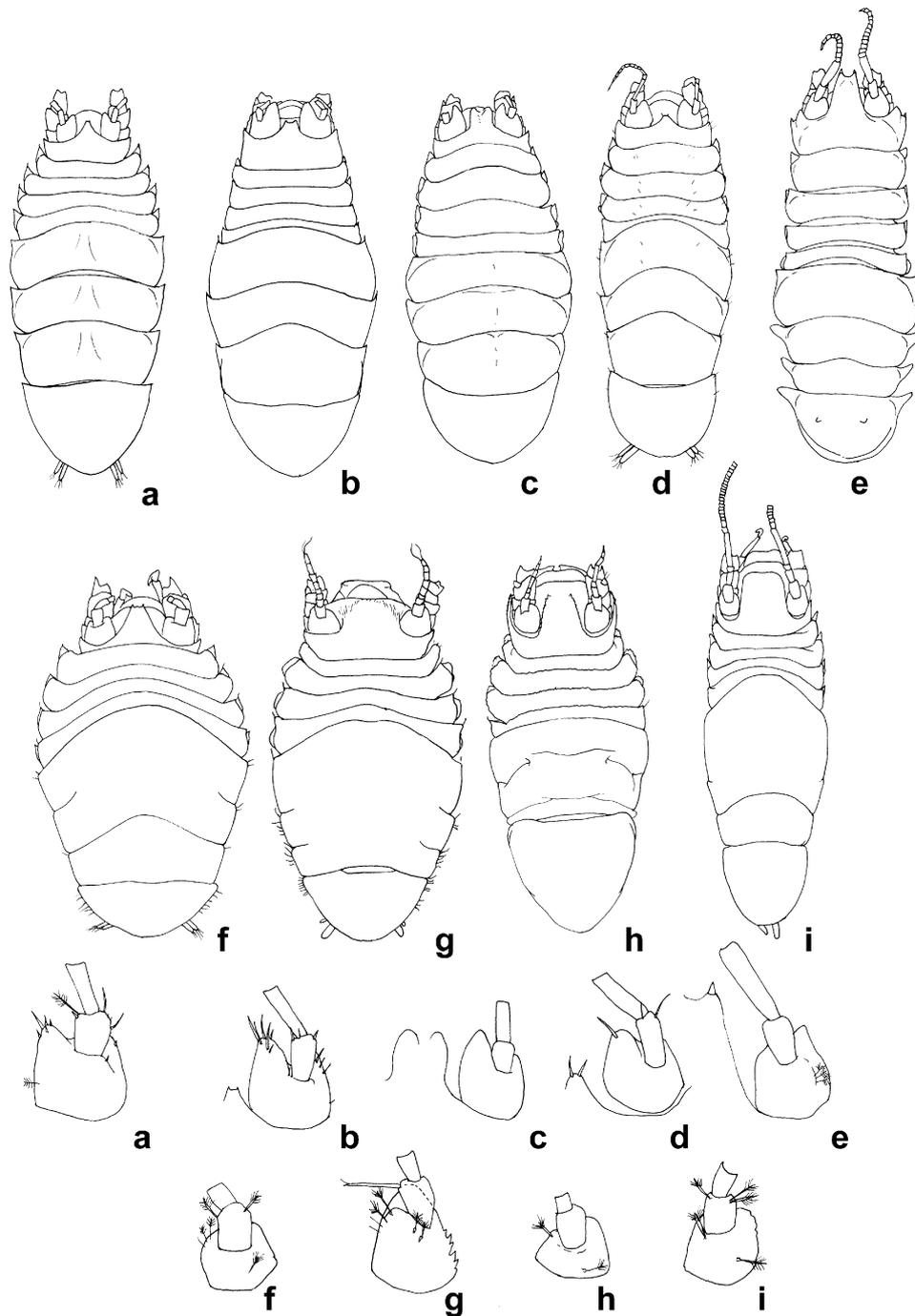
The new genus with the general *Eurycope* habitus has an unusual enlarged, deep head, which is particularly distinct in lateral view (compare in Figs 1 and 2). The combination of the long, stout rostrum, and reduction of the distomedial lobe of article 1 of antenna 1 characterises four other eurycopine genera, but not *Eurycope* (Fig. 1). *E. producta*, species

of the *E. dahli* complex, *Disconectes*, *Tythocope*, and *Belonectes* possess a long and broad rostrum, but without 2 terminal stout setae. Most species of these four genera have a rostrum with cephalic keels (Wilson & Hessler 1980: 245), some species have denticles on the rostral margins and the tips of such rostrum may appear to bear terminal setae in dorsal view. Some species of *Eurycope* and *Disconectes* have small, slender distal setae on the rostrum, but this is a different armament. A similar armament of a rostral tip occurs in species of the *E. longiflagrata* complex and *E. tumidicarpus* Schmid, Brenke and Wägele, 2002, but the few terminal setae are slender, not as robust and obvious, as in the new genus (Fig. 1).

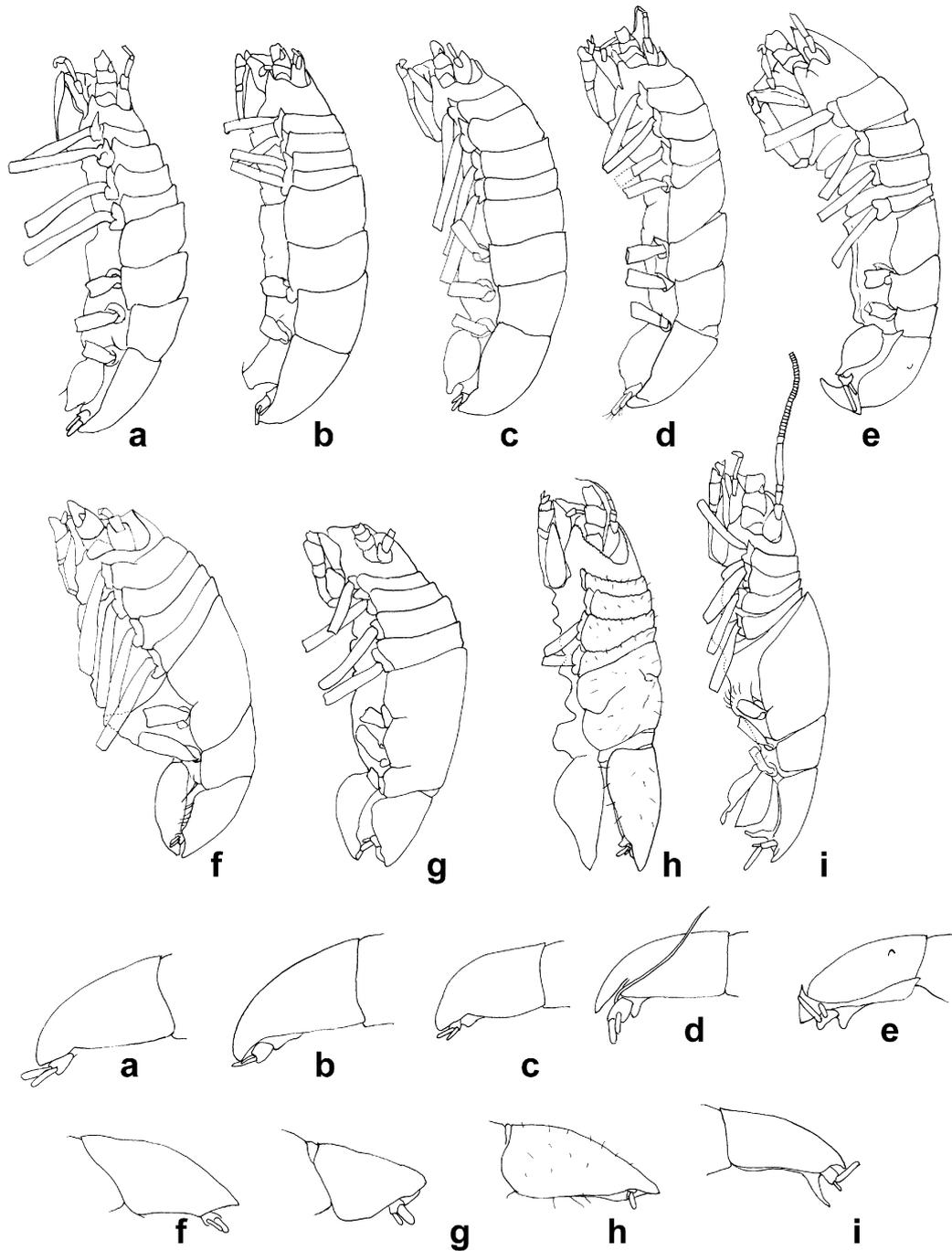
The mandibles of *Dubinectes* **gen. nov.** also have some unusual features for Eurycopinae: i.e. the longitudinal keel on the outer side of the mandibular body and the high acute ridge between the spine row and the broad molar. The condyle is also longer than the molar, while it is typically shorter in all Eurycopinae, except *Baeonectes* (Fig. 3). The expansion of the palp article 2 at midlength has not previously been recorded for species of Eurycopinae.

The male pleopods 1 and 2 of the new genus possess a unique shape. The pleopod 1 distomedial lobes are narrow and shorter than the distolateral lobes. In comparison, all Eurycopinae, except the *E. longiflagrata* complex, are characterised by the broad and rather protruded distomedial lobes (Fig. 4). The male pleopod 2 of the new genus has a protopod with a truncated distal margin, so the exopod emerges posteriorly and terminally from it. Most of the munnopsid species have a protopod that tapers distally and the exopod emerges from the distal part of the medial margin (Fig. 4). A similar truncated shape of the protopod and the exposure of the exopod have been described in Munnopsidae only for species of the *E. longiflagrata* complex and for some species of *Munneurycope* (Wolff 1962; Svavarsson 1987). The endopod has the swollen basal article and the elongate stylet, which is approximately twice as long as the protopod. This differs from the common shape in the subfamily (Fig. 4) where both articles are of subequal width and the stylet is shorter than the protopod or subequal to it, as in *E. cornuta*. Again, the only eurycopine group with a similarly shaped endopod is the *E. longiflagrata* complex. In addition to the genital characters, both groups possess features which distinguish them from most of the other *Eurycope* species. These include: the short pereonite 4, which is only a third of the pereonite 1 length (Figs 1 and 2), in contrast to the typical state (pereonites 1–4 of similar length); the body is deepest at the head–pereonite 1 area instead of at pereonite 5 or 6 as usually found in *Eurycope* (Figs 1 and 2).

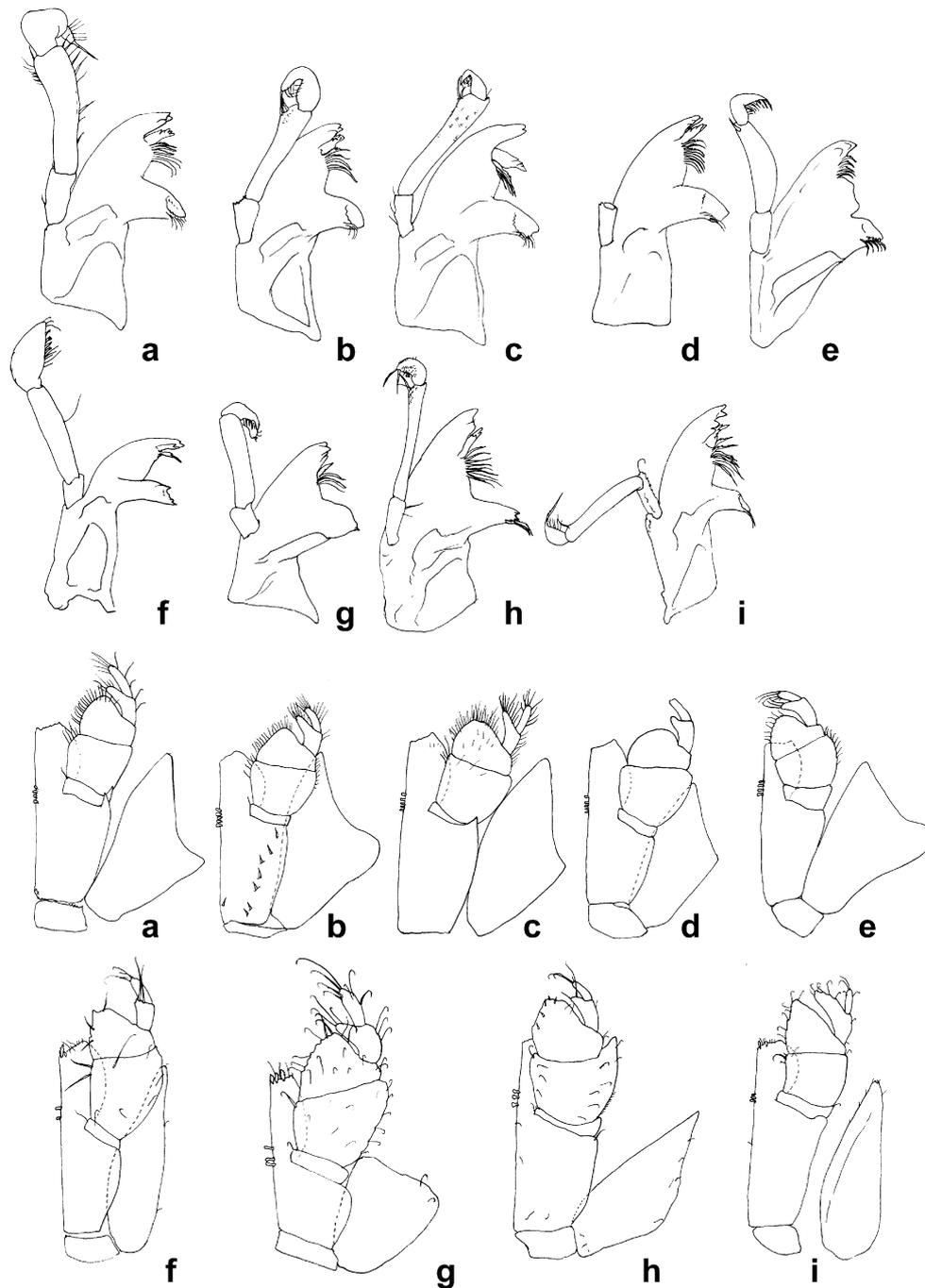
Despite these similarities the new genus and the *E. longiflagrata* complex cannot be grouped into one genus because they differ in the structure of the posterior margin of the pleotelson, the protopod of the uropod and in other characters. For example: 1. the new genus possesses a thick, long rostrum, overhanging the frons, while the rostrum is short and narrow in the *E. longiflagrata* complex. 2. The new genus has a relatively shorter natasome (about half of the body length contrary to 0.7 in the *E. longiflagrata* complex),



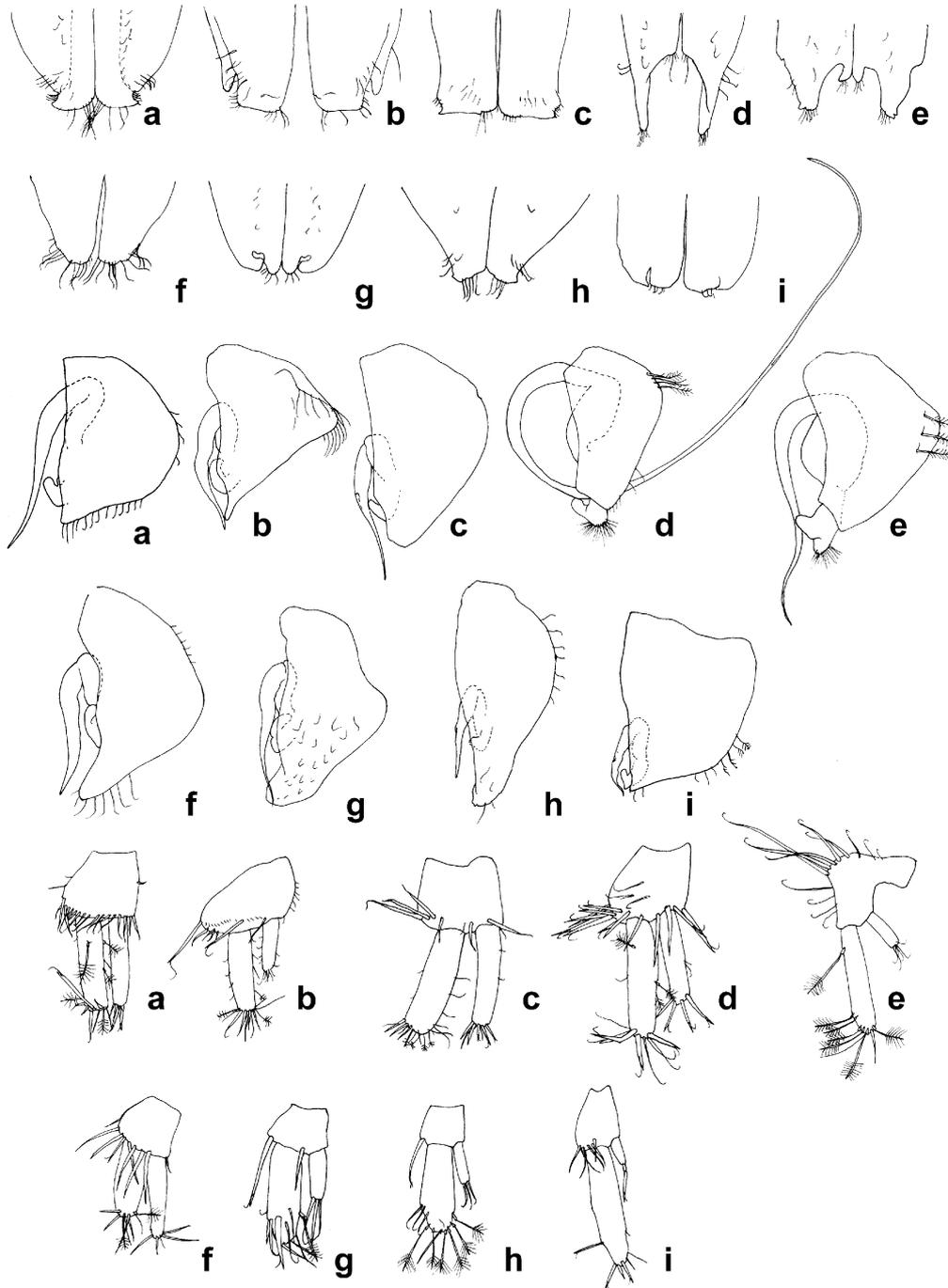
**FIGURE 1.** Representatives of the subfamily Eurycopinae, dorsal view of body (two upper rows) and right antenna 1 (two lower rows, in the same sequence): a, *Eurycope cornuta* Sars, 1864; b, *Eurycope complanata* complex Wilson, 1982; c, *Eurycope dahli* complex Svavarsson, 1987; d, *Eurycope longiflagrata* complex Wilson, 1983; e, *Dubinectes* **gen. nov.**; f, *Disconectes* Wilson & Hessler, 1981; g, *Baeonectes* Wilson, 1982; h, *Tythocope* Wilson & Hessler, 1981; i, *Belonectes* Wilson & Hessler, 1981.



