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APANTHURA, APANTHURETTA AND *APANTHUROPSIS* GEN. NOV. (CRUSTACEA: ISOPODA: ANTHURIDAE) FROM SOUTH-EASTERN AUSTRALIA

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Abstract

Nine new species of *Apanthura* Stebbing (*A. banskia*, *A. callitris*, *A. drosera*, *A. isotoma*, *A. lambertia*, *A. mirbelia*, *A. styphelia*, *A. thryptomene* and *A. xanthorrhoea*), three new species of *Apanthuretta* Wägele (*A. correa*, *A. olearia* and *A. pimelia*) and *Apanthuropsis richea*, new genus and new species, are described, figured and keyed. Relationships between the three genera are discussed.

Introduction

Recently, numerous south-eastern Australian species of the family Paranthuridae have been described (Poore, 1978, 1981, 1984). This paper begins to address the larger related family, Anthuridae, and follows an earlier contribution on the genus *Haliophasma* (Poore, 1975). Poore (in the papers cited) has explained abbreviations and conventions used in the figures and the sources of material on which the study is based. In addition, samples from Port Hacking, New South Wales, have been made available by the Commonwealth Scientific and Industrial Research Organization (CSIRO), Fisheries and Oceanography Division, Cronulla, NSW. Material collected during the 1970s from estuaries by the New South Wales State Fisheries (NSWSF) has also been included. Material from Bass Strait collected during the National Museum of Victoria's Bass Strait Survey (BSS stations) and from Cape Paterson, Vic. (CPA stations) contributed additional specimens.

Specific epithets for new species have been chosen from genera of the Australian flora and are used as nouns in apposition. This follows a pattern established for *Paranthura* (Poore, 1984).

Material is lodged in the Museum of Victoria, Melbourne (NMV), the Australian Musuem, Sydney (AM), the Queensland Museum, Brisbane (QM), the South Australian Musuem, Adelaide (SAM), the Tasmanian Museum and Art Gallery, Hobart (TM), and the Queen Victoria Museum, Launceston (QVM).

Apanthura, Apanthuretta and Apanthuropsis

The three genera included in this contribution share a 5-articled maxillipedal palp, fused pleonites, a long bean-shaped uropodal endopod and triangular or trapeziform fifth article on the walking legs (typical species in figure 1). They differ from the related genera *Cyathura* and *Mesanthura* in that the terminal article of the maxilliped is small and triangular and the uropodal endopod is longer.

The genus *Apanthura* historically has contained numerous species separated by only slight morphological differences (Kruczynski and Myers, 1976; Kensley, 1979). Wägele (1981a, b) was the first to attempt to divide the species when *Apanthuretta* was differentiated from *Apanthura*. The major character separating the two genera is structure of the pleon (pleonites 1-5 fused in *Apanthura*, pleonites 1-4 separated by dorsal folds in *Apanthuretta*). Wägele (1981a, b) maintained that species of *Apanthuretta* lack a maxillipedal endite. This is not so in Australian species nor in *A. magnifica* as Kensley's (1980) scanning electron micrograph demonstrates. Wägele (1981b) interpreted the endite in Kensley's and others' figures as a maxillar endite but both the maxilliped and maxilla of Australian species possess endites (e.g. fig. 30). Possession of maxillipedal endite, the presence of terminal setae on the telson, similar mandibular palp, and the elongate uropodal endopod suggest that the two genera are closely related.

Although pleonal structure is sometimes a character of doubtful value (e.g. in *Paranthura*,

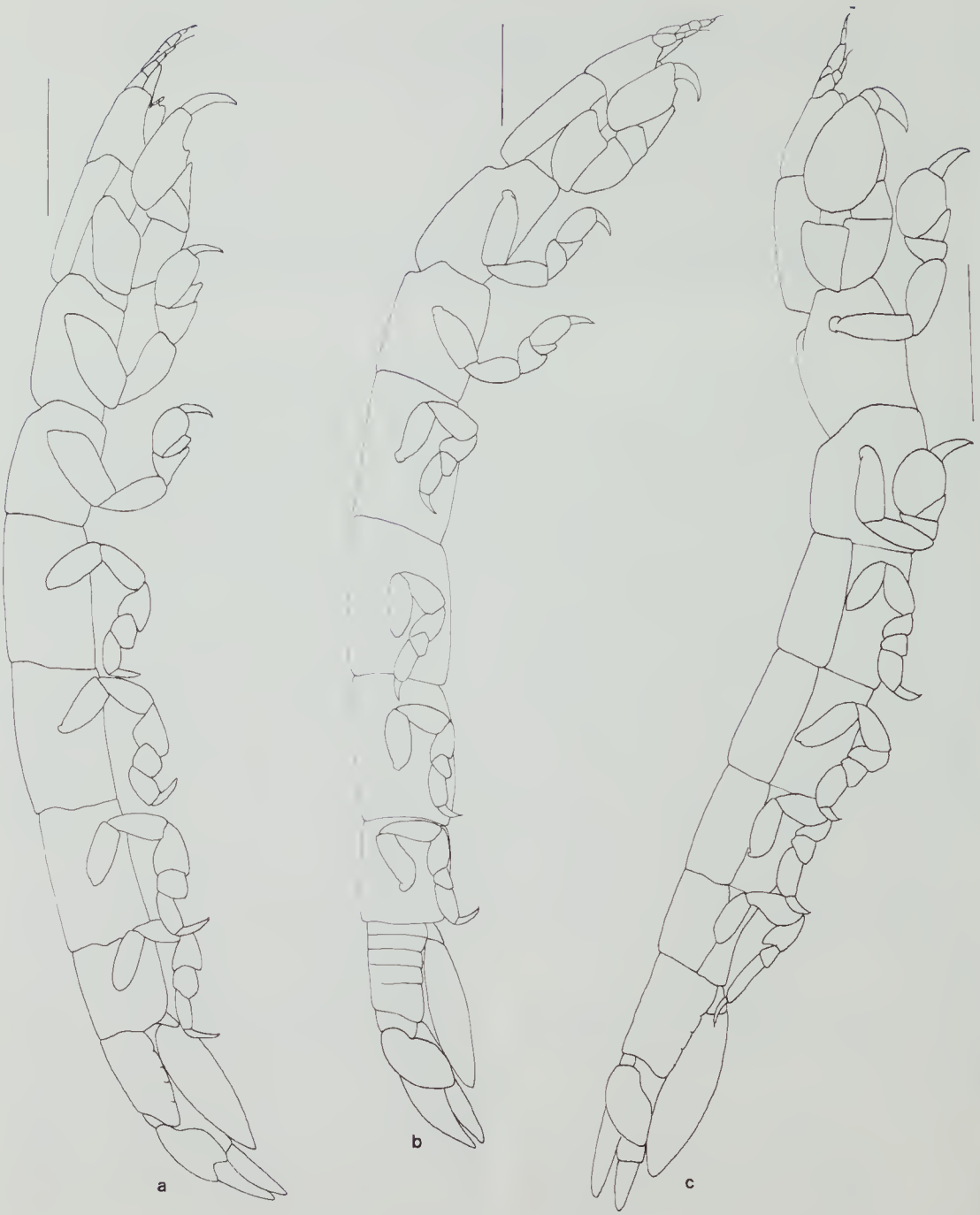

Figure 1. a, *Apanthura isotoma*, paratype juvenile, 9.0 mm, NMVJ2733; b, *Apanthuretta olearia*, paratype juvenile, 12.4 mm, NMVJ2231; c, *Apanthuropsis richea*, paratype juvenile, 7.4 mm, NMVJ2300. Scales = 1 mm. Pereopods are figured as if completely flat, not as normally held.

see Poore, 1984), in this case the reality of *Apanthuretta* is upheld by other character differences. The pleon is longer than wide in *Apanthuretta*, only as long as wide in *Apanthura*. The mesial setae of the palm of pereopod 1 of *Apanthuretta* are quite stout and articulate in shallow circular depressions (Kensley, 1980: fig. 1d); those on *Apanthura* are of more typical form. The cutting edge of this limb is definitely toothed in most species of *Apanthura*, but often only stepped in species of *Apanthuretta*. Males of *Apanthuretta* possess a flagellum on antenna 1 of more than ten articles; in *Apanthura* ten or fewer are found.

Examination of descriptions of *Apanthura* in the literature reveals several apparent conflicts which question the separation of the two genera. Kensley (1980) pointed out that the pleonites of *A. magnifica* Menzies & Frankenberg were fused (meaning that these segments do not articulate) but that dorsal integumental folds separate pleonites 1-4. His SEMs clearly differentiate these folds from true sutures. We suspect that some so-called species of *Apanthura* figured without these dorsal folds may in fact possess them (e.g., *A. mana* Kensley, *A. motasi* Negoescu, *A. libyana* Negoescu). We are inclined to place these species in *Apanthuretta* on the basis of elongate pleon and elongate male antenna 1. *Apanthura californiensis* Schultz was originally figured with six free pleonites. Specimens seen by us confirm that there is in fact no fold between pleonites 4 and 5 and the species belongs, probably with *A. inornata* Miller & Menzies, in *Apanthuretta*.

Typically pleonites of *Apanthura* are fused, sutures between them are visible only ventrolaterally. In one Australian species, *A. mirbelia*, the sutures are apparent dorsally but do not meet in the middle. Two Mediterranean species, *A. corsica* Amar and *A. tyrrhenica* Wägele, are figured with separate pleonites (Wägele, 1980) but in all other respects the two are typcial of *Apanthura*.

Two species-groups are apparent among Australian *Apanthura* (s.s.). These are not given formal rank here because one intermediate species was found and because descriptions of species from elsewhere do not allow them to be assigned to group with confidence.

Species of the first group have a single minute seta on the second article of antenna 1 and a single long seta on the third (in addition to 3-4 dorsal terminal setae); there are no long lateral setae on the first article. Species of the second group possess at least six long lateral setae on the second article of antenna 1 and at least two on the third article; long setae may be present on the first article. The marginal setal row on the uropodal endopod is continuous in species-group 1 but is broken in species-group 2, with three brush-setae in the hiatus. The apex of the telson tends to be more acute in species-group 2 than in species-group 1. Finally, pereopods 4-7 of species of group 1 possess fourth and fifth articles with short anterior margins and barely convex posterior margins. In species-group 2 these articles have longer anterior margins and lobed setose posterior margins.

The type-species, *Apanthura sandalensis* Stebbing, of which the holotype was examined, has all the features of species-group 1. The Australian species with affinities to both groups is *A. banksia*.

The new genus *Apanthuropsis* shares with *Apanthura* and *Apanthuretta* a maxilliped with five articles, similar pereopod 1 and pereopods 4-7 and antennae. However numerous differences suggest that the similarity may not be more than superficial. Only a single species is known.

Key to south-eastern Australian species of *Apanthura*, *Apanthuretta* and *Apanthuropsis*

Every effort has been made to avoid qualitative comparisons in this key but this has not always been possible; the user is advised to refer to the figures when in doubt.

1. Pereopods 2 and 3 with sixth article similar to that of pereopod 1, ovoid; maxilliped without endite, article 3 longer than wide; mandibles asymmetrical, molars fitting as tooth and socket ..... *Apanthuropsis*
   (monotypic *A. richea*, figs. 34-37)

– Pereopods 2 and 3 with sixth article different from that of pereopod 1, elongate; maxilliped with endite, article 3

wider than long or barely longer than wide; mandibles symmetrical, molars with flat opposing surfaces 2

2. Pleonites 1-5 fused (rarely apparently separated by dorsal folds); pleon about as long as pereonite 7; male antenna 1 flagellum of about 10 articles ..... *Apanthura* 3

— Pleonites 4-5 only fused; pleon longer than pereonite 7; male antenna 1 flagellum of about 20 articles ..... *Apanthuretta* 11

3. Antenna 1 bearing a single minute seta laterally on article 2 (in addition to brush-setae); pereopods 2-7 without strong lobes on articles 4 and 5, only moderately setose; dorsal lobe of uropodal exopod reaching as far posteriorly as ventral lobe 4

— Antenna 1 bearing at least 6 long setae laterally on article 2 (in addition to brush-setae): (not more than 3 long setae in *A. banksia*); pereopods 2-7 with setose lobes on articles 4 and 5; dorsal lobe of uropodal exopod not reaching as far posteriorly as ventral lobe 8

4. Pleonal sutures visible only dorsolaterally; apex of telson broadly rounded; male pereopod 1 without a palmar tooth, article 5 grossly and eomplexly expanded distoposteriorly ..... *Apanthura mirbelia* (figs. 15-17)

— Pleonal sutures not visible dorsally; apex of telson narrowly rounded; male pereopod 1 with palmar tooth, article 5 only slightly expanded 5

5. Integument pigmented; telson 2.5× as long as wide; pereopod 1 palm oblique with a well-developed eonical tooth; male with a large ventral swelling at base of maxillipeds; male pereopod 1 with a strong tooth on article 5 ..... *Apanthura xanthorrhoea* (figs. 23, 24)