**FIGURE 2.** Representatives of the subfamily Eurycopinae, lateral view of body (two upper rows) and lateral view of pleotelson (two lower rows, in the same sequence): a, *Eurycope cornuta* Sars, 1864; b, *Eurycope complanata* complex Wilson, 1982; c, *Eurycope dahli* complex Svavarsson, 1987; d, *Eurycope longiflagrata* complex Wilson, 1983; e, *Dubinectes* **gen. nov.**; f, *Disconectes* Wilson & Hessler, 1981; g, *Baeonectes* Wilson, 1982; h, *Tythocope* Wilson & Hessler, 1981; i, *Belonectes* Wilson & Hessler, 1981.



**FIGURE 3.** Representatives of the subfamily Eurycopinae, mandibles (two upper rows) and maxillipeds (two lower rows, in the same sequence): a, *Eurycope cornuta* Sars, 1864; b, *Eurycope complanata* complex Wilson, 1982b; c, *Eurycope dahli* complex Svavarsson, 1987; d, *Eurycope longiflagrata* complex Wilson, 1983; e, *Dubinectes* **gen. nov.**; f, *Disconnectes* Wilson & Hessler, 1981; g, *Baeonectes* Wilson, 1982; h, *Tythocope* Wilson & Hessler, 1981; i, *Belonectes* Wilson & Hessler, 1981



**FIGURE 4.** Representatives of the subfamily Eurycopinae, distal margin of male pleopod 1 (two upper rows), male pleopod 2 (two middle rows) and uropod (two lower rows, in the same sequence): a, *Eurycope cornuta* Sars, 1864; b, *Eurycope complanata* complex Wilson, 1982; c, *Eurycope dahli* complex Svavarsson, 1987; d, *Eurycope longiflagrata* complex Wilson, 1983; e, *Dubinectes* **gen. nov.**; f, *Disconectes* Wilson & Hessler, 1981; g, *Baeonectes* Wilson, 1982; h, *Tythocope* Wilson & Hessler, 1981; i, *Belonectes* Wilson & Hessler, 1981.

and the longest natasomite is the pereonite 5 (in *E. longiflagrata* complex, as in all *Eurycope* species, it is the pereonite 7). 3. *Dubinectes* **gen. nov.** also differs in the presence of a pair of tubercles on the anterior half of the dorsal surface of the pleotelson. This structure was also found in *E. glabra* Kensley, 1978, another species excluded from *Eurycope* (Wilson & Hessler 1981). 4. The mandibles of *Dubinectes* **gen. nov.** have a high acute ridge between the spine row and the molar and the condyle longer than the molar, contrary to the *E. longiflagrata* complex, which has the usual subfamily character of an approximate right angle between the spine row and the molar, and the short condyle. 5. The distomedial lobes of the male pleopod 1 are present, not completely reduced, as in the *E. longiflagrata* complex. 6. The stylet of the male pleopod 2 is about twice as long as the protopod (3 to 4 times in the *E. longiflagrata* complex). Concerning the *E. longiflagrata* complex Wilson (1983b) wrote, “its possession of unusual characters opens the possibility of the creation of a new genus, or the division of *Eurycope* into subgenera”. It is very probable that the *E. longiflagrata* complex also represents a new genus. However, we do not have species of this complex in the ANDEEP material and, as the revision of *Eurycope* is not the purpose of this paper, we leave the erection of a new genus for a future investigation. Distribution and comparison of the main characters among the genera of Eurycopinae is presented in Table 1.

#### *Distribution*

The species of the genus *Dubinectes* **gen. nov.** have been found in the south-eastern Atlantic and in the Weddell Sea, Southern Ocean. The depth ranges between 1121 and 4960 m.

#### **Diagnosis of *Eurycope* (modified from Wilson 1983a, Kussakin 2003):**

Distomedial lobe of antenna 1 article 1 well developed, longer than distolateral lobe, and exceeding tip of rostrum; article 3 of antenna 1 longer than article 2; body with thin, glossy cuticula, deepest at pereonites 5–6; pereonites 1–4 of subequal in length, tightly packed, pereonite 4 broader than pereonite 1 and head; pereonites 5–7 with full dorsal articulation; pereonite 7 longer, or nearly as long as, pereonite 6; line of pleotelson posterior margin in lateral view simple, straight or angled downward; mandibular molar triturating surface broad, truncated; condyle shorter or subequal to molar; maxilliped epipod subequal to basis in length, with lateral extension, and pointed tip; pereopod 1 shorter than pereopods 2–4; male pleopod 1 distomedial lobes broad, longer than distolateral lobes; male pleopod 2 protopod tapering distally, exopod emerging from protopod medial margin; endopod, both articles of the same width, stylet shorter or subequal to protopod; uropod protopod stout, with straight lateral side.

TABLE 1. Distribution of characters among genera of Eurycopinae.

Taxon	<i>Dubinectes</i>	<i>Eurycope</i>	<i>E. longiflagrata</i> complex	<i>Disconectes</i>	<i>Tythocope</i>	<i>Belonectes</i>	<i>Baeonectes</i>
Body cuticle	<b>Strong mat</b>	Thin glossy	Thin glossy	Thin glossy	Thin glossy	Thin glossy	Thin glossy
Head width	<b>Equal to pereonite 4</b>	Narrower than pereonite 4	Narrower than pereonite 4	Narrower than pereonite 4	Narrower than pereonite 4	Narrower than pereonite 4	Narrower than pereonite 4
Head lateral margins	<b>With ledge</b>	Straight	Straight	Straight	Straight	Straight	Straight
Rostrum margins	Present	Present	Present	Present	Lateral present	Present	Absent
Rostrum length	<i>Longer than article 1 of antenna 1</i>	Shorter than article 1 of antenna 1	Shorter than article 1 of antenna 1	<i>Longer than article 1 of antenna 1</i>			
Antenna 1 article 1 distomedial lobe	<i>Reduced</i>	Present	Present	<i>Reduced</i>	<i>Reduced</i>	<i>Reduced</i>	<i>Reduced</i>
Antenna 1 article 3	Longer than article 2	Longer than article 2	Longer than article 2	Shorter than article 2	Shorter than article 2	Shorter than article 2	Shorter than article 2
Pereonites 1–4 packed	<b>Loose</b>	Tight	Tight	Tight	Tight	Tight	Tight
Pereonite 4 length	<u>Approximately 1/3 of pereonite 1</u>	Subequal or slightly shorter	<u>Approximately 1/3 of pereonite 1</u>	Subequal or slightly shorter			
Pereonites 5–7 dorsal articulation	Full	Full	Full	Pereonites 5 and 6 fused	Not full articulation	Pereonites 5 and 6 fused	Pereonites 5–7 fused
Body deepest at	<b>Head</b>	Pereonites 5–7	Pereonite 1	Pereonite 5	Pereonites 5	Pereonite 6	Pereonites 5, 6
Pleotelson posterior margin	<b>With rim</b>	Simple	Simple	Simple	Simple	Simple	Simple
Pereonite 7	<i>Not longer than pereonite 6</i>	Longer than pereonite 6	longer than pereonite 6	<i>Not longer than pereonite 6</i>	Shorter than pereonite 6	<i>Not longer than pereonite 6</i>	<i>Not longer than pereonite 6</i>
Mandible molar	Broad, truncated	Broad, truncated	Broad, truncated	Thin, toothed	Thin, tapering	Thin, truncated	Broad, truncated
Mandible condyle	<i>Longer than molar</i>	Shorter than molar	Shorter than molar	Shorter than molar	Shorter than molar	Shorter than molar	<i>Longer than molar</i>
Mandible longitudinal keel	<b>Present</b>	Absent	Absent	Absent	Absent	Absent	Absent

to be continued.

TABLE 1 (continued).

Taxon	<i>Dubinetes</i>	<i>Eurycope</i>	<i>E. longiflagrata</i> complex	<i>Disconectes</i>	<i>Tythocope</i>	<i>Belonectes</i>	<i>Baeonectes</i>
Mandible area between spine row and molar	<b>Ridge</b>	Simple angle	Simple angle	Simple angle	Simple angle	Simple angle	Simple angle
Maxilliped epipod	Elongated, with angled lateral projection	Elongated, with angled lateral projection	Elongated, with angled lateral projection	Elongated, without angled lateral projection	Elongated, without angled lateral projection	Elongated, without angled lateral projection	Short, Tip broad, rounded
Male pleopod 1 distolateral lobes	<u>Longer than medial</u>	Shorter than medial	<u>Longer than medial</u>	Shorter than medial	Shorter than medial	Shorter than medial	Shorter than medial
Male pleopod 1 distomedial lobes	<b>Tiny</b>	Broad	Reduced	Broad	Broad	Broad	Broad
Male pleopod 2 protopod	<u>Truncated distally</u>	Tapering distally	<u>Truncated distally</u>	Tapering distally	Tapering distally	Tapering distally	Tapering distally
Male pleopod 2 stylet	<u>2 times longer than protopod</u>	Shorter or subequal to protopod	<u>3–4 times longer than protopod</u>	Shorter than protopod	Shorter than protopod	Shorter than protopod	Shorter than protopod
Male pleopod 2 basal article of endopod	<u>2 times broader than stylet</u>	About as wide as stylet	<u>Slightly broader than stylet</u>	About as wide as stylet	About as wide as stylet	About as wide as stylet	About as wide as stylet
Male pleopod 2 Exopod insertion	<u>Distally</u>	Medially	<u>Distally</u>	Medially	Medially	Medially	Medially
Uropod protopod lateral margin	<b>Angled</b>	Straight	Straight	Straight	Straight	Straight	Straight

*E. longiflagrata* complex is included as a conditionally independent taxon. Apomorphic characters of *Dubinetes* are marked in bold, characters common for *Dubinetes* and *E. longiflagrata* complex are underlined and characters common for *Dubinetes* and genera except *Eurycope* and *E. longiflagrata* complex are marked in Italics.

*Eurycope pavlenkoi* Gurjanova, 1933 and *E. ochotensis* Kussakin, 1979 should be transferred from *Eurycope* to *Baeonectes*, because of the shape of the rostrum, the article 1 of the antenna 1 with no distomedial lobe, the short truncated epipod of the maxilliped,

and the broad, rounded mandible molar. *E. magna* Birstein, 1963 and *E. scabra* Hansen, 1897 are still in *Eurycope* (Kussakin 2003), though we agree with Wilson and Hessler (1981), who excluded them from *Eurycope* and demonstrated a potential assignment to *Munnicope* Menzies and George, 1972. The systematic position of *E. ovata* Birstein, 1970, *E. sarsi* Beddard, 1886, *E. glabra* Kensley, 1978, and a few other species is still unclear, but obviously they do not belong to *Eurycope*. We therefore consider them *incertae sedis*. The species within the *E. longiflagrata* complex possessing some unusual characters, which were discussed above, do not fit to *Eurycope*.

### Key to the genera of Eurycopinae

- 1 Posterior margin of pleotelson with additional structure (outer rim); uropod protopod bent at midlength with both margins angled; cuticle strongly calcified, mat, body deepest at head ..... *Dubinectes* **gen. nov.**
- Posterior margin of pleotelson simple; uropod protopod with straight lateral margin, cuticle thin, glossy, body deepest at natasome ..... 2
- 2 Pereonites 5 and 6 with complete dorsal articulation; antenna 1 article 1 with produced distomedial lobe, article 3 longer than article 2; epipod of maxilliped with angled lateral projection..... *Eurycope*
- Pereonites 5 and 6 without complete dorsal articulation, antenna 1 article 1 with rather reduced distomedial lobe, article 3 shorter than article 2; epipod of maxilliped with no angled lateral projection ..... 3
- 3 Pereonite 6 dorsally fused with pereonite 7; rostrum without distinct margins; mandibular molar thick, condyle longer than molar; maxilliped epipod shorter than basis, tip truncated, broad..... *Baeonectes*
- Pereonite 7 separated from pereonite 6 by dorsal suture; rostrum with lateral margins; mandibular molar narrow, condyle shorter than molar; maxilliped epipod elongate, subequal to basis, tip pointed ..... 4
- 4 Pereonite 7 considerably shorter than pereonite 6; pereonites 5–7 compressed dorsally, venter of pereonite 6 bulging downwards ..... *Tythhocope*
- Pereonite 7 subequal to pereonite 6 in lateral length; pereonites 5–7 convex dorsally; venter of pereonite 5 bulging downwards ..... 5
- 5 Body broad, venter of anterior part of pereonite 5 bulging downwards, labrum tiny, shorter than clypeus, uropod exopod as long or longer than endopod ..... *Disconectes*
- Body elongated, venter of posterior part of pereonite 5 bulging downwards, labrum longer than clypeus, uropod exopod much smaller than endopod ..... *Belonectes*

***Dubinectes acutitelson* (Menzies, 1962)**

(Figs 5 and 6)

*Eurycope acutitelson* Menzies, 1962: 143, Figure 36 A–E.*Material examined*

**Holotype** (AMNH 12096), male (3.4 mm), **allotype** (AMNH 12097), female (3.2 mm), **paratypes** (AMNH 12098): 7 specimens (2.1–3.0 mm): Biotrawl No 52, Vema–14–28, 28 March 1958, south-western flank of the Schmidt-Ott Rise southwest of Cape Town, 41°03.5'S, 07°49'E, 4960 m.

Additional material from ANDEEP III.—Male natasome (2.5 mm) (ZMH 41146), Stn. 16–10, 26 January 2005, 41°07.55'S, 09°55.94'W, 4720 m; 2 juveniles (2.4 and 1.9 mm), (ZMH 41147), Stn. 59-5, 14 February 2005, 67°30.75'S, 00°00.23'W, 4651 m; 1 damaged specimen (~ 4 mm) (ZMH 41148), Stn. 88–8, 27 February 2005, 68°03.84'S, 20°31.39'W, 4928 m.

*Diagnosis*

Body with strong cuticule; rostrum thick, by volume dorsally, as long as four basal articles of antenna 2, with distal notch; head lateral ledge smooth; natasome approximately as long as anterior part of body; anterolateral margins of pereonites 6 and 7 and pleotelson greatly extended anterodorsally; posteroventral process of pleotelson thick, triangular, about half as long as pleotelson, uropod protopod angled at 90°, medial angle extended.