— Integument not pigmented; telson less than 2× as long as wide (rarely more than 2×); pereopod 1 palm axial and with a small tooth; male with a poorly-developed ventral chin, or none; male pereopod 1 with tooth on article 5 similar to juvenile 6

6. Telson with numerous lateral setae on distal third; head with a prominent ventral lobe at base of maxillipeds ..... *Apanthura thryptomene* (figs. 20-22)

— Telson with 1-2 pairs of lateral setae about 3/4 way along; head without a ventral lobe 7

7. Telson less than 2× as long as greatest width; male pereopod 1 with a conical tooth on palm distal to midpoint ..... *Apanthura styphelia* (figs. 18, 19)

— Telson 2.3× as long as greatest width; (male not known) ..... *Apanthura drosera* (figs. 7, 8)

8. Uropodal endopod having a complete distolateral marginal setal row; telson apically rounded and with few dorsal setae; antenna 1 article 2 with 1-3 lateral setae ..... *Apanthura banksia* (figs. 2, 3)

— Uropodal endopod having rows of distal and lateral marginal setae separated by a distinct hiatus; telson tapering apieally (or, if rounded, with pairs of dorsal setae); antenna 1 article 2 with at least 6 lateral setae 9

9. Telson having lateral margins eonvex, dorsal setae in pairs near midline; male pereopod 1 with a palmar tooth ..... *Apanthura callitris* (figs. 4-6)

— Telson having lateral margins straight or coneave distally, dorsal setae near margin; male pereopod 1 without a palmar tooth 10

10. Telson tapering from proximal third; male pereopod 2 with a truneate blade on the palm and a setose triangular artiele 5; pereonite 1 of male without a ventral keel ..... *Apanthura lambertia* (figs. 12-14)

— Telson tapering only on distal third; male pereopod 2 with a straight palm and a strong truncate lobe on article 5; pereonite 1 of male with a ventral keel ..... *Apanthura isotoma* (figs. 9-11)

11. Antenna 1, first 2 articles each with at least 2 lateral long setae; uropodal endopod elongate (about 2× as long as broad ..... *Apanthuretta pimelia* (figs. 31-33)

-- Antenna 1, first artiele without lateral setae, second with at most 1 long seta; uropodal endopod compact (about 1.5× as long as broad) 12

12. Telson with evenly eonvex lateral margins and rounded apex, a single pair of long

dorsal setae; uropodal exopod widest distally, its posterior apex short and acute; male without a developed chin ..... *Apanthuretta olearia* (figs. 28-30)

— Telson tapering distally to a narrowly rounded apex, with 2 pairs of long dorsal setae; uropodal exopod widest at midpoint, its posterior apex long and rounded; male with a well-pronounced chin ..... *Apanthuretta correa* (figs. 26-27)

Apanthura Stebbing

Apanthura Stebbing, 1900: 621.—Barnard, 1925: 141.—Kruczynski & Myers, 1976: 354ff.—Wägele, 1981b: 116 (major references only).

Diagnosis: Integument smooth, sometimes pigmented. Eyes present, rarely absent. Antenna 1 flagellum short, of 3 articles, the last minute and bearing 3 aesthetascs. Antenna 2 flagellum short, 2-4 articles. Mandibles symmetrical, not sexually dimorphic; incisor, lamina dentata and blunt molar present; palp 3-articled, article 3 one-third length of article 2, with 3-4 terminal setae. Maxilliped of five articles and bearing an acute endite with terminal seta; article 3 wider than long; article 4 usually with a row of mesial setae; article 5 oblique, subterminal, much smaller than 4, with 4-6 apical setae.

Pereopod 1 subchelate, article 6 swollen, palm usually with a tooth, mesial setae not especially stout. Pereopods 2 and 3 with article 6 only little more robust than posterior pereopods. Pereopods 4-7 with article 5 triangular-trapeziform, sometimes strongly lobed posteriorly, its anterior margin free.

Pleon short (about as long as pereonite 7), as long as wide; typically pleonites 1-5 fused dorsally (rarely free); pleonite 6 free from others and from telson. Pleopod 1 exopod operculiform, endopod setose; pleopods 2-5 setose. Uropodal endopod as long as peduncle, marginal lateral setal row either continuous or with a distolateral hiatus; exopod broad, excavate distally at least to the extent that there is a definite dorsodistal lobe. Telson with two basal statocysts, dorsal surface and apex with long setae.

Male antenna 1 flagellum with about 10 isometric articles bearing numerous aesthetascs; as long as head.

Type-species: *Apanthura sandalensis* Stebbing, 1900 (Holotype in BMNH).

Remarks: *Apanthura* in Australia is confined to species in which there are no complete dorsal folds between the pleonites. As has been noted previously (Kensley, 1979) species of *Apanthura* are separated on only subtle morphological differences which are often difficult to quantify. Appreciation of the two species-groups defined above aids in species recognition and, we hope, will encourage authors to describe species in greater detail in future.

As is true in *Apanthuretta* and *Paranthura* (Poore, 1984) the recognition of males is extremely helpful in definition of species.

Apanthura banksia sp. nov.

Figures 2, 3

Material examined: 5 juveniles, 6.9-11.9 mm: *Holotype*: juvenile, 11.9 mm AMP32626 (with one slide). NSW, Jervis Bay (35°03′S., 150°44′E.), NSWSF stn 54, 1972.

Paratypes: NSW, type locality, NMVJ3184 (1 specimen). NSW, Lord Howe Island, rocks off Signal Point, lagoon, eel grass on coarse shelly sand, 1.5 m, J. K. Lowry, 9 May 1977 (stn LHA-1), AMP29806(1). Lord Howe Island, North Bay, *Zostera* on sand, J. K. Lowry and G. D. Fenwick, 12 May 1977, AMP29808(2).

Description: Integument not pigmented. Eyes present. Head 1.2× as long as wide, barely tapering anteriorly. Antenna 1 peduncle with 1-3 and 1 long marginal setae on articles 2 and 3 respectively. Maxilliped article 4 with 4 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, not exceeding distal margin of article 4.

Pereopod 1 article 4 with 7 mesial setae on anterior margin; article 5 with 7 mesial setae, with a pronounced distal tooth; article 6 palm with a pronounced tooth distal to midpoint, 11 marginal setae and 17 setae on mesial face. Pereopod 2 article 4 with 3 anterior setae, with a setose posterior margin not produced distally; article 5 well produced distally into a blunt setose lobe; article 6 ovoid, mesially setose, without long marginal setae. Pereopod 3

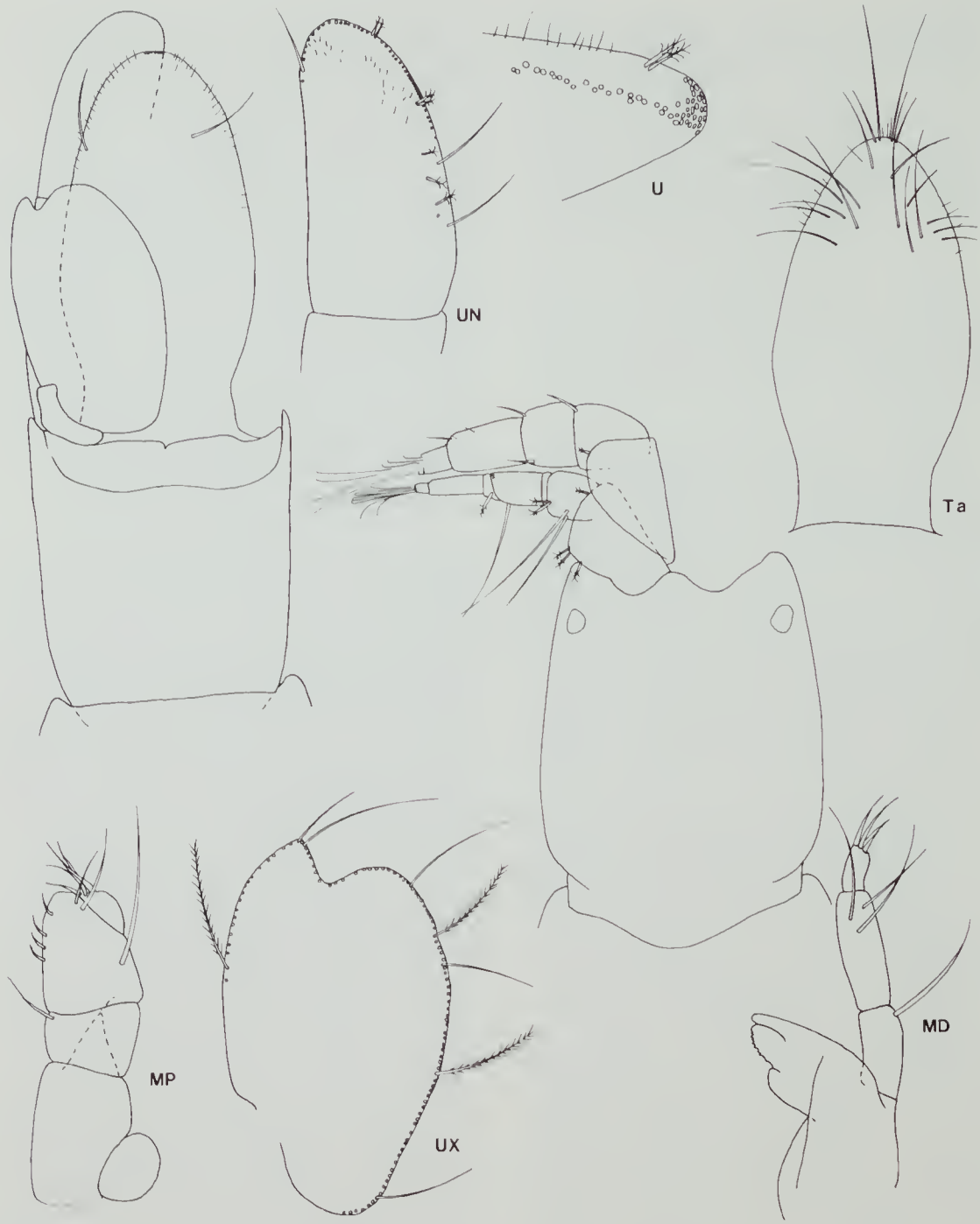

Figure 2. *Apanthura banksia*. Holotype juvenile, 11.9 mm; a, juvenile, 7.6 mm, AMP29809.

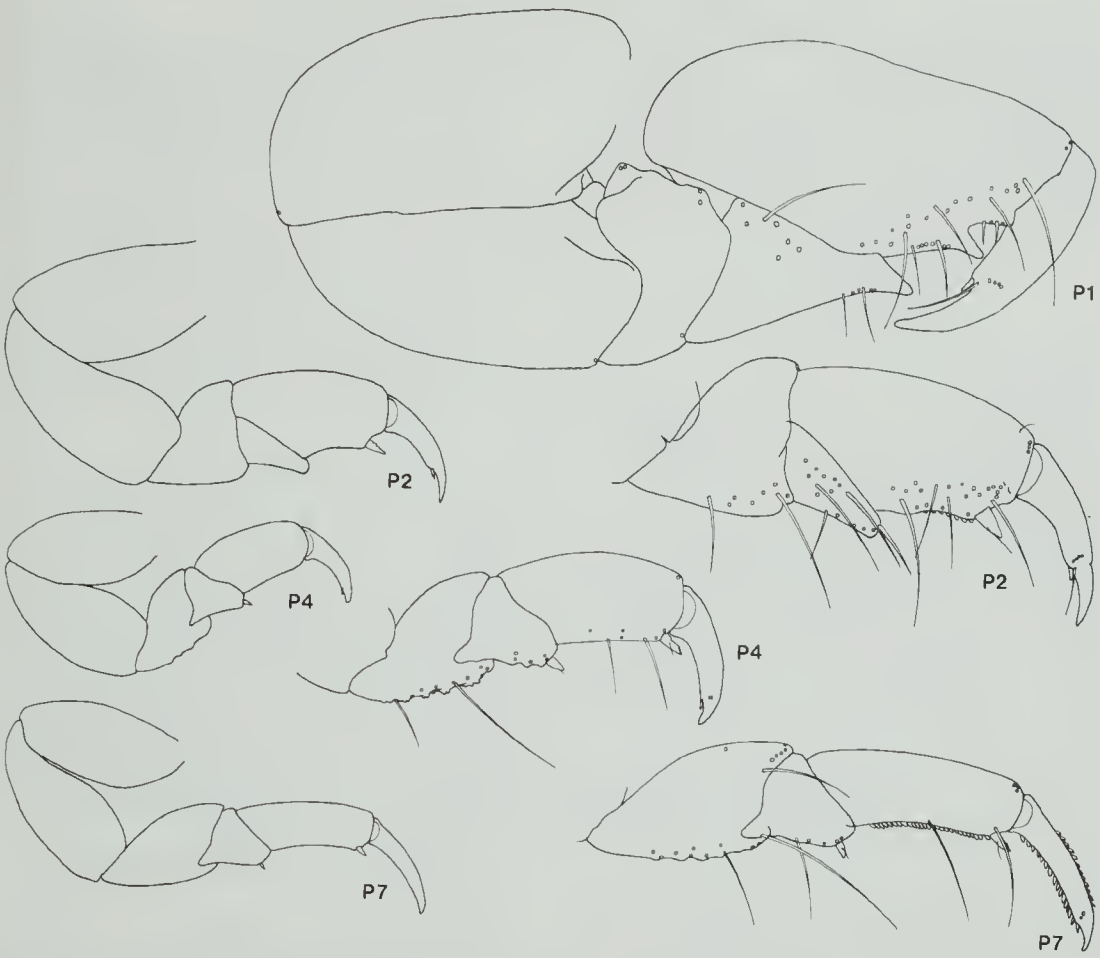

Figure 3. *Apanthura banksia*. Holotype juvenile, 11.9 mm.

similar to 2, but smaller. Pereopods 4-7 with articles 4 and 5 with convex posterior margins bearing few long setae.

Uropodal endopod with a continuous row of long setae just ventral to lateral margin, and terminally; 2 brush-setae just ventral to lateral margin, and 5 others dorsally. Exopod 1.7× as long as greatest width, ventral distal lobe acutely rounded and separated from the broadly rounded dorsal lobe by an acute angular notch. Telson 1.5× as long as pleon, 2.0× as long as greatest width, lateral margins evenly curved and with a broadly rounded apex; dorsal setae only on distal third.

Male: Unknown.

Distribution: New South Wales including Lord Howe Island, sandy sediments.

Remarks: *Apanthura banksia* shares features of both species groups into which all other Australian species of the genus can be divided. Its affinities with species-group 1 are: a continuous marginal setal row on the uropodal endopod (except that this is more ventral with respect to the brush-setae than is typical); and a rounded telsonic apex. The species shares with those in species-group 2: long setae on the second article of antenna 1 (only 1-3 rather than six or more which is typical); and moderately developed lobes on the walking legs.

The antenna 1 and setose telson serve to distinguish the species from other Australian species of *Apanthura*.

The specimens from Lord Howe Island are smaller (6.9-7.6 mm) and possess a more setose telson than those from the NSW mainland. However, none was mature and no other differences could be found.

Apanthura callitris sp. nov.

Figures 4-6

Material examined: 10 males, 329 juveniles; 4.6-12.4 mm:

Holotype: juvenile, 8.3 mm, QMW10017 (with one slide). Qld, Moreton Bay, Middle Banks, W. of Tangalooma, S. Cook and S. Newlands (QUBS station), Mar 1974.

Paratypes: Qld, type locality, QMW10018(1), QMW10019 (1 male), QMW10020 (1 male), QMW4728(14), NMVJ2906(20), AMP33584 (10). Type locality, June 1973, NMVJ2907 (2 males, 10 juveniles); Sep 1972, NMVJ2913 (1 male, 3 juveniles), J2914(1); Dec 1972, NMVJ2915 (1 male).

Other material: Qld, type locality, Dec 1972—March 1974: 273 specimens from 13 QUBS stations, QMW4721-5, W4728, W4734, W6129, W8385, W8456, W8459, W8462, W8463.

Description: Integument not pigmented. Eyes present. Head 1.3× as long as wide, tapering anteriorly. Antenna 1 peduncle with 7 and 4 long marginal setae on articles 2 and 3 respectively (none on first article) and with marginal brush-setae on articles 1 and 2. Mandibular palp articles with 1, 4 and 3 setae respectively. Maxilliped article 4 with 4 mesial setae, 1 laterally and 2 distally; article 5 with 6 setae, barely exceeding distal margin of article 4; surface of article 4 with fine hairs.

Pereopod 1 article 4 with 12 mesial setae along anterior margin; article 5 with 6 mesial setae, with a pronounced distal tooth; article 6 palm with pronounced tooth at midpoint, 2 marginal rows each of 6 setae, with a setose posterior lobe produced distally to shield article 5; article 5 well produced distally into a sharp setose lobe; article 6 linear-ovoid, mesially setose and with setae only along posterior margin. Percopod 3 similar to 2, but smaller. Pereopods 4-7 with articles 4-5 having lobed posterior margins bearing numerous long setae.

Uropodal endopod with a discontinuous row of long setae along lateral and terminal margin; 3 brush-setae in hiatus of setal row and others dorsally. Exopod 2.0× as long as greatest width, distal lobes well separated by an angular notch at the end of an almost straight dorsal margin. Telson as long as pleon, 1.9× as long as greatest width, lateral margins strongly convex and tapering to broadly triangular apex; not strongly convex in longitudinal section; 3 pairs of dorsal setae near midline on distal third.

Male: Antenna 1 with flagellum of 10 articles, reaching to posterior margin of head. Eyes enlarged. Pereopod 1 with article 5 more elongate and tooth more projecting than in juvenile; article 6 more swollen, mesial setae on palm more numerous; article 7 with a blade along posterior margin. Pereopods 2 and 3 article 5 with a strongly produced, narrow posterior lobe. Most posterior pereopods slightly more elongate than in juvenile. Pleon more elongate than in juvenile. Appendix masculina on pleopod 2 a simple rod not reaching to end of endopod.

Distribution: Queensland, Moreton Bay; sandy sediments.

Remarks: *Apanthura callitris* is a typical member of *Apanthura* species-group 2. The species co-occurs with *A. lambertia*, both in high densities, in Moreton Bay, Qld, but is easily distinguished by its broad rounded telson. The anterior pereopods of males are not as highly modified as in other species in this species-group.

Apanthura drosera sp. nov.

Figures 7, 8

Material examined: 4 juveniles; 5.7-7.3 mm.

Holotype: juvenile, 6.5 mm, NMVJ4160 (with one slide). Bass Strait, eastern Bass Strait (39°05.8′S., 147°26.2′E.), coarse shell, 59 m, 18 Nov 1981 (BSS stn 175).

Paratypes: Bass Strait, 39°06.7′S., 143°07.4′E. (BSS stn 192), NMVJ4162(1); 39°38.2′S.,

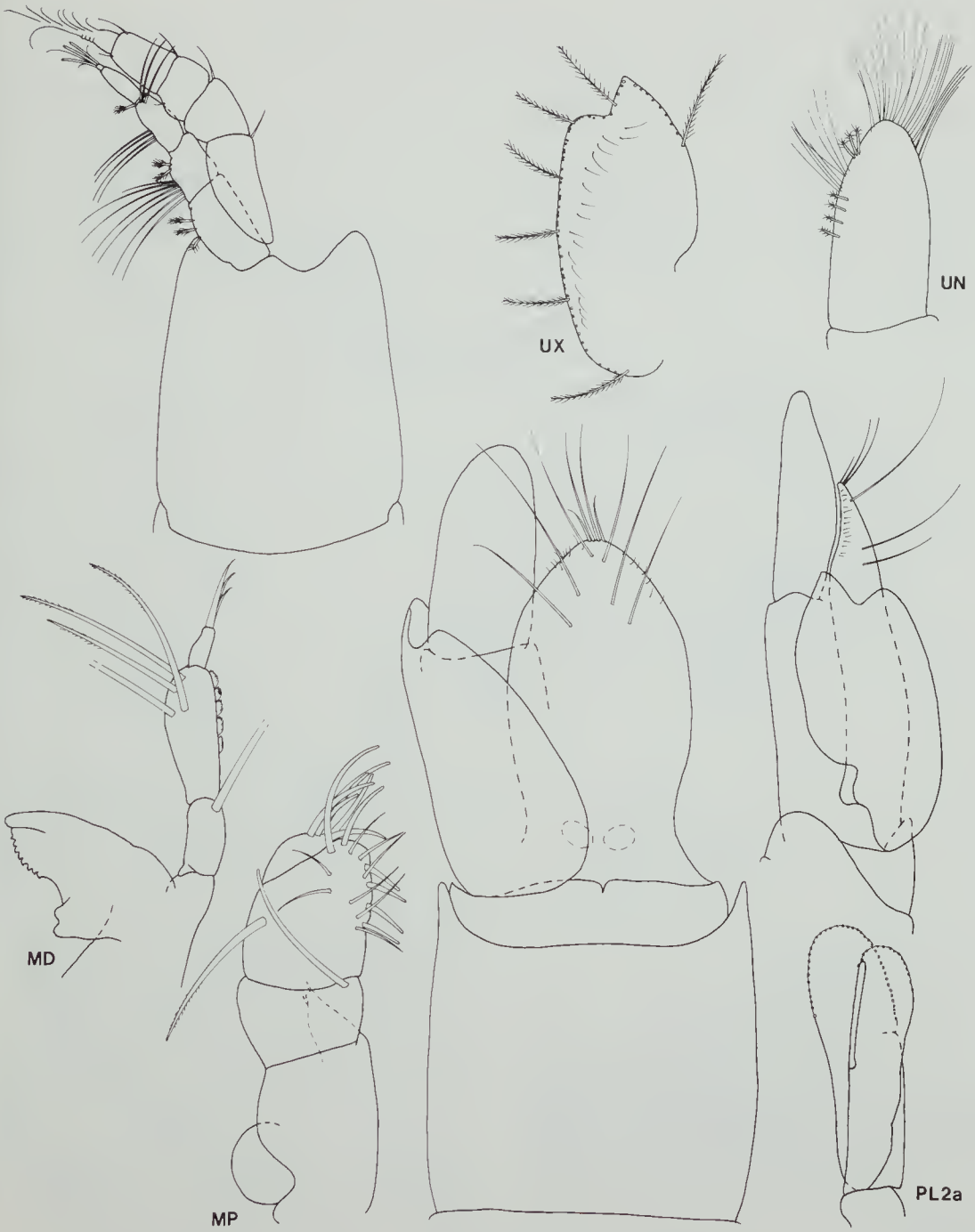

Figure 4. *Apanthura callitris*. Holotype juvenile, 8.3 mm; a, paratype, male, 12.4 mm, QMW10019.

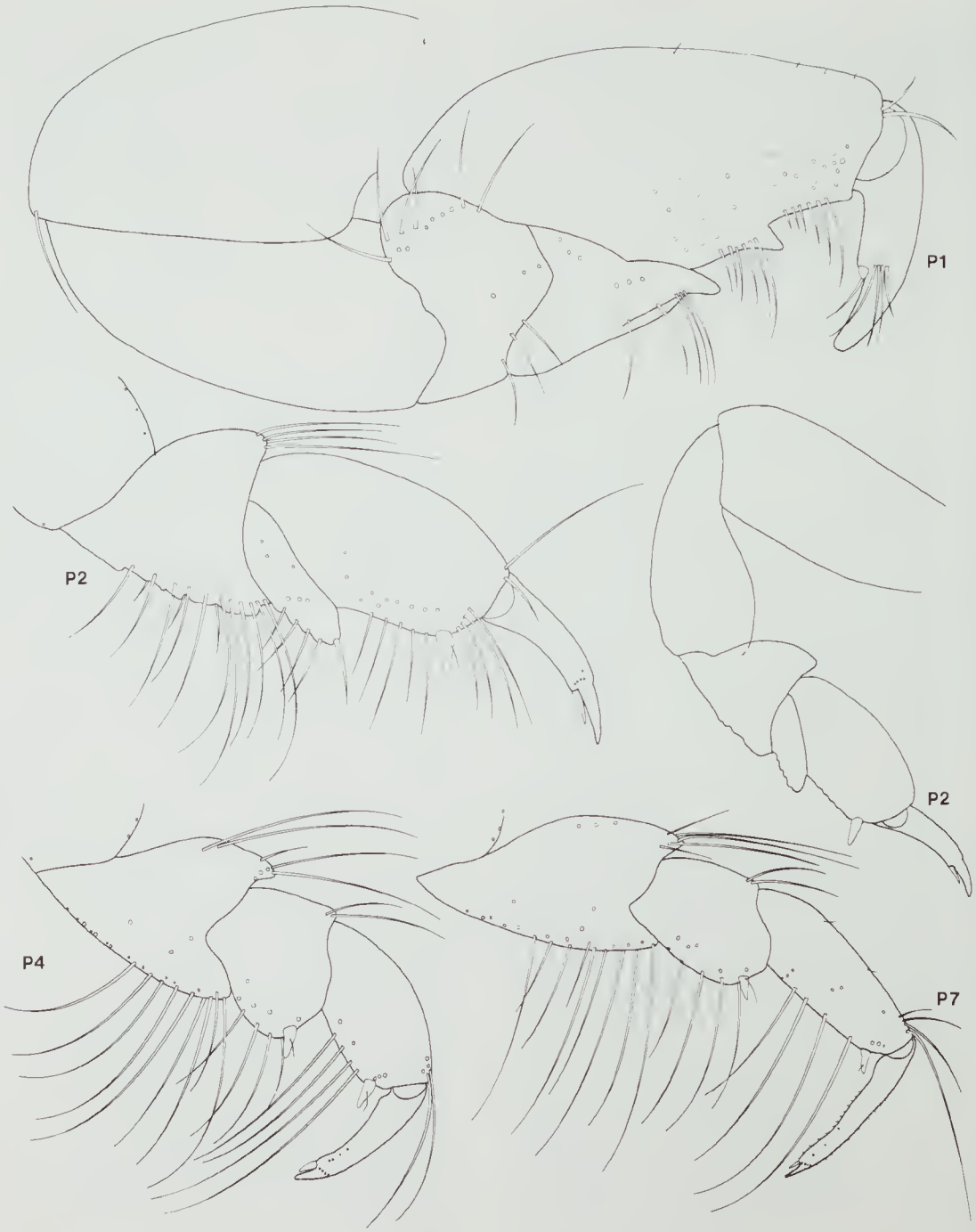

Figure 5. *Apanthura callitris*. Holotype juvenile, 8.3 mm.