*Redescription of holotype*

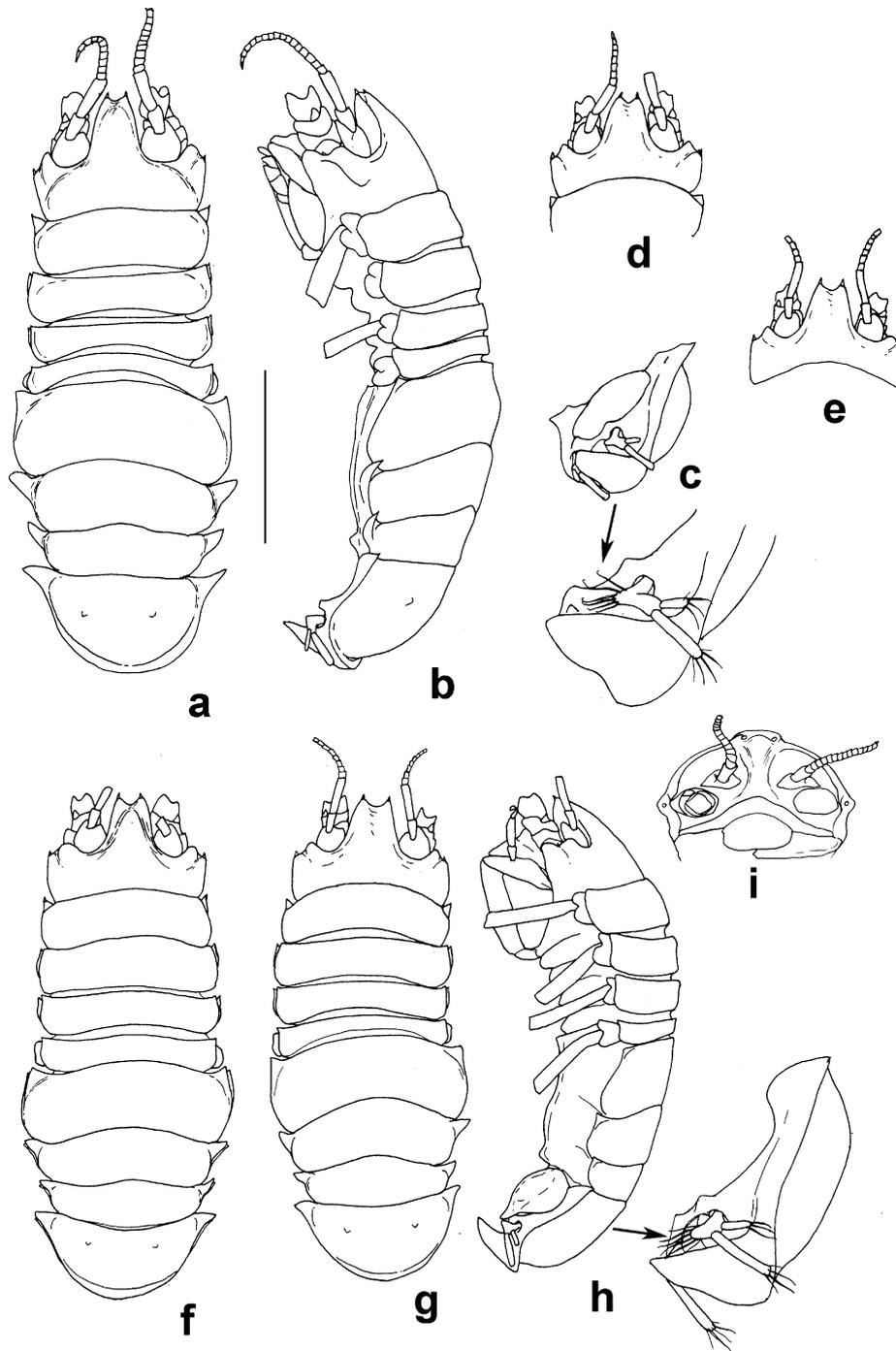
Body length (Fig. 5a–c) 2.7 times width, height 0.8 times the width. Head length 0.7 times width; anterolateral ledge smooth; rostrum from tip to level of antennal sockets 1.5 times as long as remainder of head, with distal hollow; clypeus twice as broad and 0.4 times length of labrum.

*Pereonite 1* as wide and long as head posterior to antennal sockets, pereonite 4 0.4 times length of pereonite 1. Natasome nearly as long as anterior body part. Pereonite 7 length 0.7 times length of pereonite 5; anterolateral margins of pereonites 6 and 7 and pleotelson greatly extended anterodorsally. Pleotelson length 0.7 times width, slightly longer than medial portion of head; posteroventral projection triangular, robust, 0.6 times length of pleotelson, preanal ridge with two projections near uropod insertions.

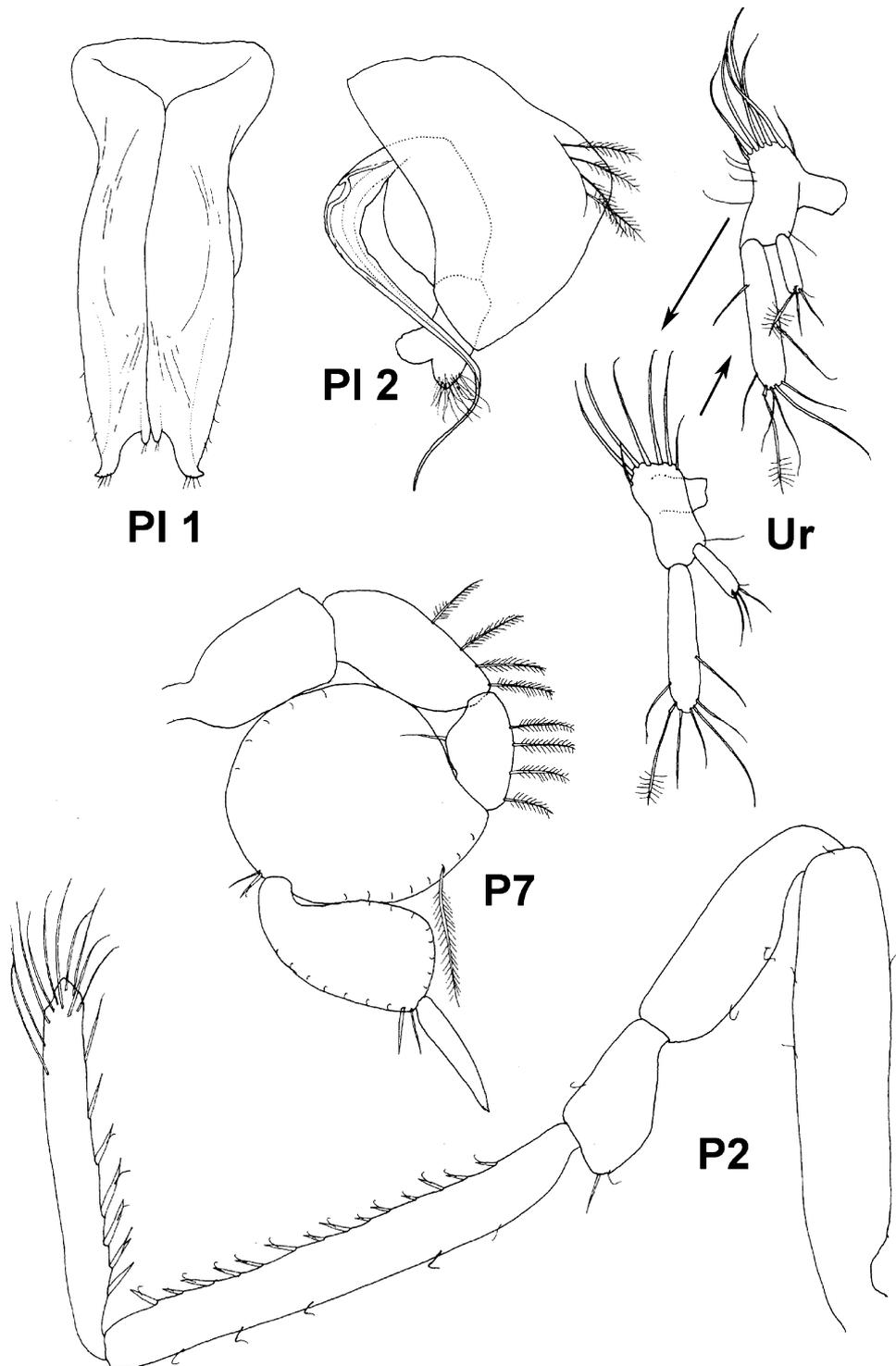
*Antenna 1* (Fig. 5a, b) article 1 length 1.1 times width, distolateral projection reaching two third of article 2 with 2 or 3 broom setae dorsally and 3 simple setae distomedially; article 2 0.6 times length of article 1, with 2 or 3 broom distal setae; articles 3 as long as article 1, flagellum of 16 articles, article 4 (first flagellar article) length 0.1 times length of article 3, following articles subequal in length to article 4, some with aesthetasc.

*Pereopod 2* (Fig. 6): length ratios of ischium-propodus to basis: 0.55, 0.3, 1.1, 0.8; basis and ischium with sparse, small, simple setae, merus with 2 distodorsal simple setae and 1 small, simple ventral seta; carpus with 14 stout flagellate ventral and 5 small, simple

dorsal setae; propodus with 6 stout, flagellate ventral setae and tuft of long, whip distal setae; dactylus broken off.



**FIGURE 5.** *Dubinectes acutitelson* (Menzies, 1962). a–c, male, holotype, AMNH 12096; d–h, paratypes, AMNH 12097. a, f, g, body dorsal views; b, h, body lateral views, c, pleotelson oblique ventral view, d, e, head dorsal view, i, head, frontal view.



**FIGURE 6.** *Dubinectes acutitelson* (Menzies, 1962). Male, holotype, AMNH 12096. Pereopods 2 and 5; pleopods 1, 2 and uropod.

*Pereopod 7* (Fig. 6) about 0.5 times length of pereopod 2, length ratios of ischium-dactylus to basis: 1.0, 0.6, 1.2, 1.1, 0.7; ischium and merus each with 4 ventral plumose setae, carpus length 0.9 times width; propodus length 1.9 times width and 0.4 times width of carpus, both articles with distodorsal stout seta, dactylus longer than propodus width.

*Pleopod 1* (Fig. 6) length 2.1 times basal width; distolateral lobes length 0.1 pleopod length, each with 4 simple distal setae; distomedial lobes half as wide and 0.3 times length of distolateral lobes.

*Pleopod 2* (Fig. 6) protopod length 1.6 times width, with 4 lateral submarginal, plumose setae; stylet of endopod 1.6 times length of protopod; exopod medial hook as long as projected distal part.

*Uropod* (Fig. 6) length 0.5 times length of pleotelson; protopod angled at 90°, distal part of equal length to proximal, medial angle projected, with 6 long, whip setae; endopod length 0.5 times width and 0.8 times length of protopod, with 1 broom and 6 whip distal setae; exopod length 0.42 times length and 0.5 times width of endopod, with 1 broom and 3 simple distal setae.

*Female, paratypes.* Similar to male (Fig. 5d–h), but body slightly stouter than in male, length 2.5 times width; antenna 1 shorter and from articles 2 more slender, pleopod 2 approximately as long as wide.

#### Remarks

This species is similar to *D. acutirostrum* sp. nov., see comparison under the description of *D. acutirostrum*. Both species differ from *D. nodosus* and *D. intermedius* sp. nov. in having strong, calcified body with long, thick anterior and posterior projections; stout, long rostrum and strong, long posteroventral process of pleotelson.

#### Distribution

South-eastern Atlantic, Cape Basin, depth 4720–4960 m; western sector of the Southern Ocean: Weddell Sea, depth 4651–4928 m.

#### *Dubinectes acutirostrum* sp. nov.

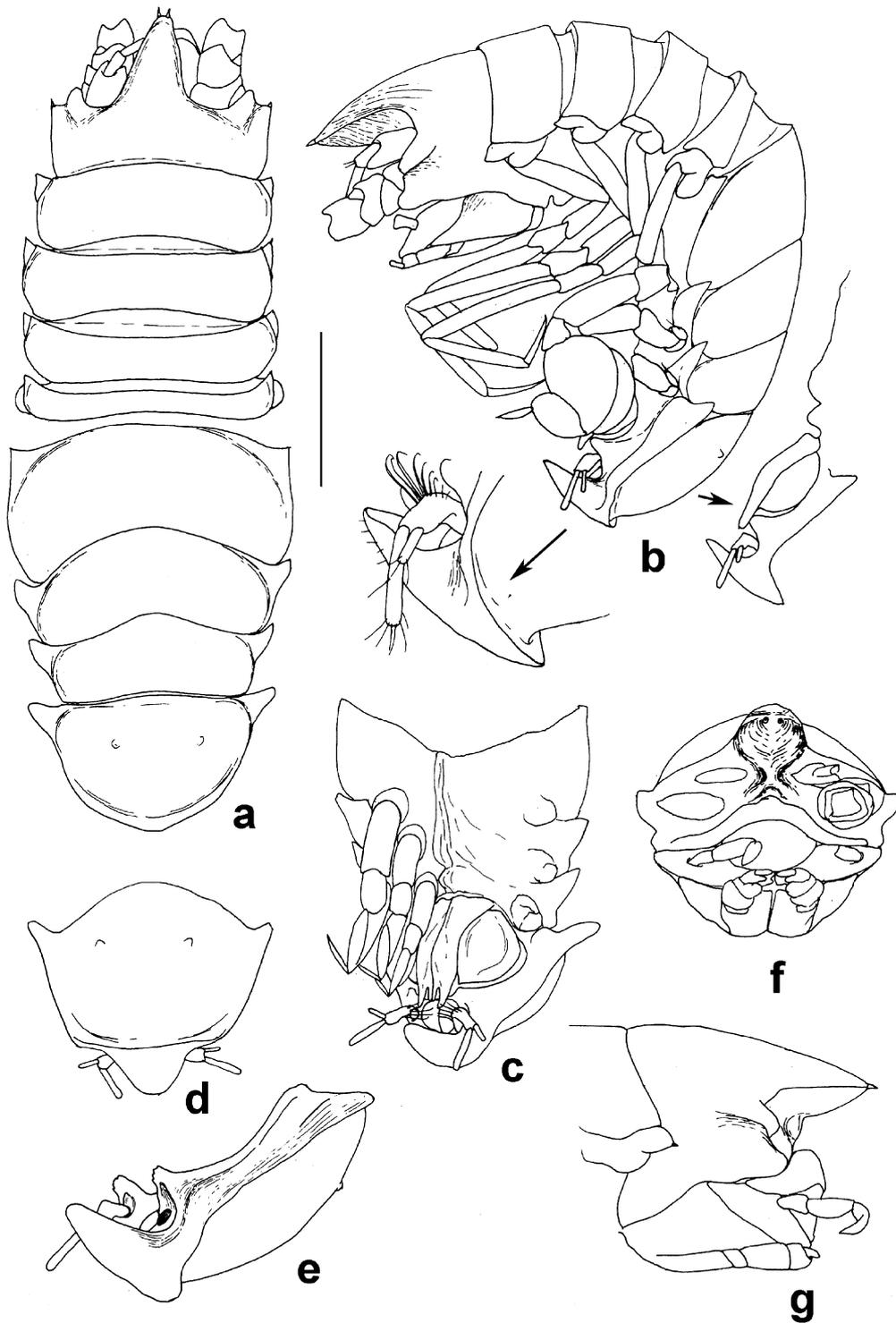
(Figs 7–11)

#### Material examined

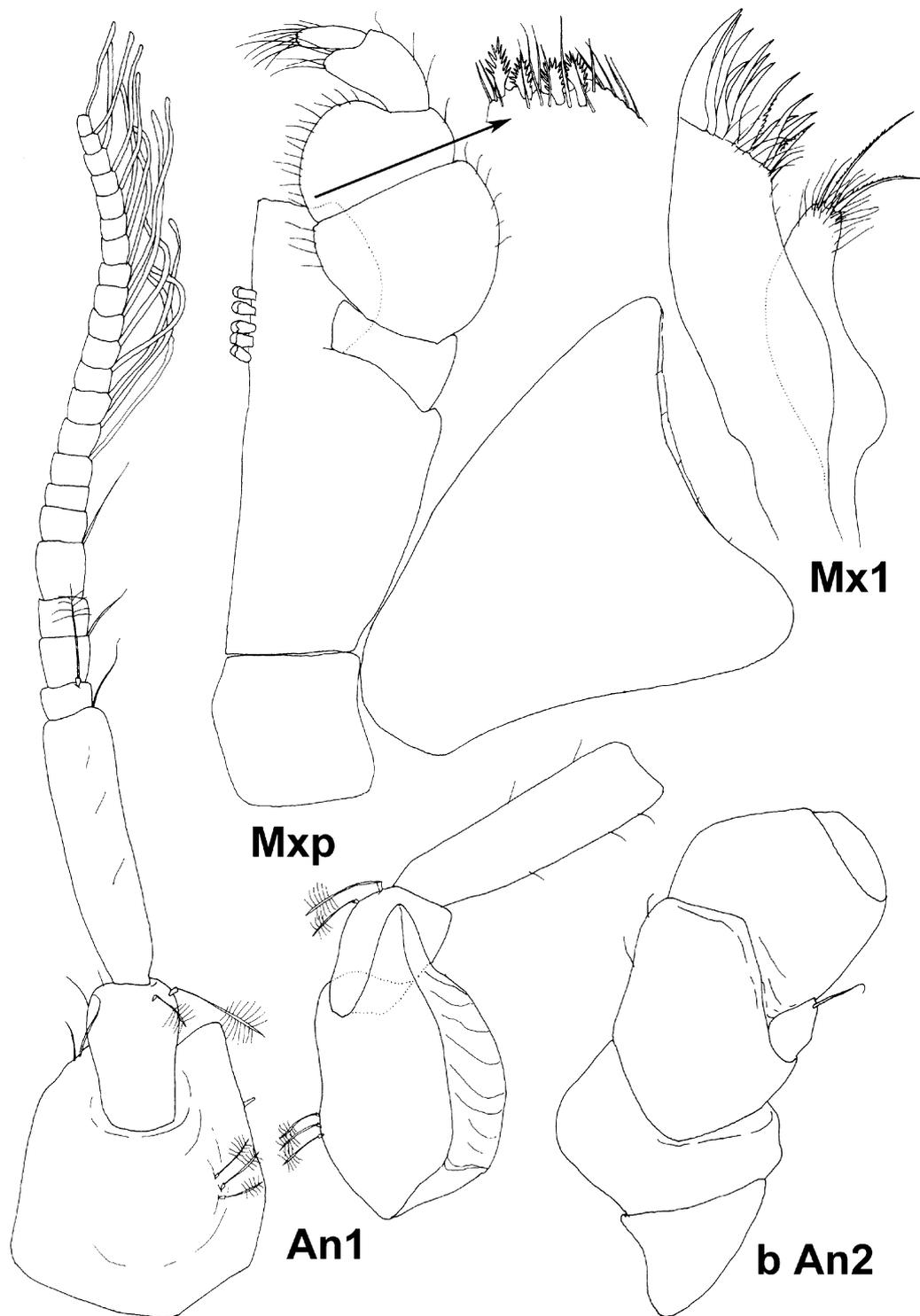
**Holotype** (ZMH 41149), male (5.5 mm), ANDEEP II Stn. 137-4, 14 March 2002, 63°44.98'S, 38°47.75.61'W, 4976 m.

#### Etymology

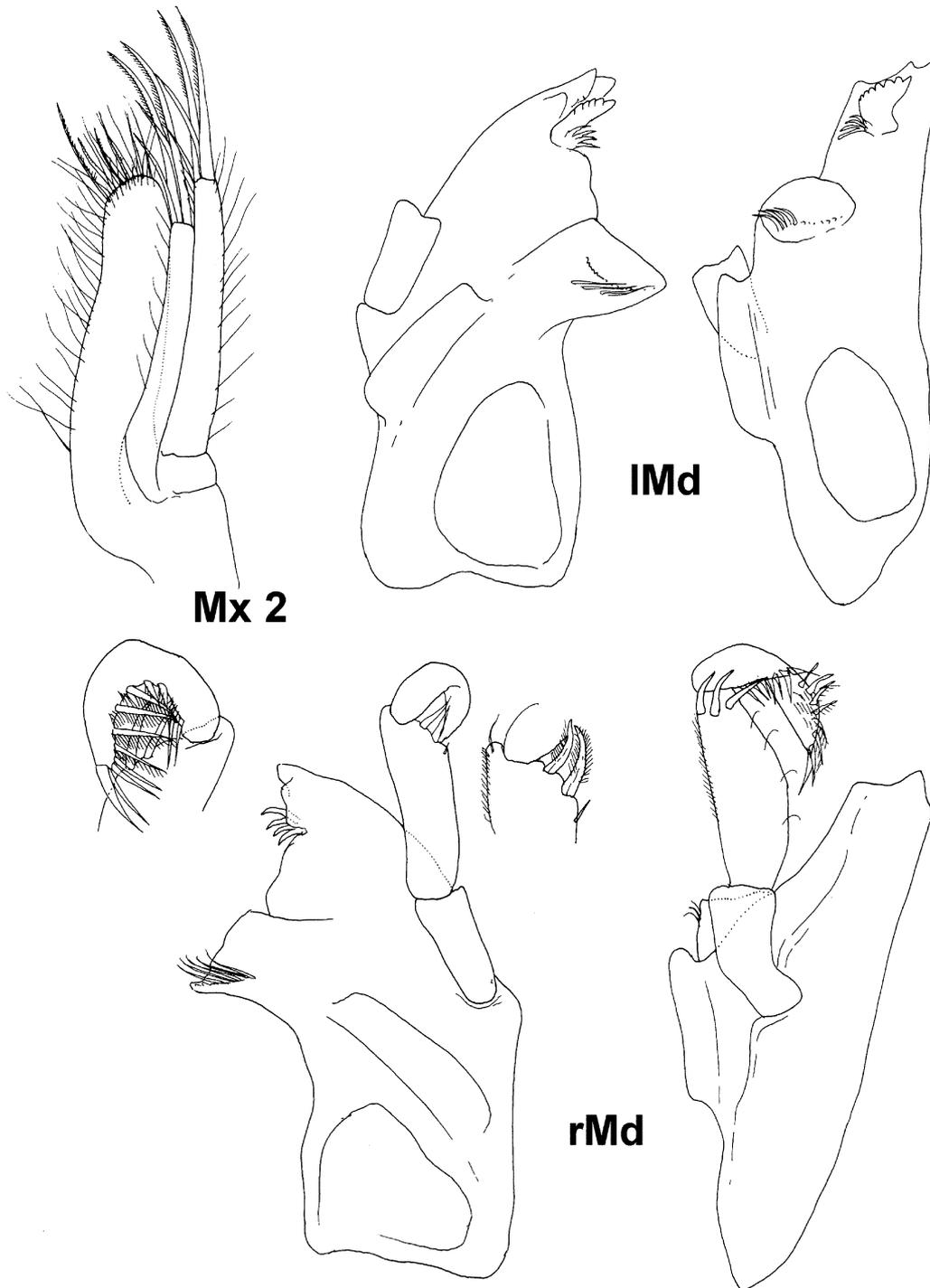
*acutirostrum* means provided with acute rostrum, referring to the special shape of the rostrum of the species.



**FIGURE 7.** *Dubinectes acutirostrum* sp. nov. Male, holotype, ZMH 41149, a, body dorsal view; b, body lateral views; c, natasome, ventral view; d, pleotelson, terminal view; e, pleotelson, lateral view; f, head, frontal view; g, head, lateral view.



**FIGURE 8.** *Dubinectes acutirostrum* sp. nov. Male, holotype, ZMH 41149, antennae, maxilla 1 and maxilliped.



**FIGURE 9.** *Dubinectes acutirostrum* sp. nov. Male, holotype, ZMH 41149, mandibles and maxilla 2.

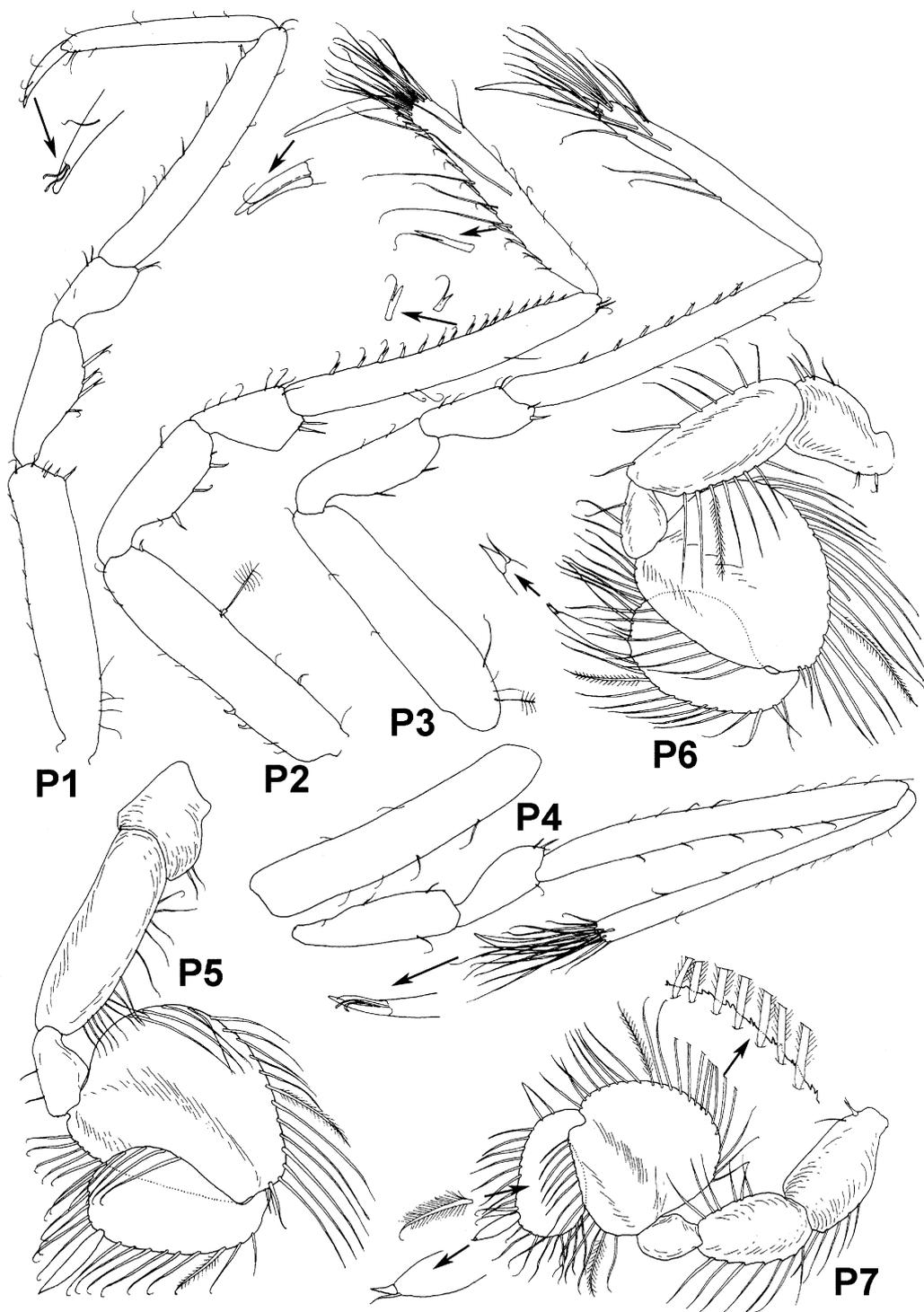


FIGURE 10. *Dubinectes acutirostrum* sp. nov. Male, holotype, ZMH 41149, pereopods 1–7.

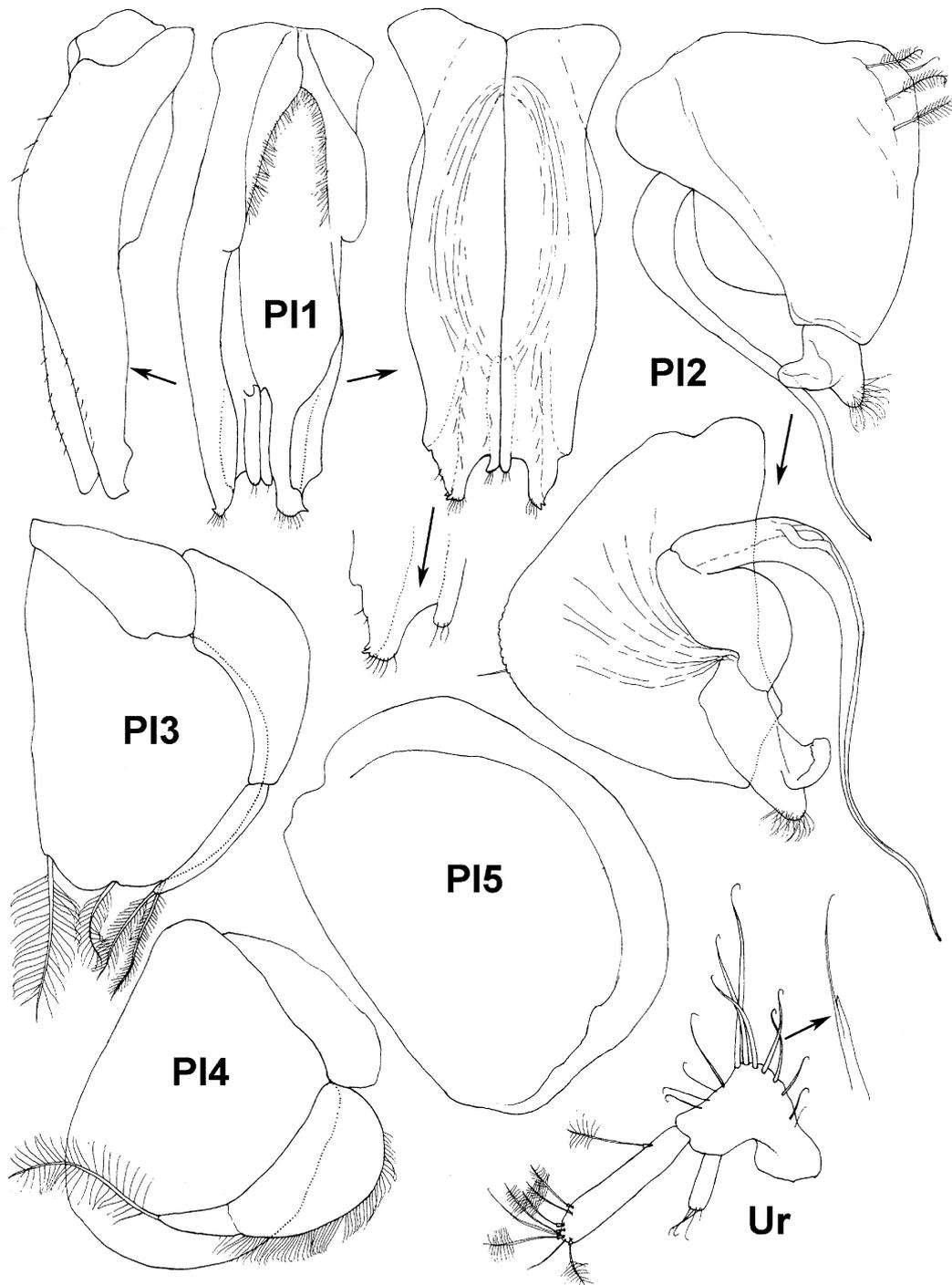


FIGURE 11. *Dubinectes acutirostrum* sp. nov. Male, holotype, ZMH 41149, pleopods and uropod.

*Diagnosis*

Body stout with thick cuticle, rostrum thick, tapering, equal in length to four basal articles of antenna 2; head lateral ledge rectangular; natasome length approximately equal to anterior part of body, anterolateral margins of pereonites 6, 7 and pleotelson greatly extended anterodorsally; posteroventral process of pleotelson thick, pointed, about half the length of the pleotelson; male pleopod 1 with small lateral ledges on base of distolateral lobes; uropod protopod angled at 90°, medial angle projected, exopod length 0.35 times length of endopod.

*Description of holotype*

Body (Fig. 7) length 2.9 times length of pereonite 5. Head length 0.7 times width; lateral ledge rectangular; rostrum length 1.4 times length of the rest of the head, tapering; clypeus 1.5 times as broad and 0.3 times length of labrum.

*Pereonite 1* slightly wider than head, pereonite 4 length 0.3 times length of pereonite 1; pereonite 7 length 0.8 times length of pereonite 5. Pleotelson length 0.7 times width and equal to length of head medially; posteroventral projection 0.5 times length of pleotelson.

*Antenna 1* (Fig. 8) article 1 length 1.2 times width, setation: 3 dorsal broom setae and 2 distomedial simple setae; article 2 length 0.5 times length of article 1, with 2 broom and 2 small simple distal setae; articles 3 subequal to article 1, flagellum of 21 articles, article 4 length 0.1 times length of article 3, with distal broom seta, following 3 articles longer, remaining articles about equal length to article 4, from article 6 each with aesthetasc.

*Antenna 2* incomplete (Fig. 8): article 3, dorsal side, almost twice length of article 2, scale length 0.4 times length of article 4, with distal seta; article 4 subequal to article 3.

*Mandibles* (Fig. 9) pars incisiva with 3 weak cusps (on right mandible central cusp longest); lacinia mobilis of left mandible stout, length 0.9 times length of pars incisiva, with 8 teeth; spine row with 4 and 5 spines on left and right mandibles respectively; ventral margin of molar process triturative surface with 5 setulose setae; palp article 2 length 1.6 times length of article 1, with 3 stout distal setae, article 3 relatively narrow.

*Maxilla 1* (Fig. 8) lateral endite 1.4 times width of mesial endite.