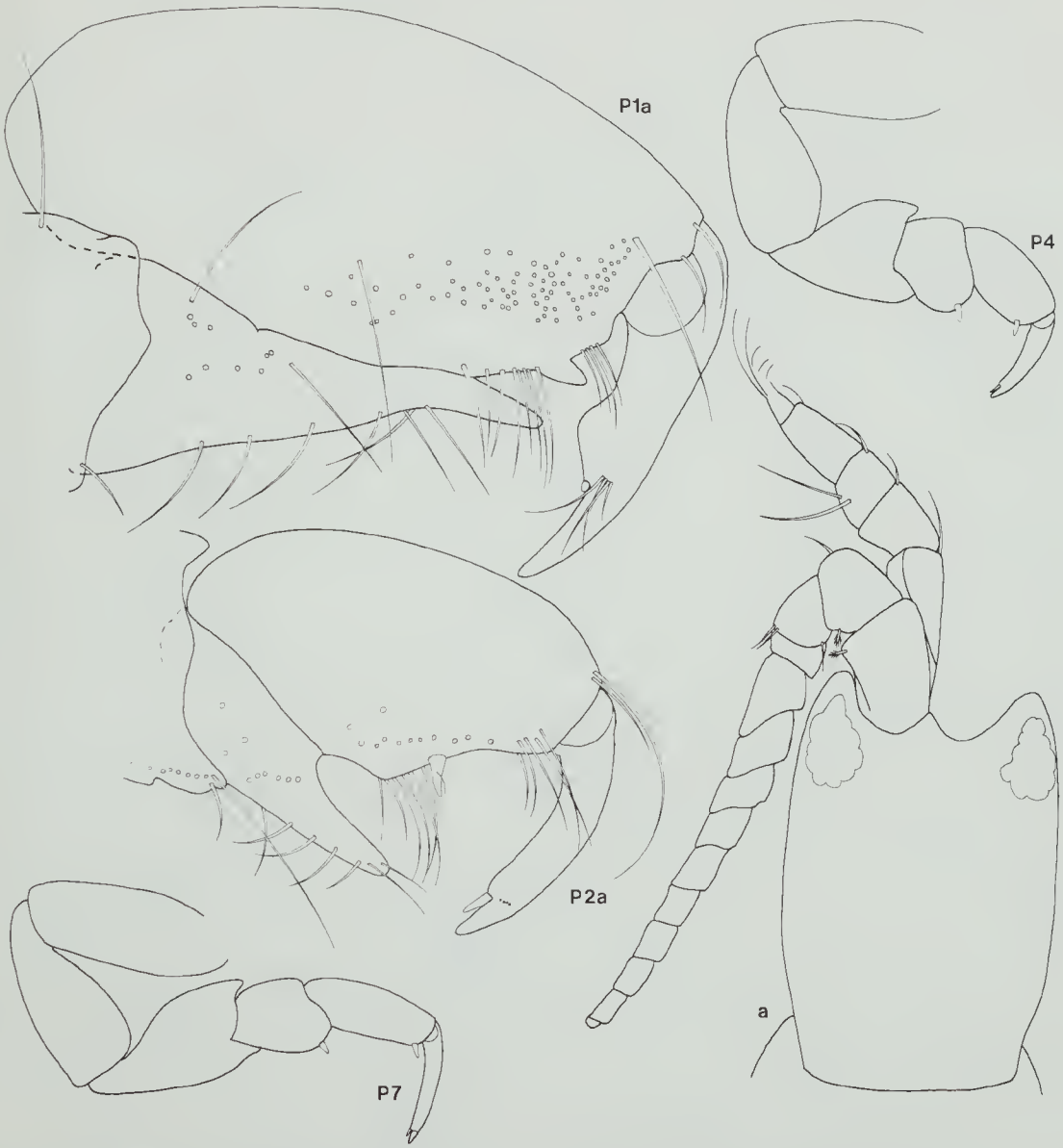

Figure 6. *Apanthura callitris*. Holotype juvenile, 8.3 mm; a, paratype male, 12.4 mm, QMW10019.

143°07.2′E. (BSS stn 195), NMVJ4163, J4164, (2).

Description: Integument not pigmented. Without pigmented eyes. Head 1.2× as long as wide, tapering anteriorly. Antenna 1 peduncle with 1 long marginal seta on article 3, 1 short marginal seta and marginal brush-setae on both articles 1 and 2. Mandibular palp articles with 1, 1 and 3 setae respectively. Maxilliped article 4 with 2 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, reaching level with end of article 4; surface with few fine hairs.

Pereopod 1 article 4 with 1 mesial seta on anterior margin; article 5 with pronounced distal tooth; article 6 palm with pronounced tooth at midpoint, 9 marginal setae and few

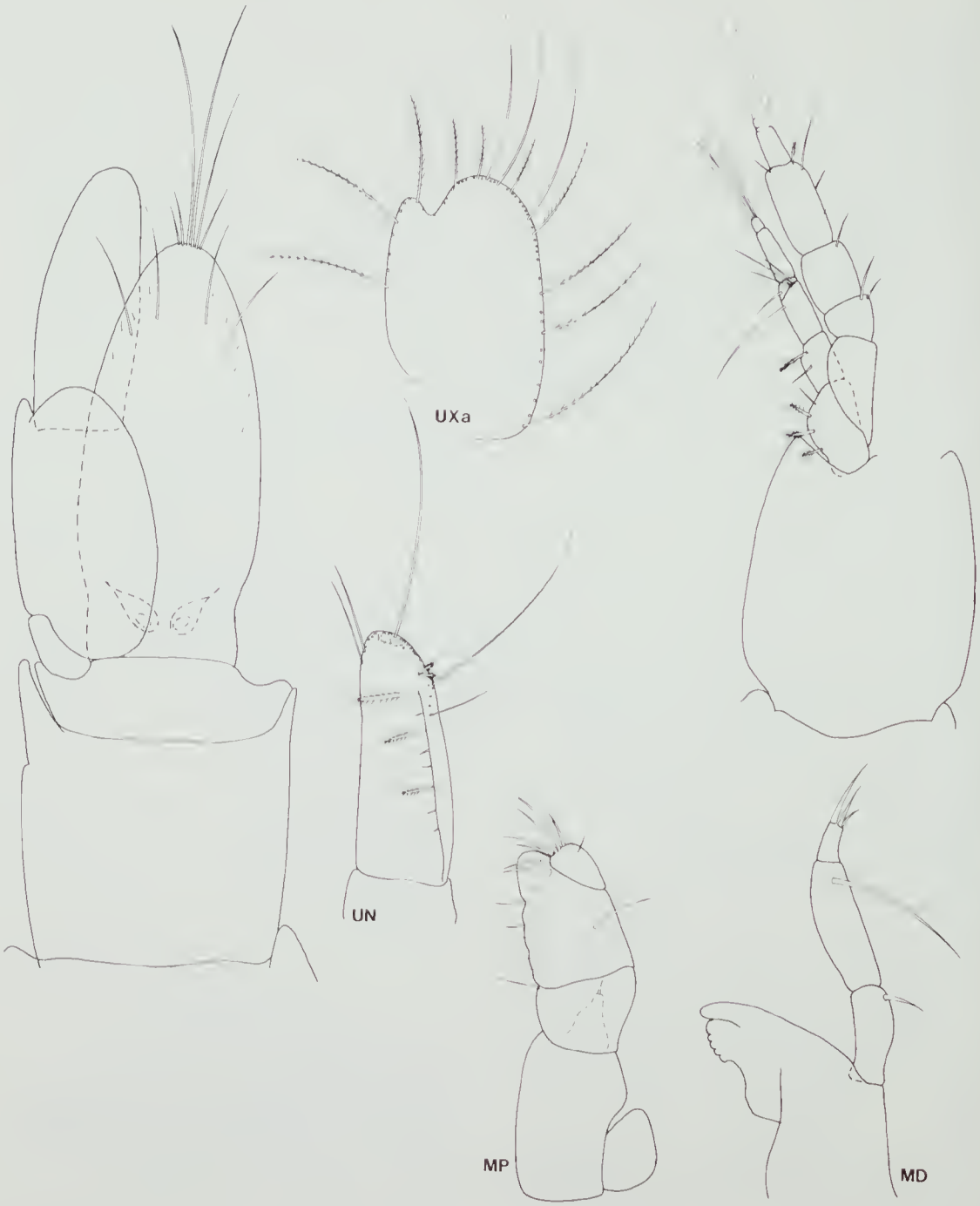

Figure 7. *Apanthura drosera*. Holotype juvenile, 6.5 mm; a, paratype juvenile, 6.2 mm, NMVJ4162.

Figure 8. *Apanthura drosera*. Holotype juvenile, 6.5 mm.

setae on mesial face. Pereopod 2 article 4 with 1 anterior seta, its posterior margin not produced distally; article 5 barely produced distally into a blunt lobe; article 6 linear-ovoid, with few mesial setae and no setae on anterior margin. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with only article 5 distally lobed.

Uropodal endopod with a continuous row of long setae along lateral and terminal margin; 2 brush-setae on distolateral margin and 3 others dorsally. Exopod 1.7× as long as greatest width, ventral distal lobe acute and separated from the much larger rounded dorsal lobe by an acute angular notch. Telson 1.3× as long as pleon, 2.3× as long as greatest width, widest at proximal one-third and tapering sharply to a narrowly rounded apex; 2 pairs of dorsal setae near apex, few marginal dorsal setae.

Male: Unknown.

Distribution: Bass Strait, 59-127 m, shelly substrates.

Remarks: *Apanthura drosera*, a typical member of species-group 1, is similar to *A. styphelia*, particularly in that both possess relatively long antennae. The distinguishing feature of this species is, however, the narrower tapering telson and narrow uropodal endopod. *Apanthura drosera* is known only from shelly sediments in Bass Strait whereas *A. styphelia* is confined to coastal bays.

Apanthura isotoma sp. nov.

Figures 1a, 9-11

Material examined: 1 male, 106 juveniles: 4.3-12.5 mm:

Holotype: juvenile, 10.5 mm, NMVJ1486 (with one slide). Vic., Port Phillip Bay, off Rosebud (38°21.0'S., 144°55.0'E.), sand, 4 m, 12 Oct 1971 (PPBES stn 986).

Paratypes: Vic., type locality NMVJ1487 (1 specimen), NMVJ1488(9), NMVJ1490(1), NMVJ1419(1). Port Phillip Bay, PPBES stations: stn 968, NMVJ2729(3); stn 973, NMVJ1489 (1 male), J1492(4); stn 979, NMVJ2730(1). Port Phillip Bay, off Patterson R.: AMP33581(38), NMVJ2731(4), NMVJ2732(5), NMVJ2733(8), NMVJ2734(2), NMVJ2735(11).

Other material: Vic., Black Rock, Breamlea, very fine sand, 15 m, J. Dorsey, 24 Jan 1979 NMVJ2922(1). Off McGaurans Beach (near Seaspray), fine sand, 9 m, J. E. Watson, 1981, NMVJ2923(2), NMVJ3434(1).

Tas., Lagoon Bay, sand, 16 m, A. J. Dartnall, 7 June 1977, TMG2645(8). Schouten Passage, sand, 12 m, A. J. Dartnall, 8 Jan 1979, TMG2647(2). Off Little Swanport, sand, 10 m, A. J. Dartnall, 8 June 1977, TMG2646(1).

NSW, E. of Burwood Beach (32°57.3'S., 151°44.4'E.), sand, 14 m, 10 June 1975 (HDWBS station), AMP24040(1). Botany Bay, AMP33582(1).

Description: Integument not pigmented. Eyes present. Head 1.2× as long as wide, tapering anteriorly. Antenna 1 pedunele with 4, 6 and 4 long marginal setae on articles 1, 2 and 3 respectively and with marginal brush-setae on articles 1 and 2. Mandibular palp articles with 1, 3 and 3 setae respectively. Maxilliped article 4 with 3 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, exceeding distal margin of article 4; surface of articles 4 and 5 with fine hairs.