*Maxilla 2* (Fig. 9) mesial endite with 5 distal comb-like setae.

*Maxilliped* (Fig. 8) basis length 2.4 times width, endite with 5 coupling hooks, distal margin with 4 large fan setae and numerous simple slender setae; palp article 2 lateral margin length 1.7 times length of medial margin, both margins convex; article 3 medial margin convex, rounded, 1.3 times length of article 2, with short setulose seta, lateral margin length 0.3 times length of article 2; article 4 laterally longer than articles 3 and 5, medial lobe half the length of article 5, with 4 distal setae, article 5 with a tuft of distal setae. Epipod length 1.4 times width and 1.1 times length of basis.

*Pereopods* (Fig. 10): pereopod 1 length 0.3 times body length, length ratios of ischium-dactylus to basis: 0.5, 0.3, 1.0, 0.7, 0.25; basis with sparse, small ventral setae, 5 proximodorsal broom setae, and 5 distal small, stout setae; ischium with 4 flagellate dorsal

setae; carpus straight, with 5 dorsal simple setae and 7 ventral setae (4 simple and 3 stout distally); propodus 0.5 times carpus length, with 4 small dorsal setae; dactylus with 2 dorsal small, simple setae, dorsal claw small, rounded distally.

*Pereopod 2* length ratios of ischium-dactylus to basis: 0.6, 0.3, 1.1, 0.9, 0.4; basis with small, simple setae, 1 broom dorsal seta, 2 stout and several simple ventral setae; ischium with 3 stout dorsal setae and 1 simple ventral seta; merus with 7 ventral simple setae and 2 distodorsal stout setae; carpus with 15 ventral stout setae, 3 simple dorsal and 3 distodorsal setae; propodus as wide as carpus, ventral margin with 10 stout and 3 long whip setae, 2 whip setae on side of article and 14 distal whip long setae, dorsal margin with 7 simple setae; dactylus slender, longer than distal setae of propodus, dorsal claw slightly longer than ventral.

*Pereopod 3* length ratios of ischium-dactylus to basis: 0.5, 0.4, 1.1, 0.9, 0.4; basis with 3 small ventral and 4 proximodorsal setae: 1 broom and 3 simple; ischium with 2 dorsal and 2 ventral setae; merus with 4 ventral and 2 distodorsal setae; carpus with 7 stout ventral and 5 small dorsal setae; propodus distal half with about 15 whip long setae; dactylus almost equal length of propodus distal setae.

*Pereopod 4* length ratios of ischium-dactylus to basis: 0.5, 0.3, 1.3, 1.1, 0.4, basis with 4 dorsal and 2 ventral setae; ischium with 2 ventral and 2 dorsal setae; carpus with 6 ventral and 9 dorsal simple setae; propodus length 0.7 times carpus length, with 2 ventral and 9 dorsal small setae and 15 distal long whip setae; dactylus about equal length of propodus distal long setae.

*Pereopod 5* 0.7 times length of pereopod 2, length ratios of ischium-dactylus to basis: 2.4, 1.0, 2.4, 2.0, 1.0; basis with 2 dorsal setae, ischium with 14 dorsal setae; merus with 2 ventral setae; carpus length 1.2 times width, propodus length 1.7 times width; dactylus of equal length to propodus distal long setae. *Pereopod 6* length ratios of ischium-dactylus to basis: 1.7, 0.7, 1.8, 1.6, 0.9; carpus length 1.2 times width, propodus length 1.7 times width. *Pereopod 7* length ratios of ischium-dactylus to basis: 0.9, 0.5, 1.2, 1.0, 0.4; carpus length 1.0 times width, propodus length 1.9 times width.

*Pleopods* (Fig. 11): pleopod 1 length 2.1 times basal width, distal third of ventral surface with 2 rows of small setae; distal margin: lateral lobes each with 5–7 distal setae, medial lobes slender, about one third width and equal in length to lateral lobes, with 3 distal setae each. Pleopod 2 protopod length 1.5 times width; with 1 marginal and 3 submarginal lateral setae, stylet of endopod 1.6 times protopod length. Pleopod 3 endopod 1.5 times width, exopod 1.2 times endopod length, basal article 0.4 times endopod width, distal article equivalent to 0.6 times and 0.3 times apical length and width respectively, with 1 distal plumose seta. Pleopod 4 endopod slightly larger than pleopod 3, 1.4 times width, exopod 0.4 times width and 0.7 times length of endopod. Pleopod 5 1.3 times width.

*Uropod* (Fig. 11) 0.4 times pleotelson length. Protopod proximal part subequal in length, but narrower than distal part, medial projection with 7 long whip setae; endopod

about half width and almost equal length of protopod, with 1 medial broom seta and 8 distal setae (6 broom and 2 simple); exopod 0.35 times length and 0.5 times width of endopod, with 5 distal setae.

#### Remarks

The pointed rostrum of the new species easily distinguishes it from *D. acutitelson*, where all observed specimens have a distal notch to the rostrum. In addition, the two species can be differentiated by: 1. the anterolateral head margins of *D. acutirostrum* **sp. nov.** in a dorsal view has a rectangular acute ledge, ending with a stout seta (the head margin of *D. acutitelson* has a smooth ledge). 2. Pleopod 1 of the new species has a small lateral ledge on the base of the distolateral lobes (the lateral margins are smooth in *D. acutitelson*). 3. The exopod of the uropod is relatively shorter in the new species: 0.35 times as long as endopod in comparison to 0.42 in *D. acutitelson*.

#### Distribution

Known only from the type locality.

#### *Dubinctes nodosus* (Menzies, 1962)

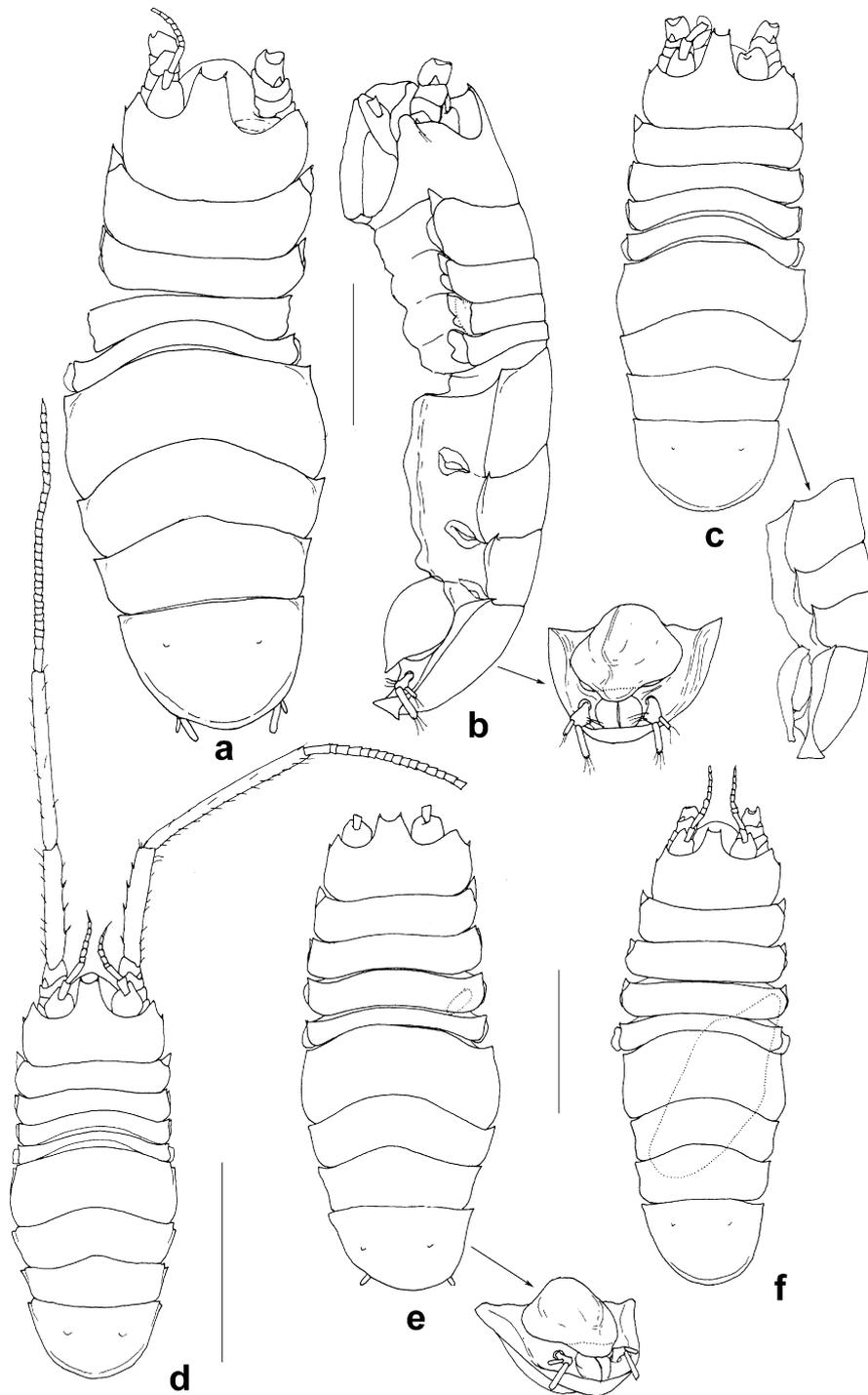
(Figs 12–18)

*Eurycope nodosa* Menzies, 1962: 145, Figure 36 F–H

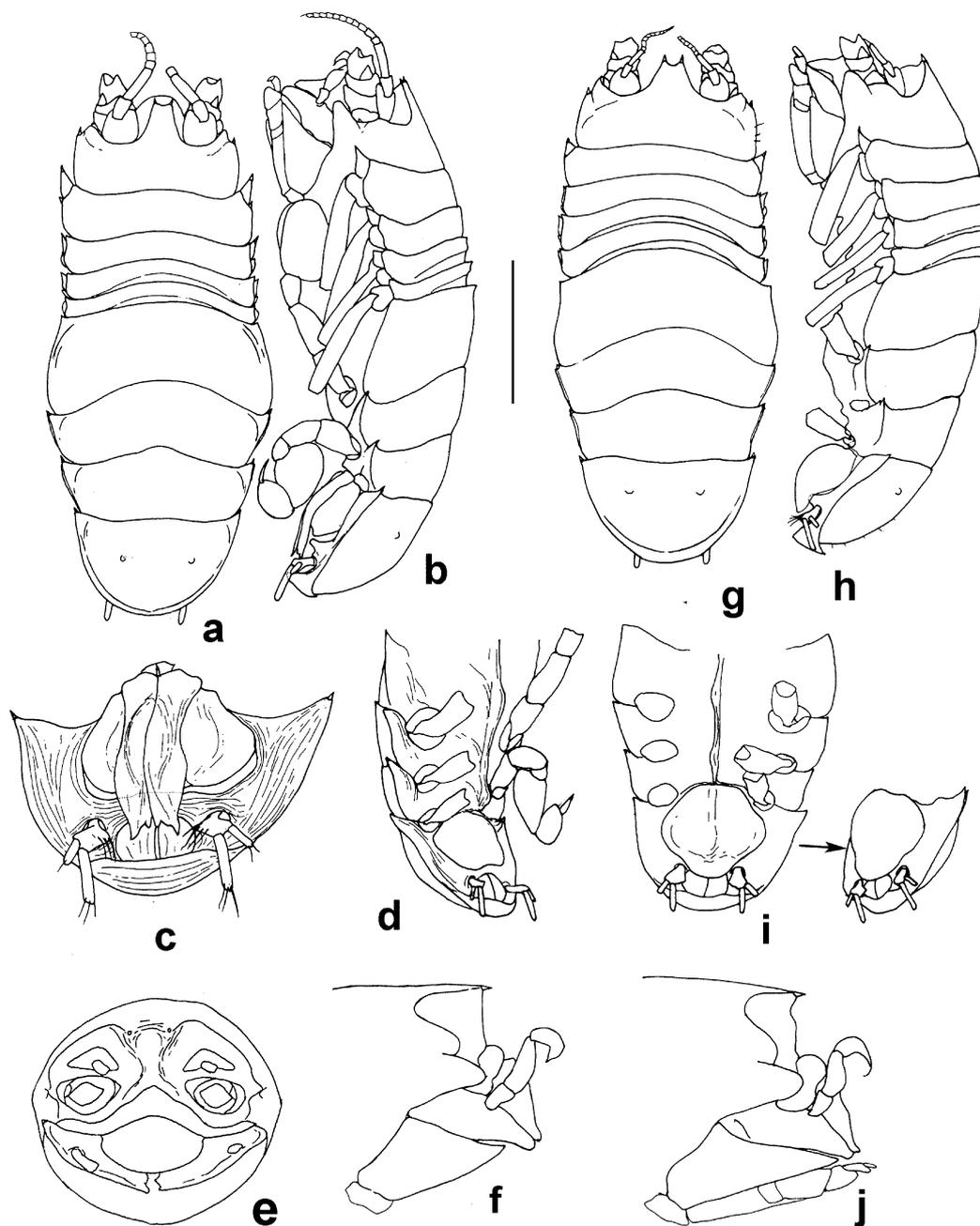
#### Material examined

**Holotype** (AMNH 12106), female (4.6 mm), Biotrawl No.53, Vema–14–31, 4 April 1958, Lower Continental Rise southwest of Cape Town, 36°34'S, 14°08'E, 4885 m; paratype (AMNH 12107), badly damaged specimen, the same locality.

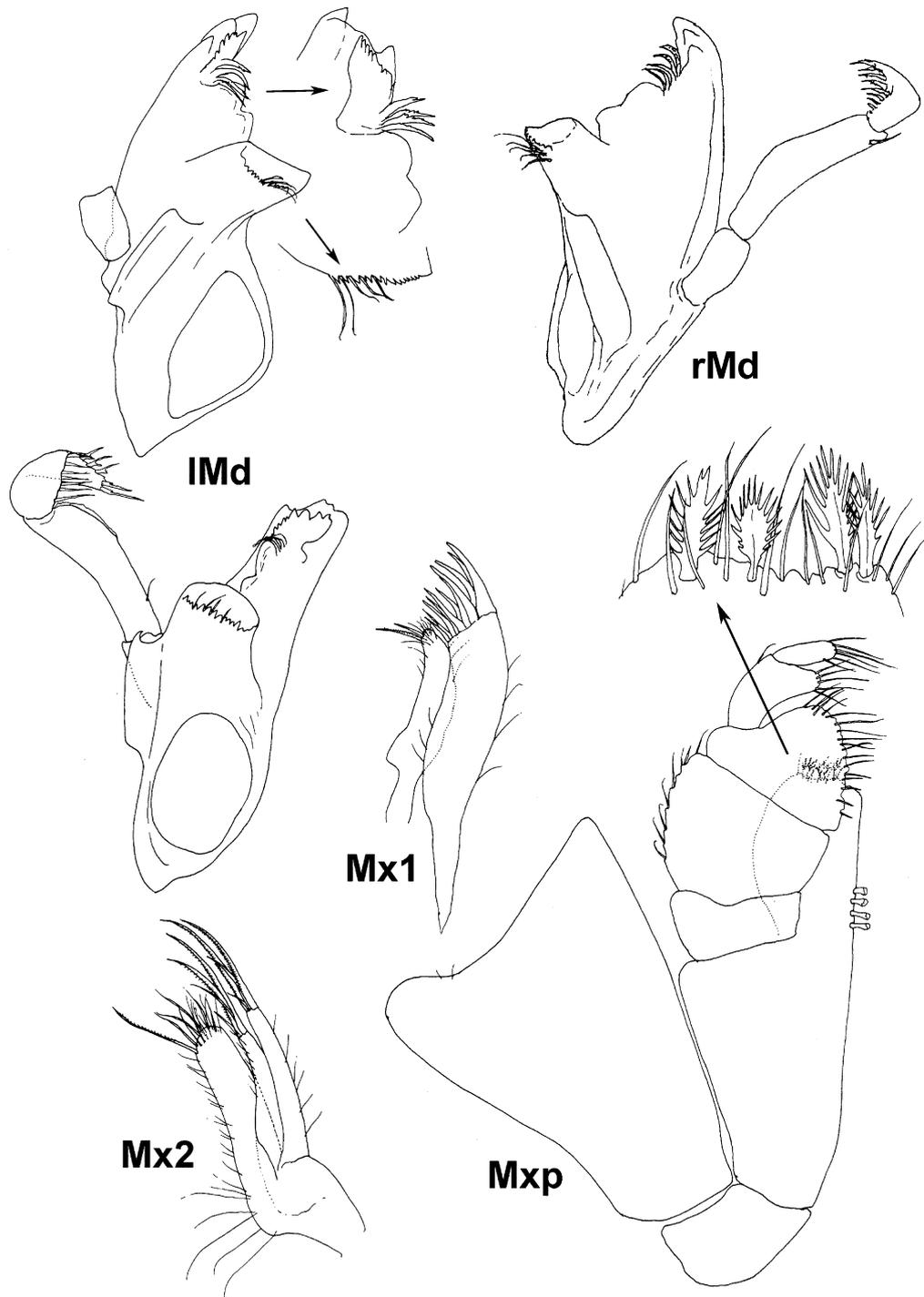
Additional material.—ANDEEP II: 3 females (2.8–3.2 mm) (ZMH 41150), Stn. 131–3, 05 March 2002, 65°20'S, 51°31.61'W, 3053 m; 1 juv. (1.8 mm) (ZMH 41151), Stn. 133–3, 07 February 2002, 65°20.17'S, 54°14.30'W, 1121 m; 5 males, 11 females (2.0–4.1 mm) (ZMH 41152); Stn. 134–4, 09 March 2002, 65°19.20'S, 48°03.77'W, 4069 m; 3 males, 10 females (1.8–3.8 mm) (ZMH 41153), Stn.135–4, 10 March 2002, 65°00.05'S, 43°03'W, 4678 m; 7 females (2.5–3.4 mm) (ZMH 41154), Stn. 136–4, 12 March 2002, 64°01.54'S, 39°06.88'W, 4747 m; 2 manca (1.5, 1.7) (ZMH 41155), Stn. 137–4, 14 March 2002, 63°44.98'S, 38°47.75'W, 4976 m; 1 male, 3 females (2.3–3.6 mm), (ZMH 41156), Stn. 138–6, 17 March 2002, 62°58.08'S, 27°54.10'W, 4542 m. ANDEEP III: 2 males, 4 females (2.8–4.1 mm) (ZMH 41157), Stn. 16–10, 26 January 2005, 41°07.55'S, 09°55.94'W, 4720 m; 3 specimens (ZMH 41158), Stn. 21–7, 29 January 2005, 47°39.87'S, 04°15.79'W, 2923 m; 3 females (2.6–3.2 mm) (ZMH 41159), Stn. 59–5, 14 February 2005, 67°30.75'S, 00°00.23'W, 4651 m; 1 male, 1 female (3.9, 4.0 mm), (ZMH 41160), Stn. 88–8, 27 February 2005, 68°03.84'S, 20°31.39'W, 4928 m.



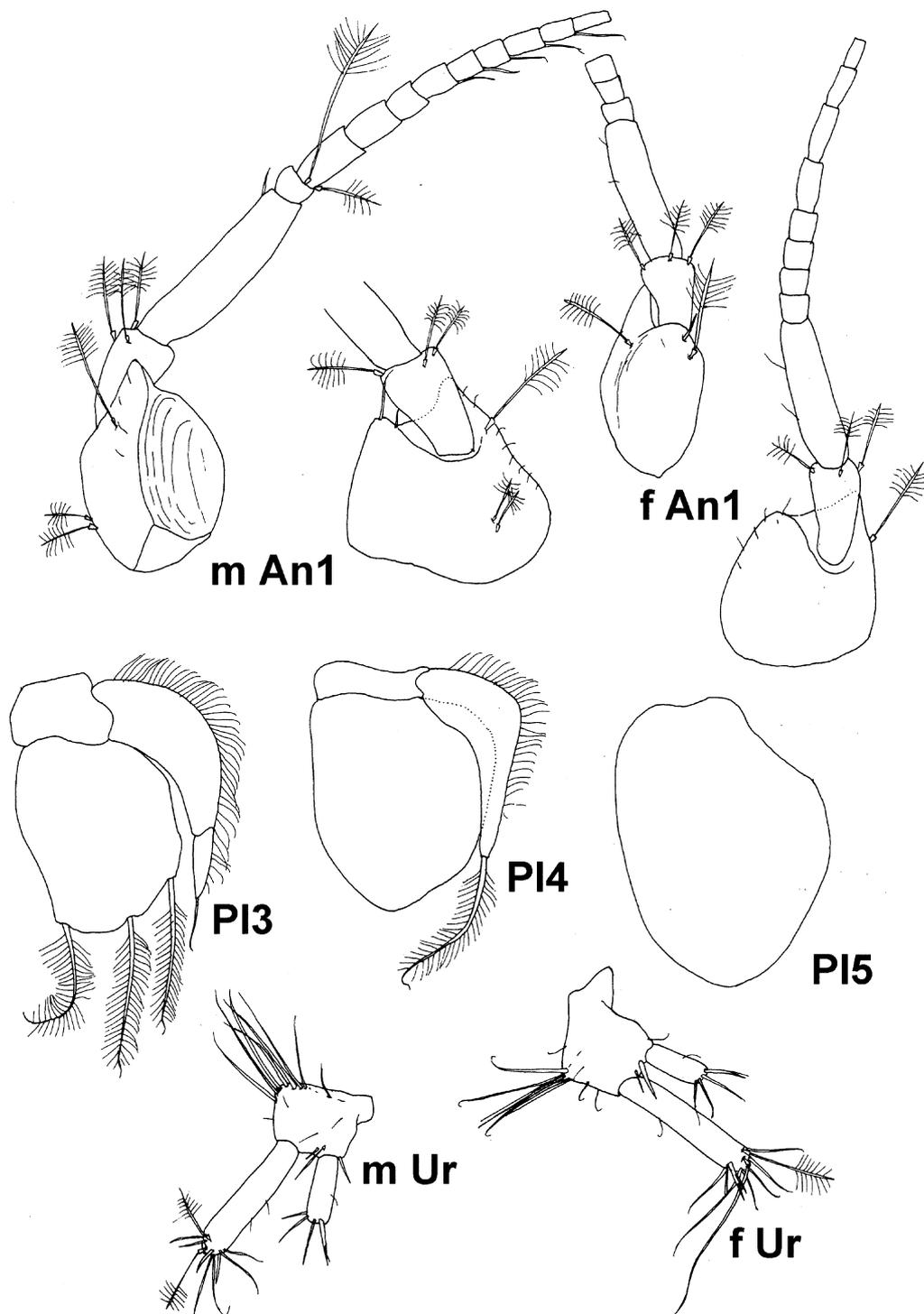
**FIGURE 12.** *Dubinectes nodosus* (Menzies, 1962). a, b, female, holotype, AMNH 12106, body dorsal and lateral views, with attached pleotelson ventral view; c, female, Stn. 135–4, dorsal view with attached natasome lateral view; d, immature male, Stn. 138–6, dorsal view; e, f, females, Stn. 136–4, dorsal views with attached pleotelson ventral view, dotted line shows oostegites.



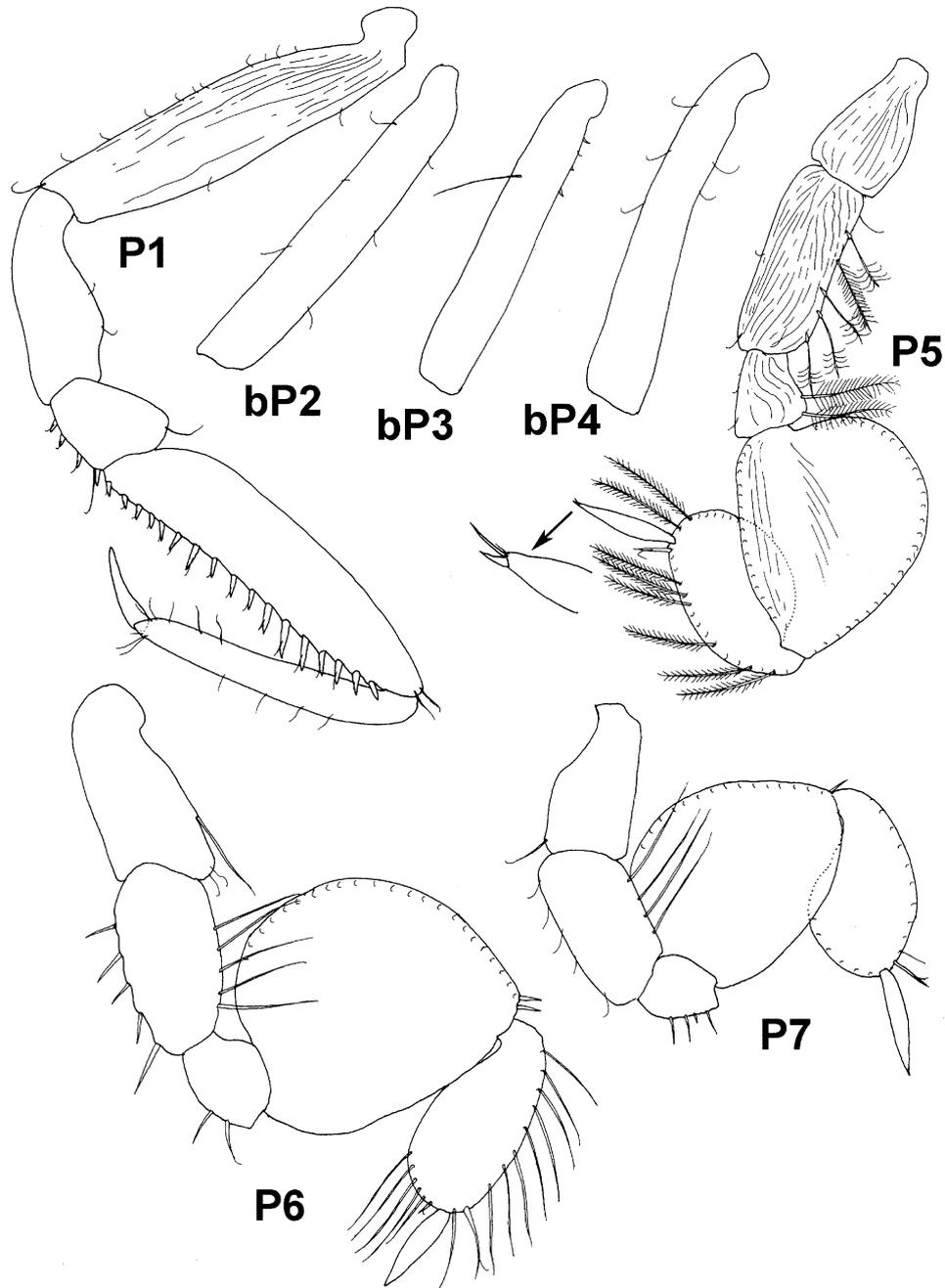
**FIGURE 13.** *Dubinectes nodosus* (Menzies, 1962). a–f, male, Stn. 137–4, a b, body dorsal and lateral views; c, pleotelson, ventral view; d, natasome, oblique ventral view; e, head, frontal view; f, head, lateral view; g–j, female from the same station, g, h, body dorsal and lateral view; i, natasome, ventral view with attached oblique ventral view of pleotelson; j, head, lateral view.



**FIGURE 14.** *Dubinectes nodosus* (Menzies, 1962). Male, Stn. 137–4, mouthparts.



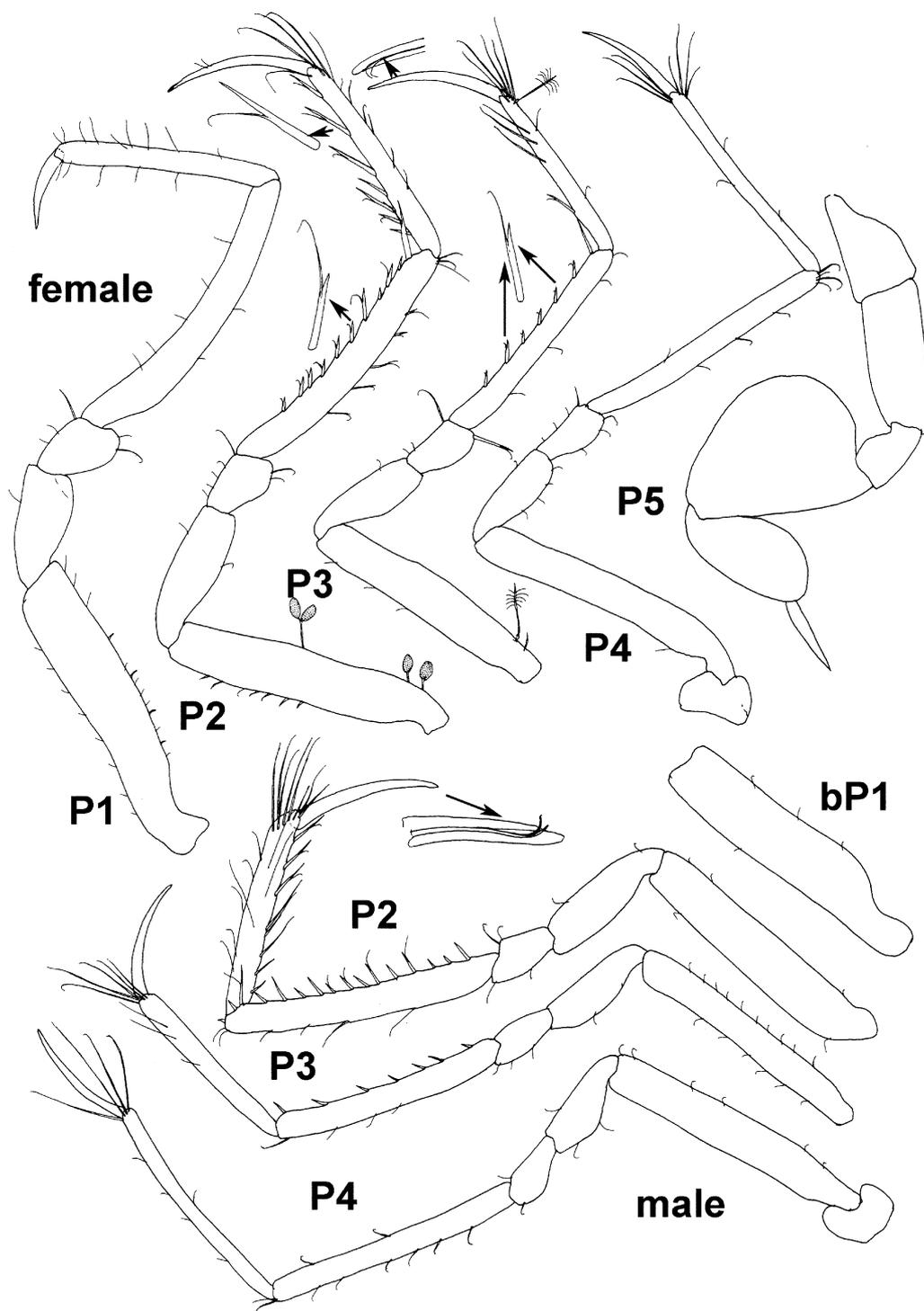
**FIGURE 15.** *Dubinectes nodosus* (Menzies, 1962). Male and female, Stn. 137–4, antenna 1, pleopods 3–5 and uropods.



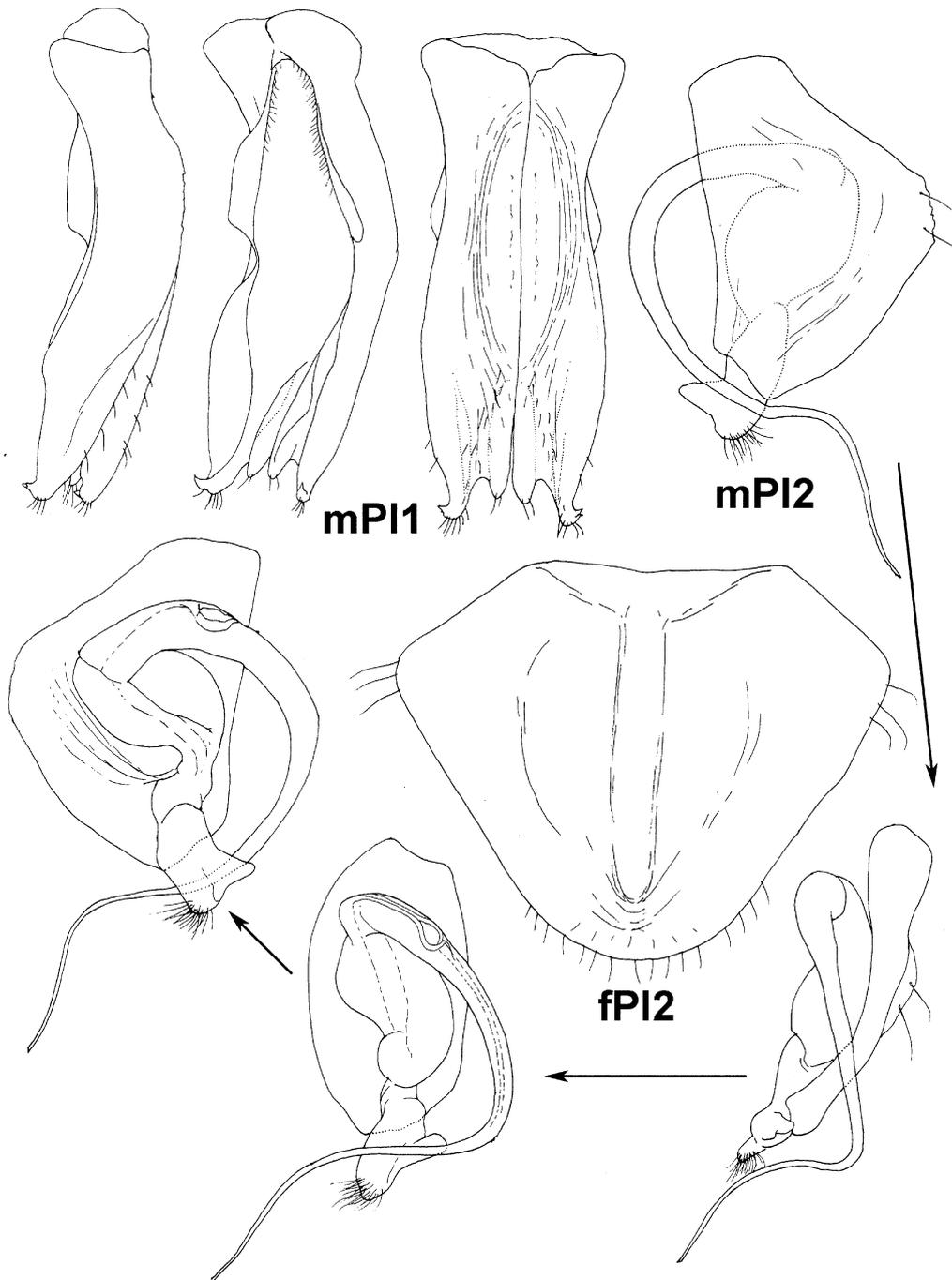
**FIGURE 16.** *Dubinectes nodosus* (Menzies, 1962). Male, Stn. 137–4, pereopods 1, 5–7; pereopods 2–4 bases.