Percopod 1 article 4 with 11 mesial setae along anterior margin; article 5 with 6 mesial setae, its distal tooth blunt; article 6 palm with tooth more or less developed at midpoint, 10 marginal setae and numerous setae on mesial face. Pereopod 2 article 4 with 6 anterior setae, with a setose posterior lobe produced distally to shield article 5; article 5 well produced distally into a rounded setose lobe; article 6 ovoid, mesially setose and with long setae only along posterior margin. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with articles 4 and 5 having lobed posterior margins bearing numerous long setae.

Uropodal endopod with a discontinuous row of long setae along lateral and terminal margin; 3 brush-setae in hiatus of setal row and 2 others dorsally. Exopod 1.8× as long as greatest width, distal lobes rounded and separated by an obtuse angular notch; dorsal margin gently convex.

Telson 1.3× as long as pleon, 2.2× as long as greatest width, lateral margins sharply angled two-thirds way along, distally almost concave and tapering to sharply rounded apex; not

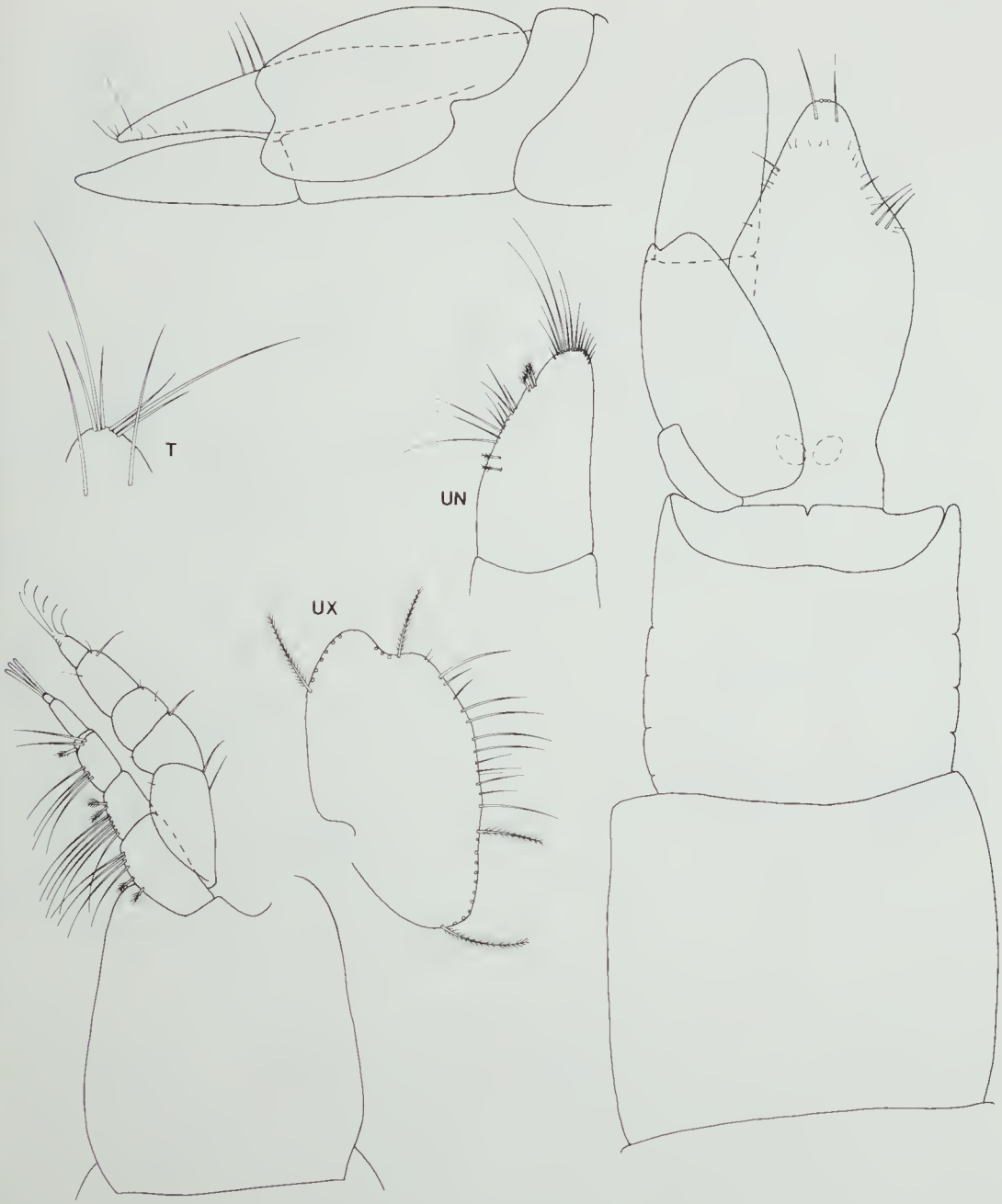

Figure 9. *Apanthura isotoma*. Holotype juvenile, 10.5 mm.

strongly convex in longitudinal section; a pair of dorsal setae near apex, others near margin in distal third.

Male: Antenna 1 with flagellum of 12 articles reaching back to posterior margin of head. Eyes enlarged. Pereopod 1 with article 5 more elongate and tooth more projecting than in juvenile; article 6 lacking palmar tooth, mesial

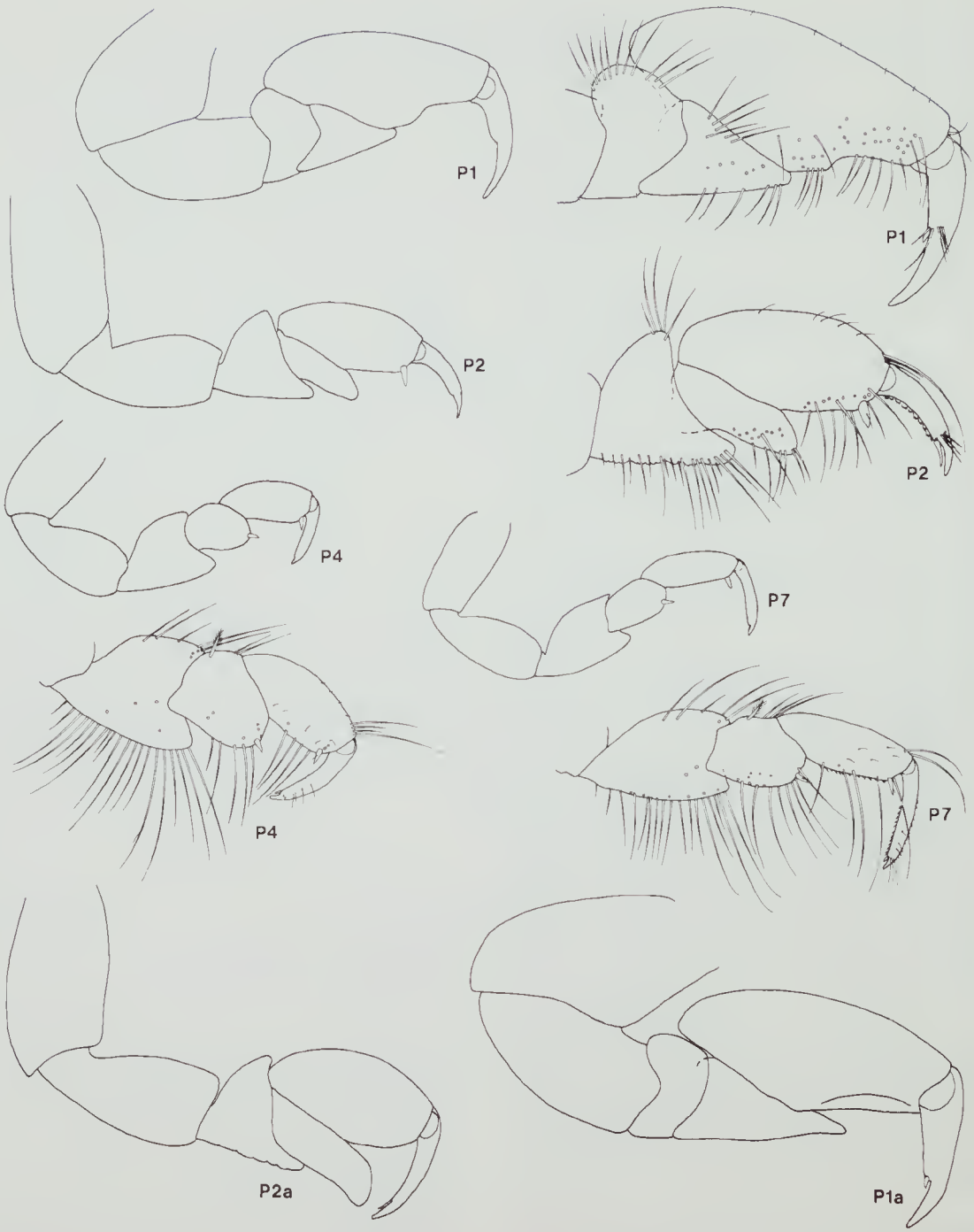

Figure 10. *Apanthura isotoma*. Holotype juvenile, 10.5 mm; a, paratype male, 12.0 mm, NMVJ1489.

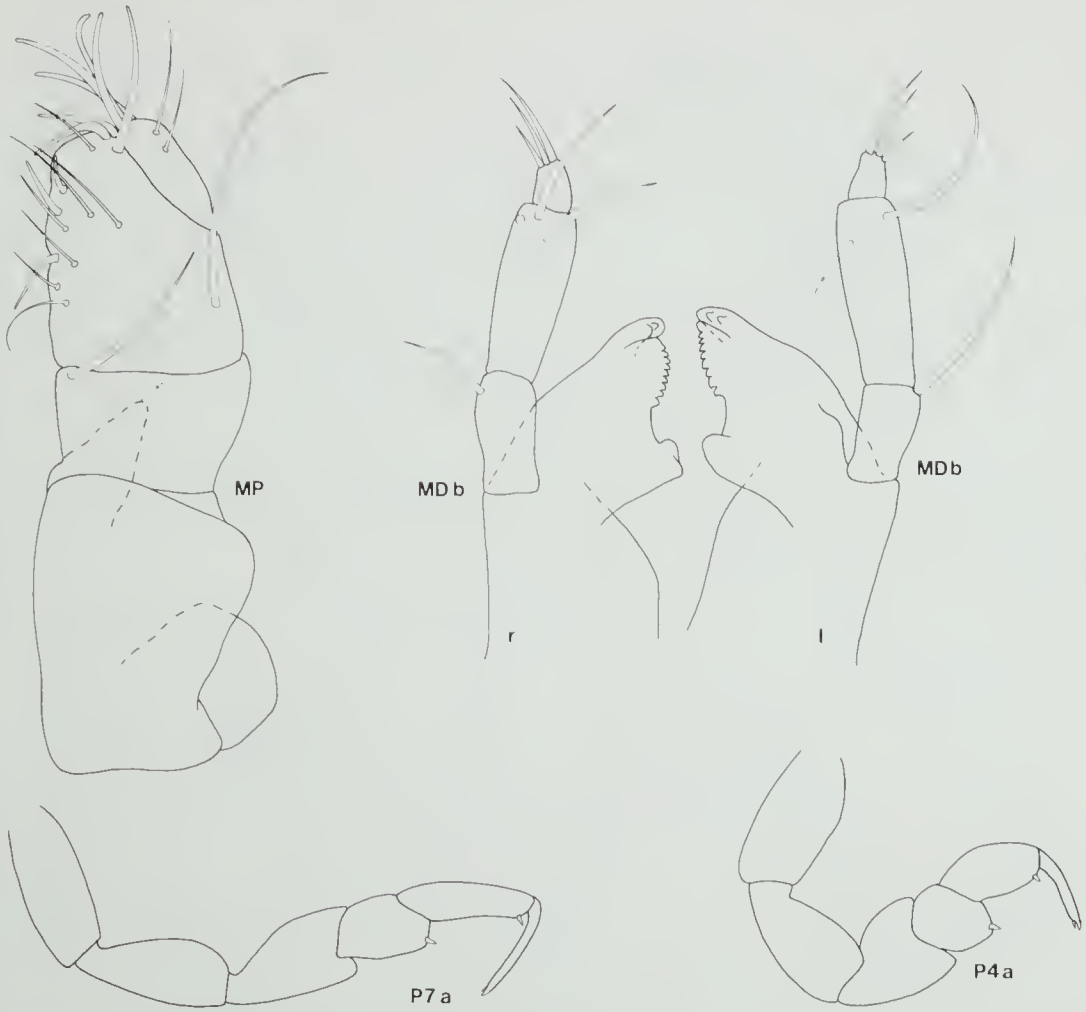

Figure 11. *Apanthura isotoma*. Paratype male, 12.0 mm, NMVJ1489; a, paratype juvenile, 11.9 mm, NMVJ1487; b, paratype juvenile, 7.6 mm, NMVJ1490; l, left; r, right.

setae more numerous. Pereopods 2 and 3 article 5 with a strongly produced broad posterior lobe. Most posterior pereopods slightly more elongate than in juvenile. Appendix masculina on pleopod 2 a simple rod not reaching to end of endopod. Pereonite 1 with a ventral keel anteriorly between pereopods. Uropodal rami slightly more elongate.