*Diagnosis*

Body cuticle relatively thin. Rostrum only slightly longer than article 1 of antenna 1; natasome about 1.5 times anterior body part length, outline of natasome is almost smooth; posterior rim narrow, almost lacking ventral process, 0.15–0.2 times pleotelson length.



**FIGURE 17.** *Dubinectes nodosus* (Menzies, 1962). Male and female, Stn. 137–4, pereopods.



**FIGURE 18.** *Dubinectes nodosus* (Menziés, 1962). Male and female, Stn. 135–4, pleopods 1 and 2.

*Redescription.* Body (Figs 12 and 13) length 2.5 times pereonite 5 width (2.3–2.5). Head length 0.7 width (0.6–0.7); anterolateral ledge sloping, rostrum length 0.9 times rest of head (0.7–0.9), concave distally, rostrum in females broader than in males; clypeus

twice as broad and 0.5 times length of labrum.

*Pereonite 1* slightly wider (1.08) than head, pereonite 4 length 0.4 times pereonite 1 length. Natasome 1.4 times length of anterior body (1.2–1.6); lateral outline almost uninterrupted; pereonite 7 0.9 times length of pereonite 5 (0.75–0.9). Pleotelson slightly longer than head, posterior rim narrow, ventral projection 0.15 times pleotelson length (0.15–0.2), preanal ventral ridge low.

*Antenna 1* of male (Fig. 15) article 1 length equals width, distolateral projection reaching two thirds of article 2, setation: 3 dorsal broom setae, lateral row of small, simple setae and 2 distomedial simple setae; article 2 length 0.6 times article 1, with 3 broom distal setae; article 3 subequal to article 1, article 4 0.1 times length of article 3, with 2 distal broom setae, the other 8 flagellar articles (the last broken off) longer than article 4, all articles after 7 each with simple seta. Antenna 1 of female (Fig. 12) 0.2 times body length, articles more slender than in male.

*Antenna 2* (Fig. 12) 1.5 times body length. Article 5 2.4 times length of articles 1–4, with 4 stout, medial setae and many small, simple lateral setae, article 6 1.5 times length of article 5, with many sparse, simple setae along article. Flagellum 1.6 times longer than article 6, article 1 elongate, the following, about 30, articles almost half as the length of article 1.

*Mandibles* (Fig. 14): incisor process with 3 weak cusps; lacinia mobilis of left mandible stout, 0.9 times length of incisor process, with 8 teeth; spine row with 4 and 5 spines respectively; palp article 2 2.5 times longer than article 1, with 1 stout distal seta and small marginal seta, article 3 with row of marginal setulose setae.

*Maxilla 1* (Fig. 14) lateral endite 1.4 times width of mesial endite.

*Maxilliped* (Fig. 14) basis 2.5 times longer than wide, endite with 4 coupling hooks, distal margin with 4 large fan setae and numerous simple, slender setae; palp article 2 lateral margin slightly convex, serrated, 1.3 times longer than straight medial margin, with 8 simple setae; article 3 medial margin slightly convex, 1.2 times longer than medial margin of article 2, with dense row of setulose setae; article 4 laterally 2.3 times length of articles 3, medial lobe half as the length of article 5, with 5 distal setae, article 5 with 6 distal setae. Epipod length 1.5 times width, and 0.9 times basis length, distal angle acute.

*Pereopods of mature male* (Fig. 16): pereopod 1 0.3 times body length, length ratios of ischium-propodus to basis: 0.5, 0.3, 1.0, 0.75, 0.2; basis with sparse small setae; merus with 4 stout flagellate ventral setae, carpus with 17 stout ventral and 2 simple distodorsal setae; basis-carpus of the same width, propodus 0.5 times carpus width, with small marginal setae. Pereopods 2–4 bases subequal in size, more than half basis 1 width, basis 3 slightly shorter than or equal to 2 and 4. Pereopod 5 0.7 times pereopod 2 length, length ratios of ischium-dactylus to basis: 1.4, 0.6, 1.6, 1.4, 0.7; ischium with 4 broom and 1 plumose dorsal setae and 2 small simple ventral setae; merus with 2 plumose dorsal setae; carpus 1.2 times width; propodus 1.6 times width; dactylus with stout dorsal claw that is half length of slender ventral seta. Pereopod 6 length ratios of ischium-dactylus to basis:

0.9, 0.5, 1.3, 1.0, 0.4; basis with 3 dorsal setae; ischium with 5 long dorsal and 5 shorter ventral setae; merus with 2 ventral setae; carpus 1.1 times width; propodus 2 times width. Pereopod 7 length ratio of ischium-dactylus to basis: 1.1, 0.5, 1.4, 1.2, 0.6; basis with 1 ventral seta; ischium with long 4 dorsal and 5 simple ventral setae; merus with 4 ventral setae; carpus 1.2 times width; propodus 1.7 times width.

*Pereopods of immature male* (Fig. 17): pereopod 2 length ratios of ischium-dactylus to basis: 0.5, 0.2, 1.0, 0.7, 0.5; basis with sparse small ventral setae; ischium with 2 ventral setae; merus with 2 ventral and 2 dorsal setae; carpus with 14 ventral stout setae, 5 slender flagellate dorsal and 3 distodorsal simple setae; propodus with 7 long ventral flagellate, some simple dorsal setae and 8 distal whip long setae; dactylus twice length of propodus distal setae. Pereopod 3 shorter than pereopods 2 and 4; length ratios of ischium-dactylus to basis: 0.4, 0.3, 0.9, 0.7, 0.5; basis with small simple ventral setae; ischium with 1 dorsal seta; merus with 3 distal setae; carpus with 7 stout ventral setae and 4 simple small dorsal setae; propodus with 1 stout and 3 slender simple setae ventrally, 5 distal whip setae. Pereopod 4 length ratios of ischium-dactylus to basis: 0.4, 0.2, 0.9, 0.9, 0.4; all articles with only simple sparse setae; carpus and propodus avoiding stout flagellate setae, propodus narrowest and longest among pereopods 1–4, with some small simple setae along article and 4 distal long setae.

*Pereopods of female* (Fig. 17) similar to those in small males. Pereopod 1 of female length ratios of ischium-dactylus to basis: 0.4, 0.2, 1.0, 0.7, 0.25; basis with many small setae; ischium with 1 ventral seta, merus with 3 ventral and 2 dorsal setae; basis-merus of the same width, carpus 0.6 times as wide as basis, with 5 small ventral and 2 simple dorsal setae; propodus 0.6 times as wide as carpus, with 5 ventral and 9 dorsal small setae.

*Pleopods* (Fig. 18): pleopod 1 of male 2.4 times width, with small ventral setae on distal third; distal margin: lateral lobes 0.1 times length of total pleopod, each with acute lateral projections and several distal small setae; medial lobes almost as wide and 0.5 times length of lateral lobes, each with two small distal setae. Pleopod 2 of male protopod 1.6 times width, and 1.1 times width of pleopod 1, with 2 lateral submarginal setae, stylet of endopod 2.2 times longer than protopod, distal part of exopod wider in ventral view before tapering medial hook. Pleopod 2 of female (Fig. 15) 0.8 times width. Pleopod 3 endopod 1.3 times width, exopod 1.2 times endopod length, reaching its distal margin, basal article 0.4 times width of endopod, distal article 0.4 times length and 0.3 times width of basal article, with 1 distal simple seta and dense row of long hair-like lateral setae. Pleopod 4 endopod 1.4 times width, exopod 0.4 times width and 0.9 times length of endopod, with dense row of long hair-like lateral setae. Pleopod 5 endopod 1.4 times width.

*Uropod* (Fig. 15) 0.3 times pleotelson length; protopod proximal part shorter than distal part, medial projection with 7–8 long whip setae, endopod 0.4 times width and almost equal protopod length, with about 10 distal setae (1 or 2 broom and 8 simple); exopod 0.5 (male) and 0.4 (female) times length and width of endopod, with 4 distal setae.

### Remarks

The body habitus of this species closest to *Eurycope*, because the natasome outline is almost smooth, the rostrum, especially in females, is not as extremely long and thick as in *D. acutitelson* and *D. acutirostrum*. The rostrum is almost the same width and slightly longer than the article 1 of antenna 1. *D. nodosus* is similar to *D. intermedius* **sp. nov.** The main characters which differentiate *D. nodosus* are: 1. the narrow posterior rim, 0.15–0.2 times the pleotelson length; 2. the ventral process is almost absent. *D. nodosus* is widely distributed and was collected at almost every station during ANDEEP.

### Distribution

South-eastern Atlantic: Cape Basin at a depth 4574–4960 m; western sector of the Southern Ocean: Weddell Sea from the 0 meridian to the Antarctic Peninsula at a depth 1121–4976 m.

### *Dubinectes intermedius* **sp. nov.**

(Figs 19–22)

*Eurycope acutitelson* Menzies, 1962: 143 (partim).

### Material examined

**Holotype** (ZMH 41161), male (3.4 mm), ANDEEP III Stn. 110-8 March 2005 64°59.20'S, 43°02.05'W, 4698 m; **paratypes** (ZMH 41162) manca female 2.1 mm, natasome of male 3.4 mm, the same locality.

Additional material.—1 male, 2 females and 2 mancas (1.8–2.9 mm), which were together with 7 paratypes of *D. acutitelson* (AMNH 12098): Biotrawl No 52, Vema-14-28, 28 March 1958, south-western flank of the Schmidt-Ott Rise southwest of Capetown, 41°03.5'S, 07°49'E, 4960 m.

### Etymology

*intermedius* is referring to the position of the species, possessing characters that are intermediate between two other species.

### Diagnosis

Rostrum only slightly longer than article 1 of antenna 1; natasome about 1.5 times anterior body part length; anterolateral margins of pereonites 6, 7 and pleotelson with limited anterodorsal extension; posterior rim of pleotelson with rounded posteroventral process 0.35 times pleotelson length.

### Description

Body (Fig. 19) length 2.6 times pereonite, 5 times width. Head length 0.7 times width;

anterolateral margins with weak ledge, rostrum 0.7 times length of rest of head, concave distally; clypeus 2.1 times as broad and 0.5 times length of labrum.

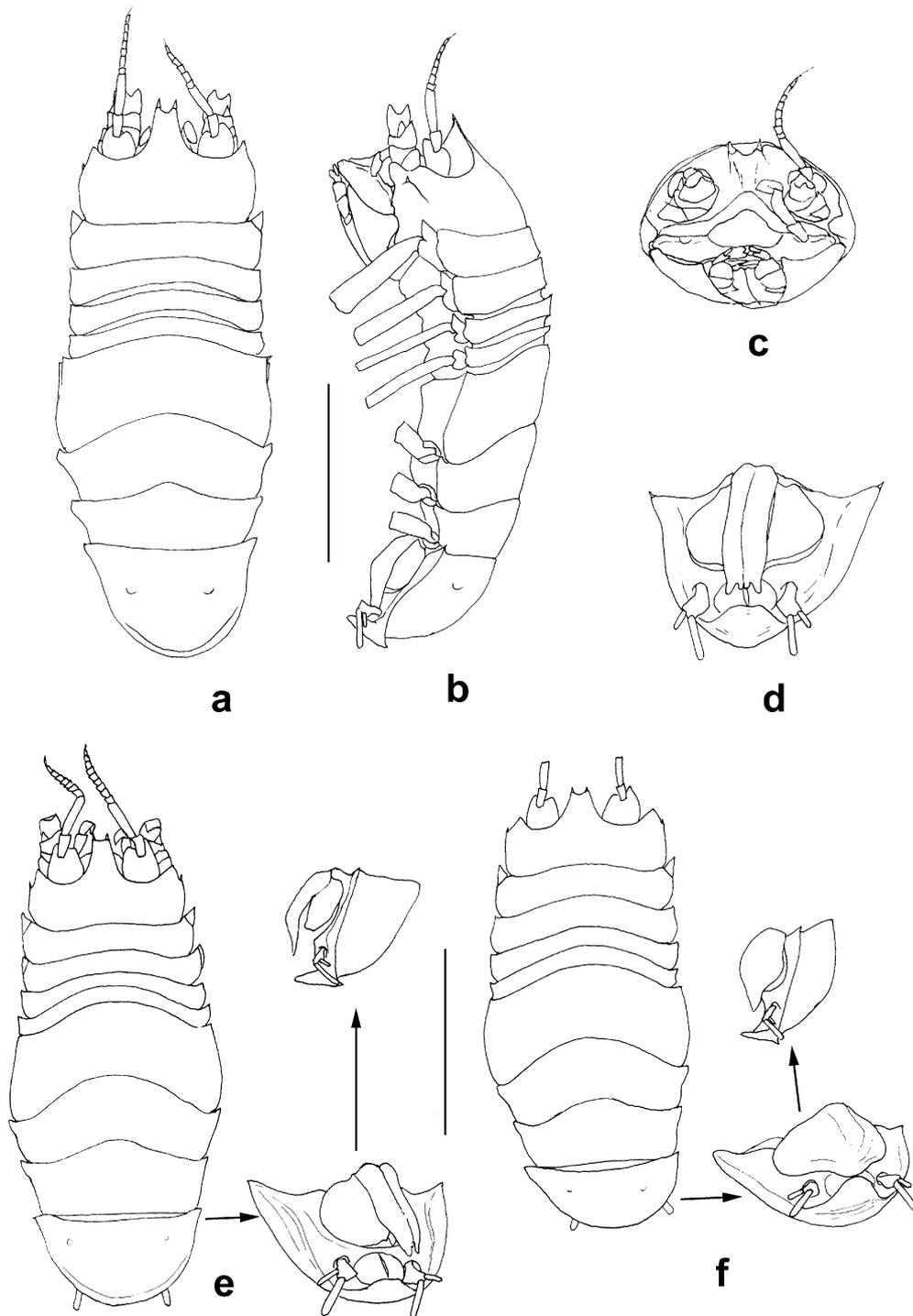
*Pereonite 4* about half the length of pereonite 1. Natasome 1.4 times anterior body part length; pereonite 7 0.8 times length of pereonite 5; pleotelson slightly longer than head, posteroventral projection 0.35 times pleotelson length, preanal ventral ridge low.

*Antenna 1* of male (Fig. 21) article 1 1.2 times width, setation: 3 broom dorsal setae, and 3 simple distomedial setae; article 2 0.5 times length of article 1, with 2 broom distal setae; article 3 almost equal in length to article 1, article 4 0.15 times length of article 3, with 1 broom and 1 simple distal setae, other 7 flagellar articles each with simple seta, last article with aesthetasc. Antenna 1 of female (Fig. 20) article 2 length 0.65 times length of article 1, article 3 slightly shorter than article 1, flagellum of 5 articles last one with 1 aesthetasc and 5 setae.

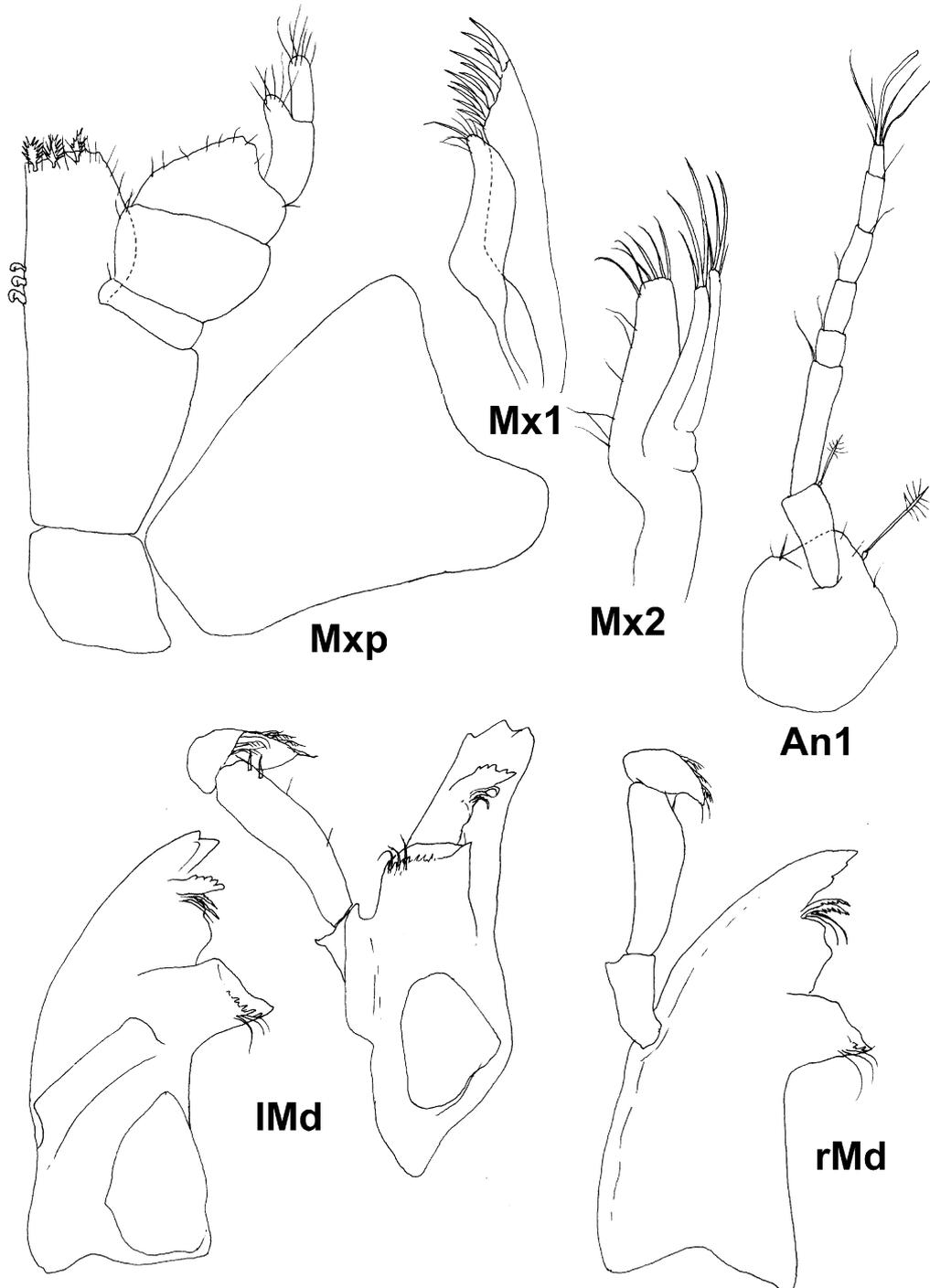
*Mandibles* (Fig. 20) incisor process with 3 weak cusps; lacinia mobilis of left mandible slender, 0.8 times length of incisor process, with 5 teeth; spine row with 3 and 4 spines respectively; palp article 2 1.9 times length of article 1, with 2 stout distal setae and small marginal setae.

*Maxilliped* (Fig. 20) basis 2.1 times width, endite with 3 coupling hooks, distal margin with 3 large fan setae and numerous simple slender setae; palp article 2 lateral margin slightly convex, 1.3 times longer than straight medial margin; article 3 medial margin almost straight, 1.6 times longer than medial margin of article 2, with row of setulose setae; article 4 laterally 1.8 times length of articles 3, medial lobe half as the length of article 5, with 6 distal setae, article 5 with 7 distal setae. Epipod 1.2 times width, equal to length of basis, distal angle rectangular.

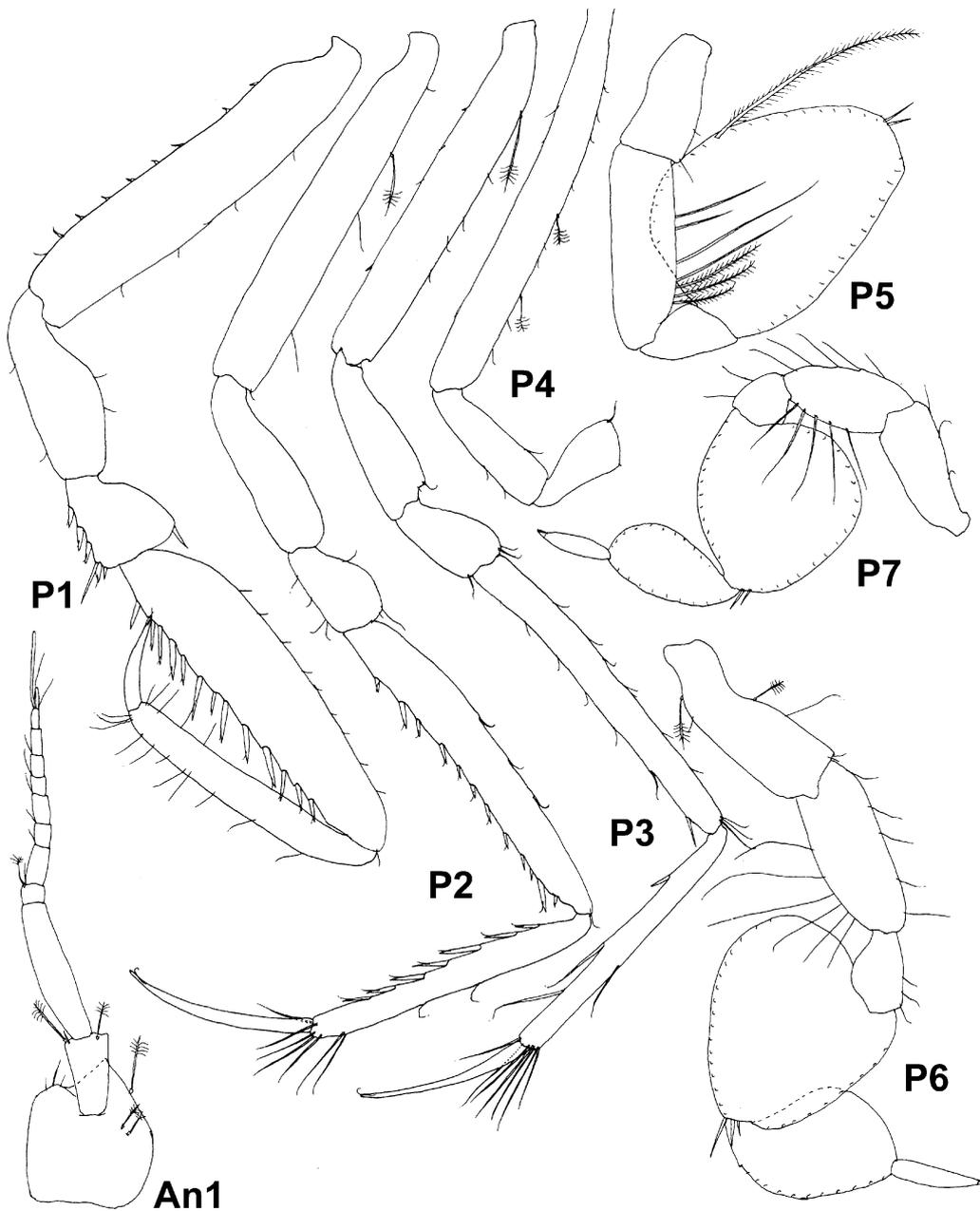
*Pereopods* (Fig. 21): pereopod 1 0.3 times body length, length ratios of ischium-propodus to basis: 0.5, 0.3, 0.9, 0.7, 0.2; basis with stout ventral setae and few small dorsal setae; merus with 5 stout ventral setae and distodorsal seta; carpus with 12 stout ventral and small simple distodorsal setae; propodus 0.5 times carpus width, with slender marginal setae. Pereopods 2–4 bases subequal in size, more than half basis 1 width, basis 3 slightly shorter than or equal to 2 and 4. Pereopod 2 length ratios of ischium-propodus to basis: 0.5, 0.3, 0.9, 0.75, 0.5; carpus with 13, stout ventral setae, 3 small dorsal setae, propodus with 7 stout ventral setae, 2 small dorsal setae and 7 long whip distal setae; pereopod 3 length ratios of ischium-propodus to basis: 0.5, 0.3, 0.95, 0.8, 0.45; carpus with 7 ventral and 9 small dorsal setae, propodus with 3 long ventral setae, 1 small dorsal seta and 7 long whip distal setae. Pereopod 5 length ratios of ischium-carpus to basis: 1.7, 0.8, 2.2; ischium with 7 plumose dorsal setae; carpus 1.3 times width; Pereopod 6 length ratios of ischium-dactylus to basis: 0.85, 0.4, 0.95, 0.8, 0.4; basis with 2 dorsal and 2 ventral setae; ischium with 6 long dorsal and 5 shorter ventral setae; merus with 3 ventral setae; carpus 1.1 times width; propodus 1.6 times width. Pereopod 7 length ratio of ischium-dactylus to basis: 1.0, 0.4, 1.2, 0.9, 0.55; basis with 3 ventral setae; ischium with 5 dorsal and 5 ventral setae; merus with 2 ventral setae; carpus 1.0 times width; propodus 1.9 times width.



**FIGURE 19.** *Dubinectes intermedius* sp. nov. Male, holotype ZMH 41161, a, dorsal view; b, lateral view; c, head, frontal view; d, pleotelson ventral view; e, f, specimens which were together with the paratypes of *D. acutitelson*: e, immature male, dorsal view with attached pleotelson ventral and lateral views; f, female, dorsal view with attached pleotelson ventral and lateral views.



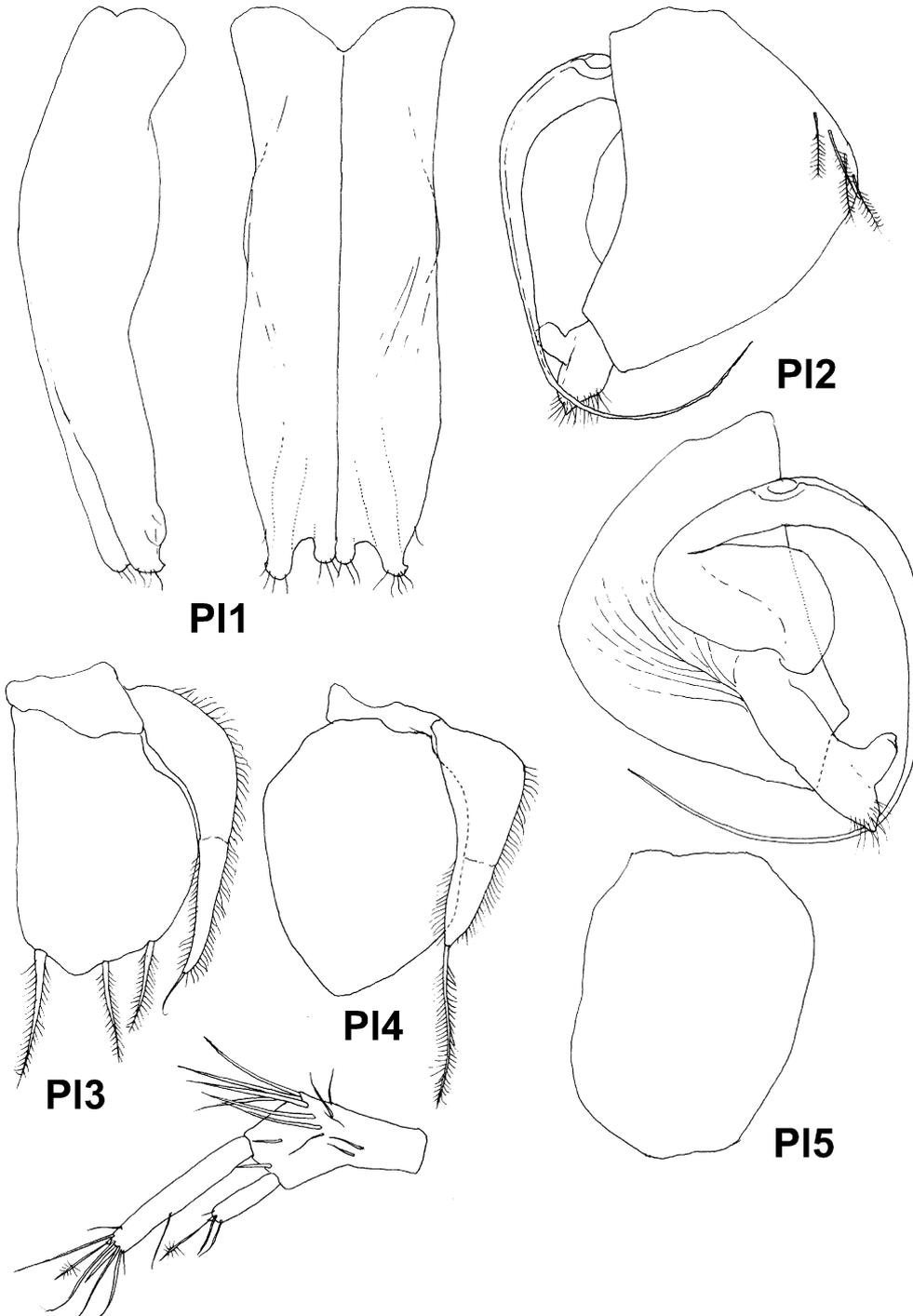
**FIGURE 20.** *Dubinectes intermedius* sp. nov. Immature female, paratype ZMH 41162, mouthparts and antenna 1.



**FIGURE 21.** *Dubinectes intermedius* sp. nov. Male, holotype ZMH 41161, pereopods and antenna 1.

*Pleopods* (Fig. 22): pleopod 1 of male 2.6 times width, distal margin: lateral lobes 0.05 times length of total pleopod, each with acute lateral projections and several distal small setae; medial lobes almost as wide and 0.7 times length of lateral lobes, each with 3 small distal setae. Pleopod 2 of male protopod 1.6 times width, and equal in width to pleopod 1,

with 4 lateral submarginal setae, stylet of endopod 2.2 times protopod length, exopod acute distally, medial hook equal in length to distal part. Pleopod 3 endopod 1.4 times



**FIGURE 22.** *Dubinectes intermedius* sp. nov. Natasome of male, paratype ZMH 41162, pleopods and uropod.

width, exopod 1.1 times length of endopod, reaching its distal margin, basal article 0.4 times width of endopod, distal article 0.4 times length and 0.3 times width of basal article, with 1 distal simple seta and dense row of long hair-like lateral setae. Pleopod 4 endopod 1.3 times width, exopod 0.4 times width and 0.9 times length of endopod, with dense row of long hair-like lateral setae. Pleopod 5 endopod 1.4 times width.

*Pleopod 2 of female* (Fig. 19f) 0.8 times width.

*Uropod* (Fig. 22) 0.3 times pleotelson length; protopod 2 times longer than broad, with 6 long whip setae on medial projection and several setae on distal half, endopod 0.4 times width and equal length of protopod, with with 1 broom and 7 simple distal setae; exopod 0.4 times endopod length, with 3 setae distally.

#### Remarks

*D. intermedius* **sp. nov.** takes a middle position between *D. acutitelson* and *D. acutirostrum* on one side and *D. nodosus* on the other. It is more similar to the latter in body shape, shape of the rostrum, and the natasome in dorsal view, but the new species has a stronger cuticle, a posteroventral projection on the posterior rim of the pleotelson, more projected anterolateral margins of pereonites 6, 7 and pleotelson than in *D. nodosa*. These characters make *D. intermedius* **sp. nov.** similar to *D. acutitelson* and *D. acutirostrum*, but they are not as well developed as in these species.

The relatively long posteroventral projection of the pleotelson was probably one reason why Menzies identified specimens of the new species as *D. acutitelson*, but the projection is not so strong and acute as in *D. acutitelson* and the range of the other characters, discussed above, helps to distinguish these species.

#### Distribution

South-eastern Atlantic: southern part of the Cape Basin at a depth 4960 m; western sector of the Southern Ocean: Weddell Sea at a depth 4698 m.

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