Distribution: Tasmania, Victoria and New South Wales, sandy sediment, shelf and oceanic parts of bays.

Remarks: *Apanthura isotoma* is a typical species of *Apanthura* species-group 2 with well-developed lobes on the posterior pereopods and particularly setose antenna 1. It is the most widespread species of *Apanthura*, distinguished from others by the tapered apex of the telson.

Apanthura lambertia sp. nov.

Figures 12-14

Material examined: 23 males, 189 juveniles; 5.3-14.7 mm:

Holotype: juvenile, 13.5 mm, QMW10021 (with one slide). Qld, Moreton Bay, Middle Banks, W. of Tangalooma, S. Cook and S. Newlands (QUBS station), Sept 1973.

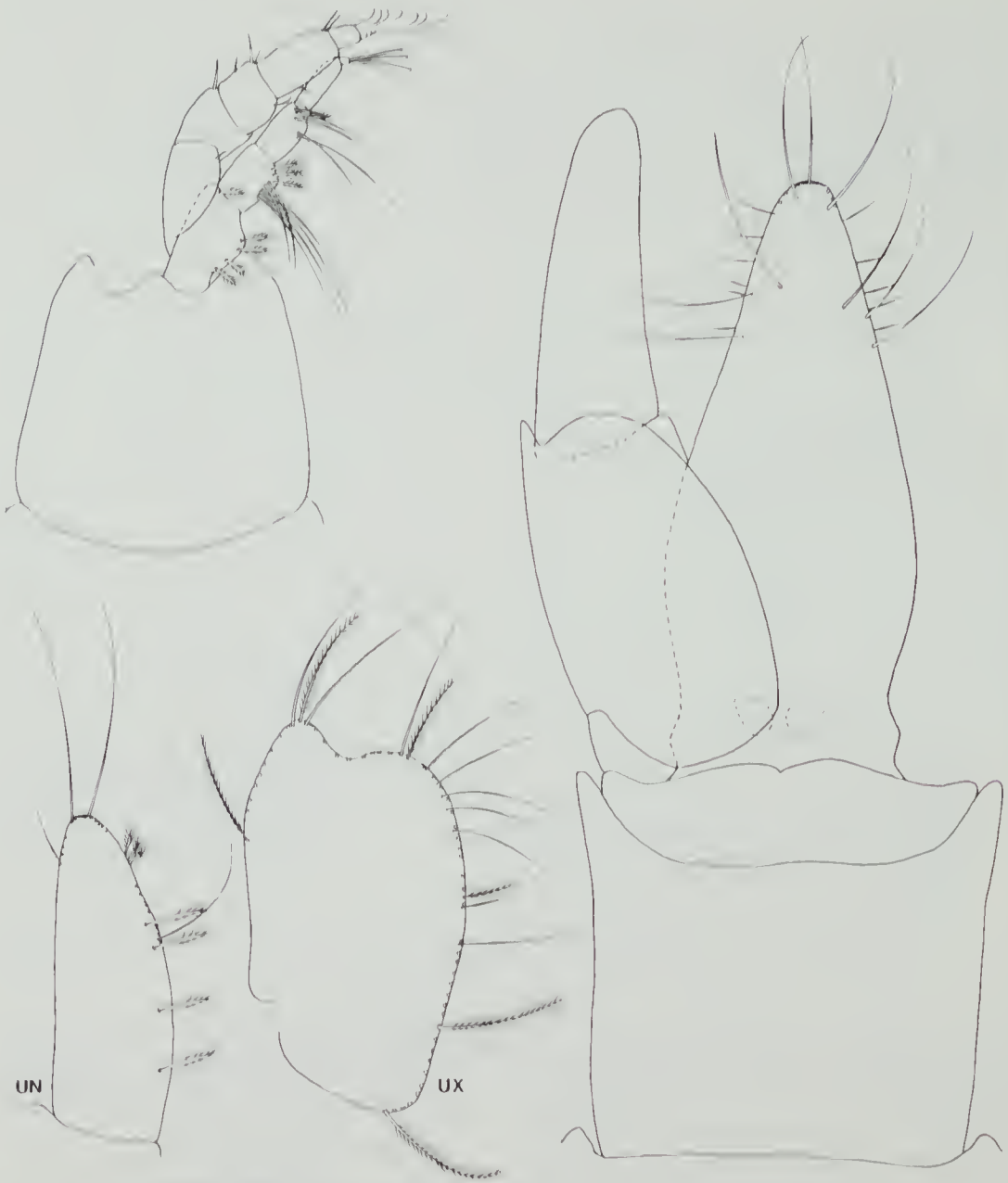

Figure 12. *Apanthura lambertia*. Holotype juvenile, 13.5 mm.

Paratypes: Qld, type locality, QMW10023 (1 male, QMW10022(1), QMW4733(16), NMVJ 2912 (1 male, 3 juveniles), AMP33583 (1 male, 2 juveniles).

Other material: Qld, Moreton Bay, QUBS stations, QMW4726(40), QMW4729-32(79), QMW4735-6(29), QMW8386(9), QMW8457 (6), QMW10024-8(22).

Description: Integument not pigmented. Eyes present. Head as long as wide, tapering

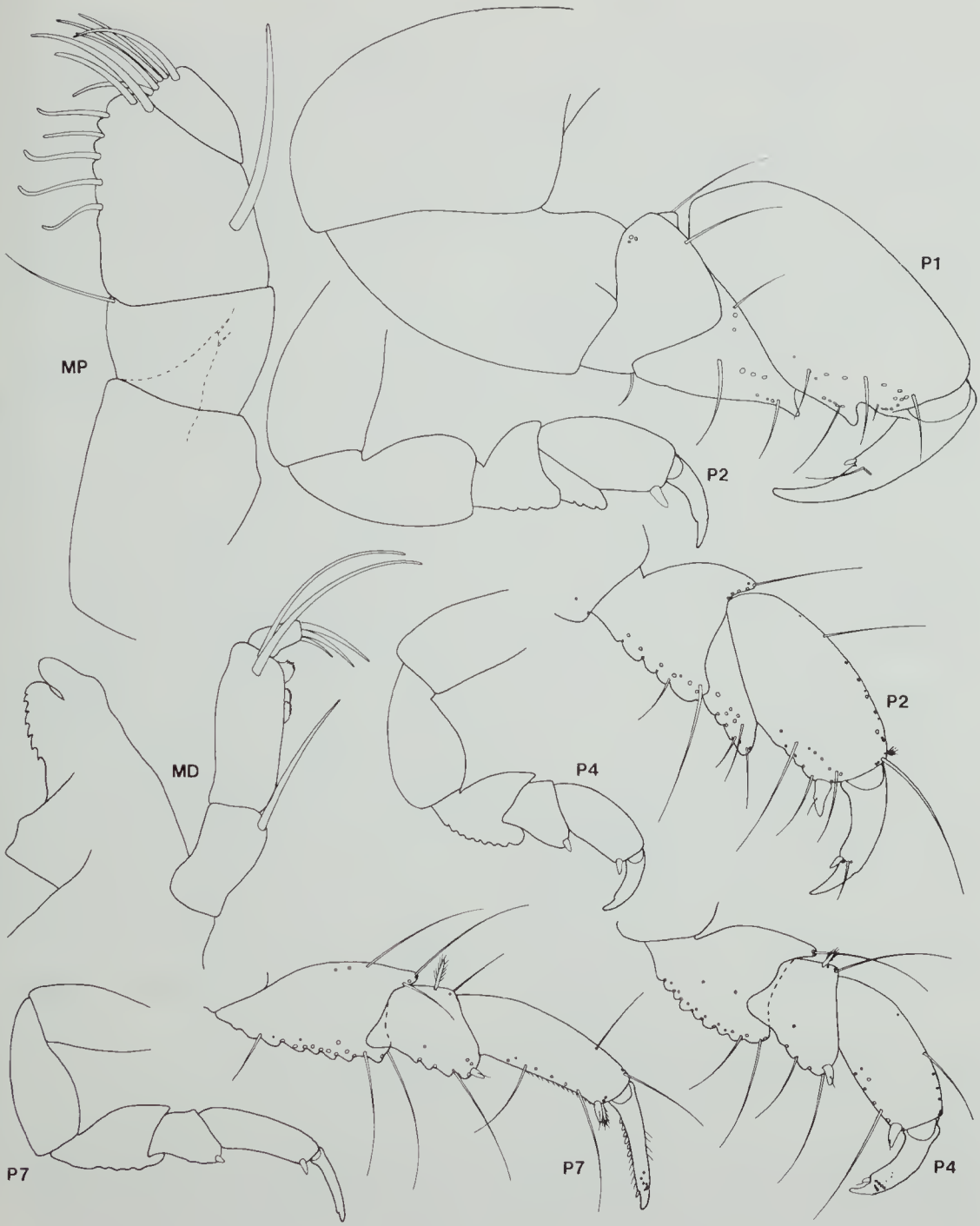

Figure 13. *Apanthura lambertia*. Holotype juvenile, 13.5 mm.

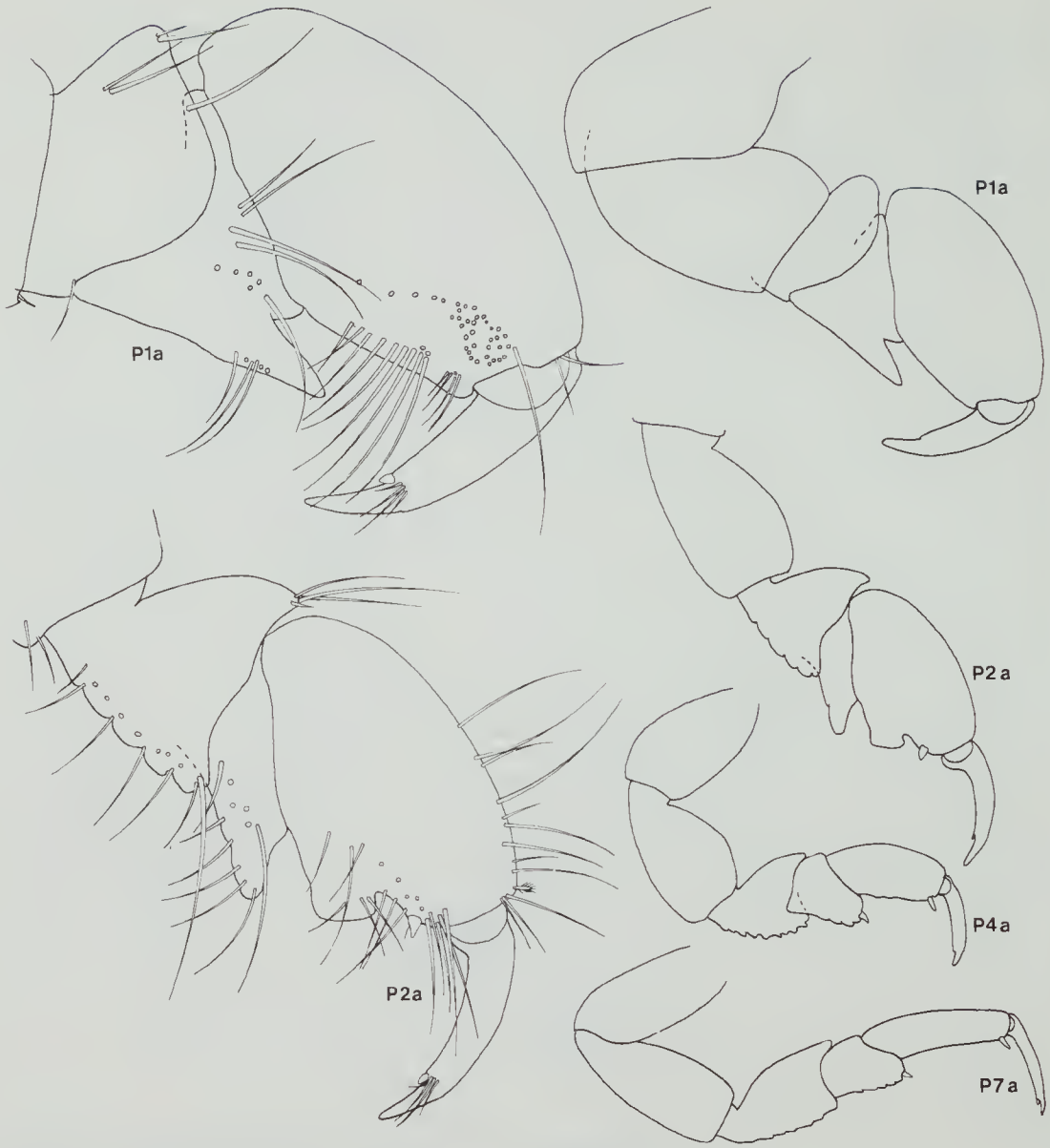

Figure 14. *Apanthura lambertia*. Paratype male, 13.9 mm, QMW10023.

anteriorly. Antenna 1 peduncle with 6 and 2-4 marginal setae on articles 2 and 3 respectively and with marginal brush-setae on articles 1 and 2. Mandibular palp barely reaching tip of incisor, articles with 1, 2 and 3 setae respectively. Maxilliped article 4 with 5 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, clearly exceeding distal margin of article 4; surface of article 4 sometimes with fine hairs.

Pereopod 1 articles 4 and 5 each with 3-4 mesial setae along anterior margin; article 5 with a pronounced distal tooth; article 6 palm

with a pronounced tooth at midpoint, a proximal marginal row of 6 setae and about 17 setae on mesial face. Pereopod 2 article 4 with 7 anterior setae, with a setose posterior lobe produced distally to shield article 5 only slightly; article 5 well produced distally into a blunt setose lobe; article 6 linear-ovoid, mesially setose, and with setae along length of anterior and posterior margins. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with articles 4-5 having lobed posterior margins bearing numerous long setae.

Uropodal endoped with a discontinuous row of long setae along lateral and terminal margin; 3 brush-setae in hiatus of setal row and 4 others dorsally. Exopod 1.8× as long as greatest width, ventral distal lobe acute and separated from a very broadly rounded dorsal lobe by a curved notch; dorsal margin gently convex. Telson 1.5× as long as pleon, 2.4× as long as greatest width, widest at proximal third and tapering evenly to a sharply rounded apex; not strongly convex in longitudinal section, about 8 dorsal setae near margin on distal quarter.

Male: Antenna 1 with flagellum of 10 articles reaching back to posterior margin of head. Eyes enlarged. Pereopod 1 with article 5 having a more pronounced tooth, article 6 lacking a palmar tooth, mesial setae more numerous. Pereopod 2 palm produced proximally as a broad truncate blade; pereopod 3 similar but less well developed. Most posterior pereopods slightly more elongate than in juvenile. Pleon and telson more elongate than in juvenile. Appendix masculina on pleopod 2 a simple rod, not reaching to end of endopod.

Distribution: Queensland, Moreton Bay, sandy sediments.

Remarks: *Apanthura lambertia*, a member of species-group 2, is immediately differentiated from other species by its elongate tapering telson and the extreme modification of the male pereopods.

The species is confined to Moreton Bay where it is common. A single male from Port Phillip Bay, Vic. (*Apanthura* sp. herein) is similar to *A. lambertia* but juveniles able to be associated with it could not be found.

Apanthura mirbelia sp. nov.

Figures 15-17

Material examined: 1 male, 5 juveniles; 5.2-14.8 mm:

Holotype: juvenile, 11.2 mm, NMVJ2917 (with one slide), Bass Strait (40°40′S., 145°15′E.), 33 m, medium shell-sand, 4 Nov 1980 (BSS stn 115).

Paratypes: Bass Strait, type locality, NMVJ2918 (1 specimen), NMVJ2919 (1 male). Bass Strait: 40°24′S., 145°32′E. (BSS stn 113), NMVJ2920(3); 39°02.4′S., 148°30.6′E. (BSS stn 169), NMVJ2921(1), J3034(1).

Description: Integument not pigmented. Eyes present. Head 1.2× as long as wide, tapering anteriorly. Antenna 1 peduncle with 1 long marginal seta on article 3, 1 very short seta and marginal brush-seta on both articles 1 and 2. Mandibular palp articles with 1, 2 and 4 setae respectively, molar with a small distal accessory tooth. Maxilliped article 4 with 2 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, reaching level with end of article 4; surface of articles 4 and 5 with few fine hairs.

Pereopod 1 articles 4 and 5 each with 1-2 mesial setae along anterior margin; article 5 with a pronounced distal tooth; article 6 palm with a pronounced tooth at midpoint, 9 marginal setae and numerous setae on mesial face. Pereopod 2 article 4 with 2 anterior setae, its posterior margin scarcely produced distally; article 5 only slightly produced distally into a blunt setose lobe; article 6 linear-ovoid, not mesially setose, and without long setae on anterior margin. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with only articles 5 distally lobed.

Pleonal sutures visible dorsolaterally.

Uropodal endopod with a continuous row of long setae along lateral and terminal margin; 3 brush-setae on distolateral margin and 4 others dorsally. Exopod 1.7× as long as greatest width, ventral distal lobe acutely rounded and separated from the bigger rounded dorsal lobe by an obtuse angular notch; dorsal margin gently convex. Telson 1.4× as long as pleon, 2.2× as long as greatest width, lateral margins smoothly convex and tapering to a broadly

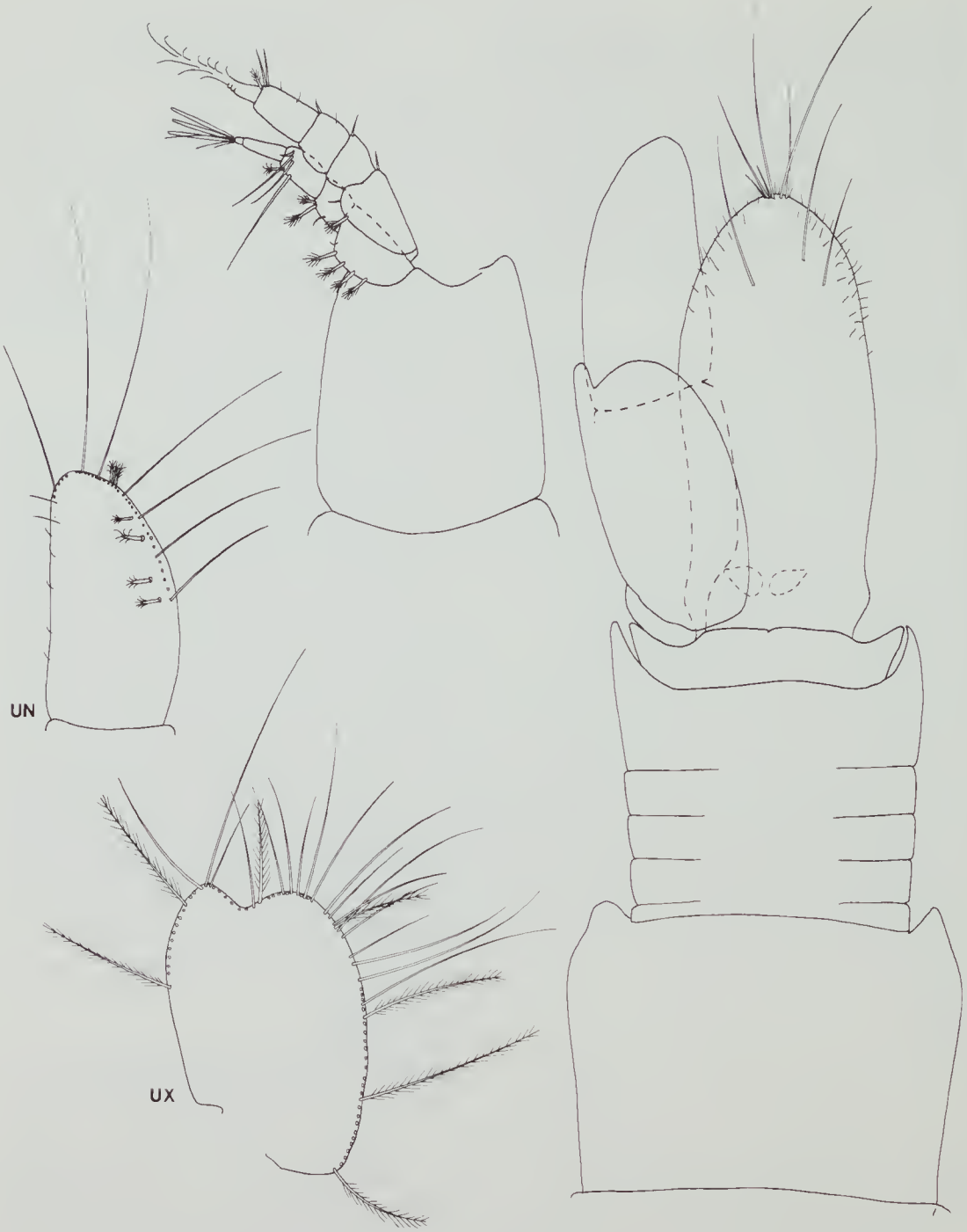

Figure 15. *Apanthura mirbelia*. Holotype juvenile, 11.2 mm.

Figure 16. *Apanthura mirbelia*. Holotype juvenile, 11.2 mm.

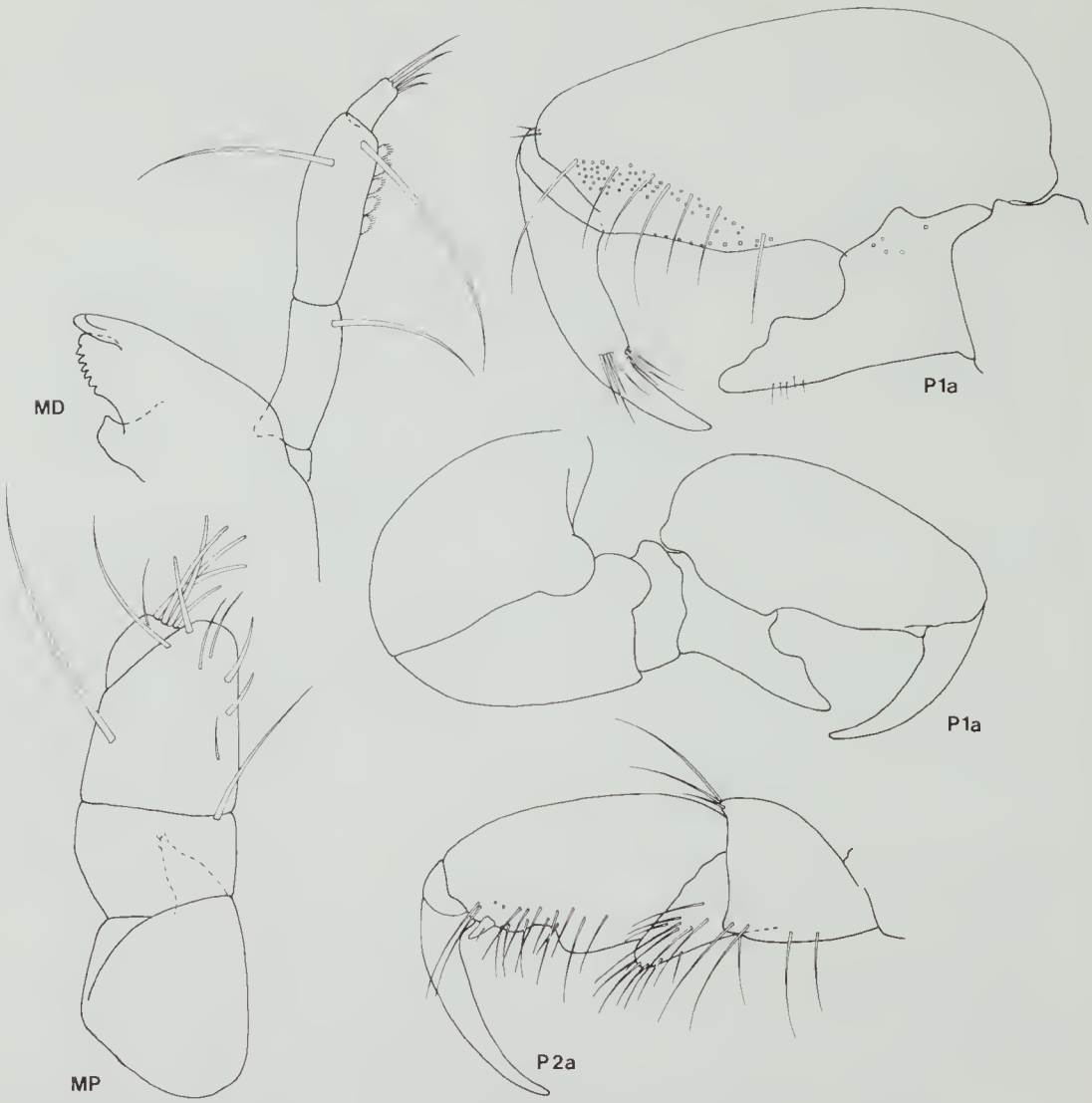

Figure 17. *Apanthura mirbelia*. Holotype juvenile, 11.2 mm; a, paratype male, 12.1 [illegible], NMVJ2919.

rounded apex, a few long dorsal setae near apex, finer hairs near margin.

Male: Antenna 1 with flagellum of 10 articles reaching back to posterior margin of head. Eyes enlarged. Pereopod 1 with article 5 grossly expanded distoposteriorly, its tooth with a complex inside edge; article 6 lacking a palmar tooth, with numerous mesial setae. Pereopod 2 article 6 with a proximal posterior lobe. Pereopod 3 similar but less modified. Most posterior pereopods slightly more elongate than in juvenile. Appendix masculina on pleopod 2 a simple rod not reaching to end of endopod. Uropodal rami slightly more elongate.

Distribution: Bass Strait, 37-120 m, muddy sand.

Remarks: *Apanthura mirbelia* is a typical member of species-group 1. It is the only Australian species in which some trace of the pleonal sutures remains. The most remarkable feature of this species is the male pereopod 1 in which the palmar tooth is absent and the tooth on article 5 is grossly expanded. Pereopods 2 and 3 of the male are also modified, having the palm lobed, especially proximally.

Apanthura styphelia sp. nov.

Figures 18, 19

Material examined: 3 males, 40 juveniles; 3.3-11.6 mm:

Holotype: juvenile, 7.2 mm, NMVJ3012 (with one slide). NSW, Port Hacking, Gunnamatta Bay (34°06′S, 151°10′E.), sand, 3 m, 18 Jan 1975 (CSIRO stn G2).

Paratypes: NSW, type locality, NMVJ3013 (1 specimen); 18 Feb 1975, NMVJ3014(5). Port Jackson, Bottle and Glass Rocks, 5 m, AMP33586(1). Off Sydney, AMSBS stn C7S5, 24 m, AMP24353(1).

Vic., Port Phillip Bay, PPBES stations: stn 907, NMVJ3015(2); stn 908, NMVJ3016(1); stn 918, AMP33587(4); stn 922, NMVJ3017(1); stn 928, NMVJ3018(1), J3055(1); stn 944, NMVJ3019(12); stn 980, NMVJ3020(1); stn 985, NMVJ3021(6), NMVJ3022 (1 male). Hobsons Bay, NMVJ3023(5). Western Port, WBES stn 1704, NMVJ3054(1); stn 1735, NMVJ3033(1).

Description: Integument not pigmented. Eyes present. Head 1.2× as long as wide, lateral margins convex. Antenna 1 peduncle with 1 long marginal seta on article 3, 1 short seta on article 2, and with marginal brush-setae on articles 1 and 2. Mandibular palp articles with 1, 2 and 3 setae respectively. Maxilliped article 4 without mesial setae, 1 seta laterally and 2 distally; article 5 with 5 setae, exceeding distal margin of article 4.

Pereopod 1 article 4 with 2 mesial setae on anterior margin; article 5 with a pronounced distal tooth; article 6 palm with a pronounced tooth at midpoint, 6 marginal setae and 8 stout setae on mesial face. Pereopod 2 article 4 with 2 anterior setae, its posterior margin not produced distally; article 5 barely produced distally into a blunt lobe; article 6 linear-ovoid, with 3 mesial setae and without setae on anterior margin. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with only article 5 distally lobed.

Uropodal endopod with a continuous row of long setae along lateral and terminal margin; 3 brush-setae on distolateral margin and 4 others dorsally. Exopod 1.7× as long as greatest width, ventral distal lobe acute and separated from the rounded dorsal lobe by an acute angular notch; dorsal margin gently convex. Telson 1.4× as long as pleon, 1.8× as long as greatest width, lateral margins with greatest curvature at midpoint and tapering to broadly rounded apex; 2 pairs of dorsal setae at three-quarter mark, few marginal setae; telson flat in profile, lateral flanges quite thin.

Male: Antenna 1 flagellum with 5 articles reaching back to posterior margin of head. Eyes enlarged. Pereopod 1 with article 5 having a prominent tooth; article 6 elongated, with a substantial palmer tooth distad to midpoint; with numerous mesial setae. Other pereopods more elongate. Appendix masculina on pleopod 2 a simple rod not reaching to end of endopod. Uropodal rami more elongate than in juvenile.

Distribution: New South Wales and Victoria, 2-31 m, sandy substrates.

Remarks: *Apanthura styphelia* has all the attributes of *Apanthura* species-group 1. The species is noted for the very flat nature of the telson, especially laterally, and is separated from *A. thryptomene* by the paucity of dorsal setae on the telson. The male is distinguished by the distal position of the palmer tooth on pereopod 1, a feature not seen elsewhere in the genus.

Apanthura thryptomene sp. nov.

Figures 20-22

Material examined: 7 juveniles; 10.0-10.7 mm:

Holotype: juvenile, 10.7 mm, NMVJ2970 (with one slide). Vic., Western Port (38°27.53′S., 145°08.59′E.), 18 m, sand, 25 Nov 1974 (WBES stn 1747).

Paratypes: Vic., type locality: NMVJ2971 (1 specimen), NMVJ2972(1). Western Port, WBES stations: stn 1704, NMVJ2973(1); stn 1730, NMVJ2974(1); stn 1736, NMVJ3010(1). Western Port, Crib Point, CPBS stn 40E, Dec 1972, NMVJ3011(1).

Description: Integument not pigmented. Eyes present. Head 1.3× as long as wide, tapering anteriorly; with a prominent ventral lobe at base of maxillipeds. Antenna 1 peduncle with 1 long marginal seta on article 3, 1 short seta and

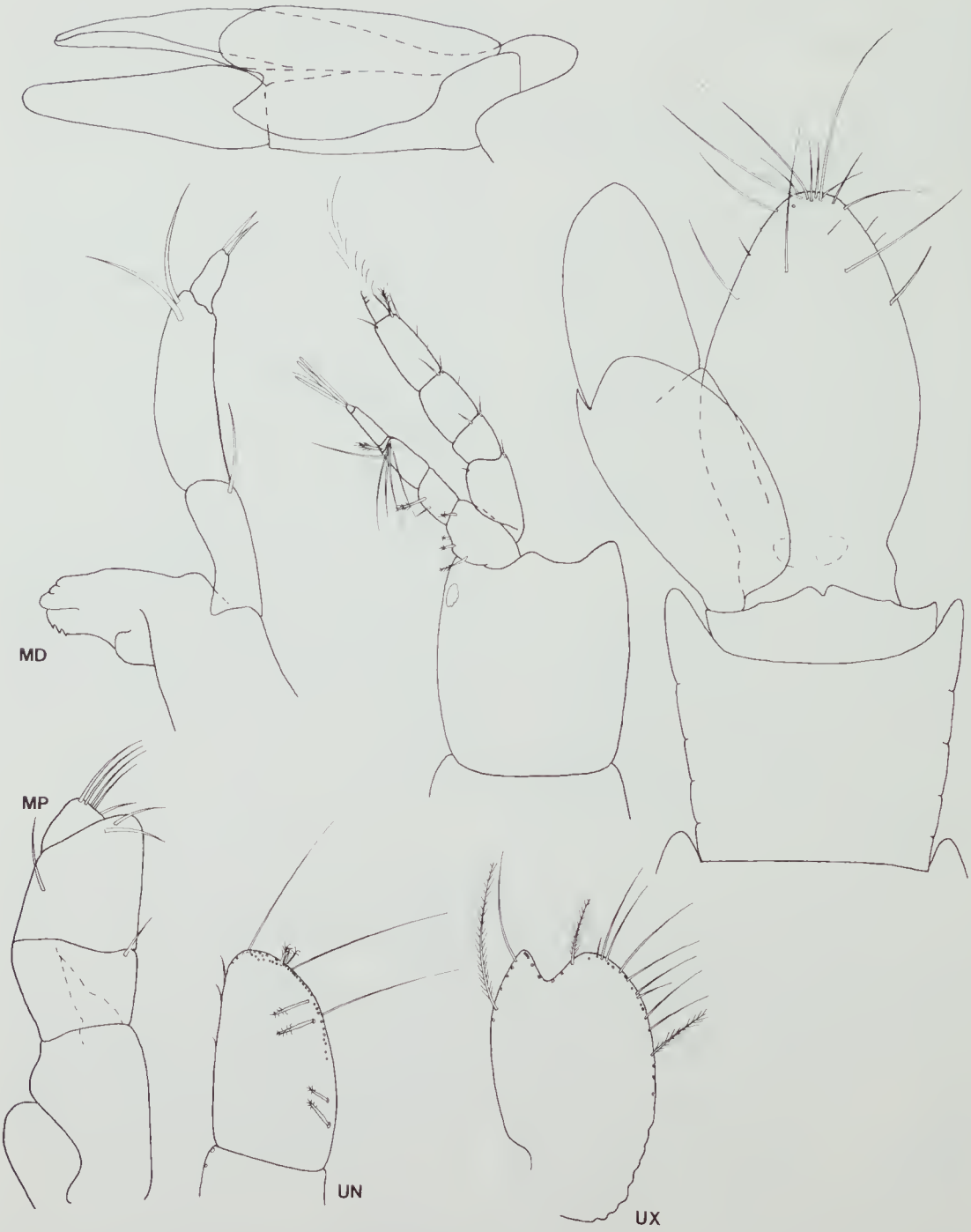

Figure 18. *Apanthura styphelia*. Holotype juvenile, 7.1 mm.

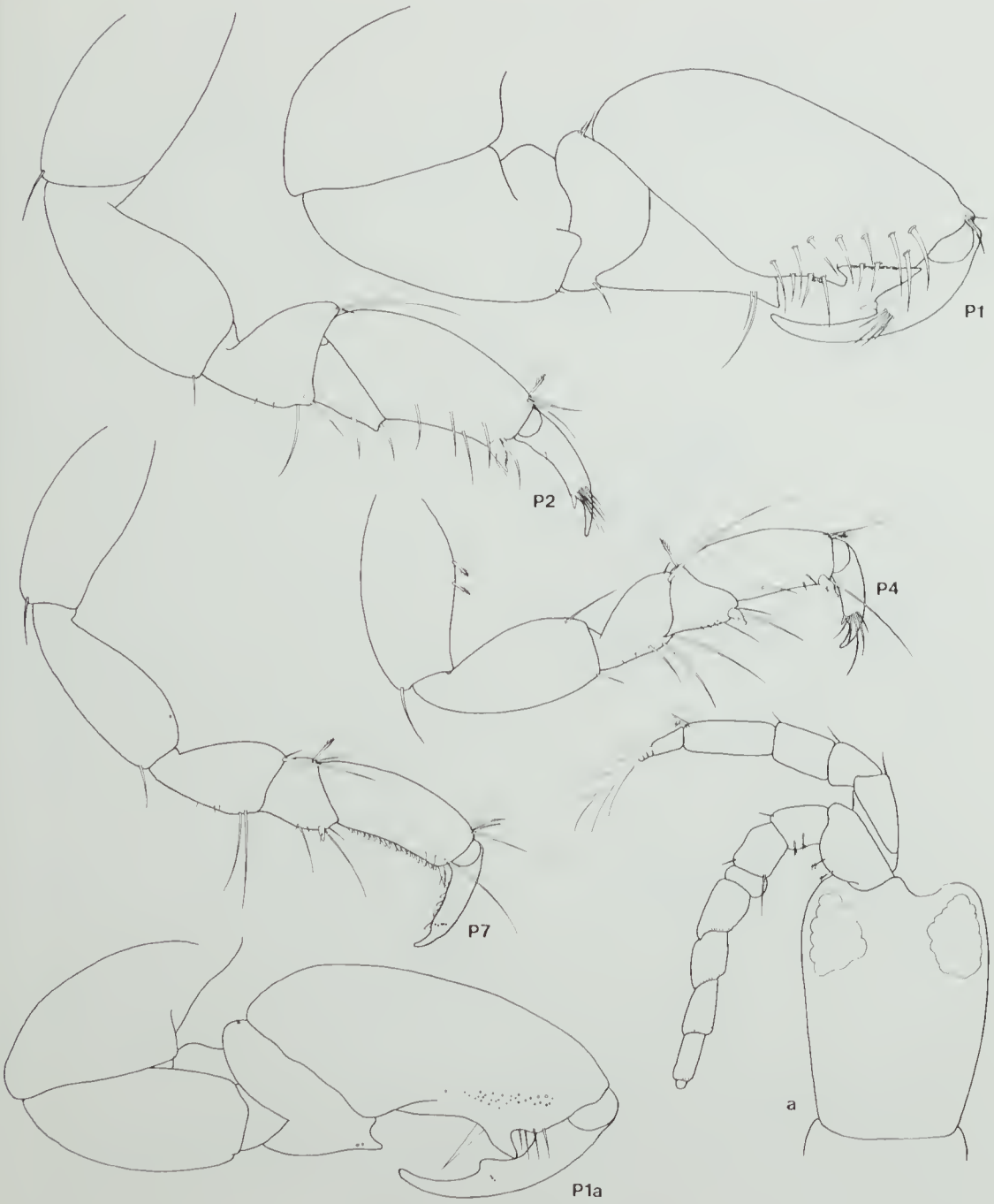

Figure 19. *Apanthura styphelia*. Holotype juvenile, 7.1 mm; a, paratype male, 5.9 mm, NMV.I3022.

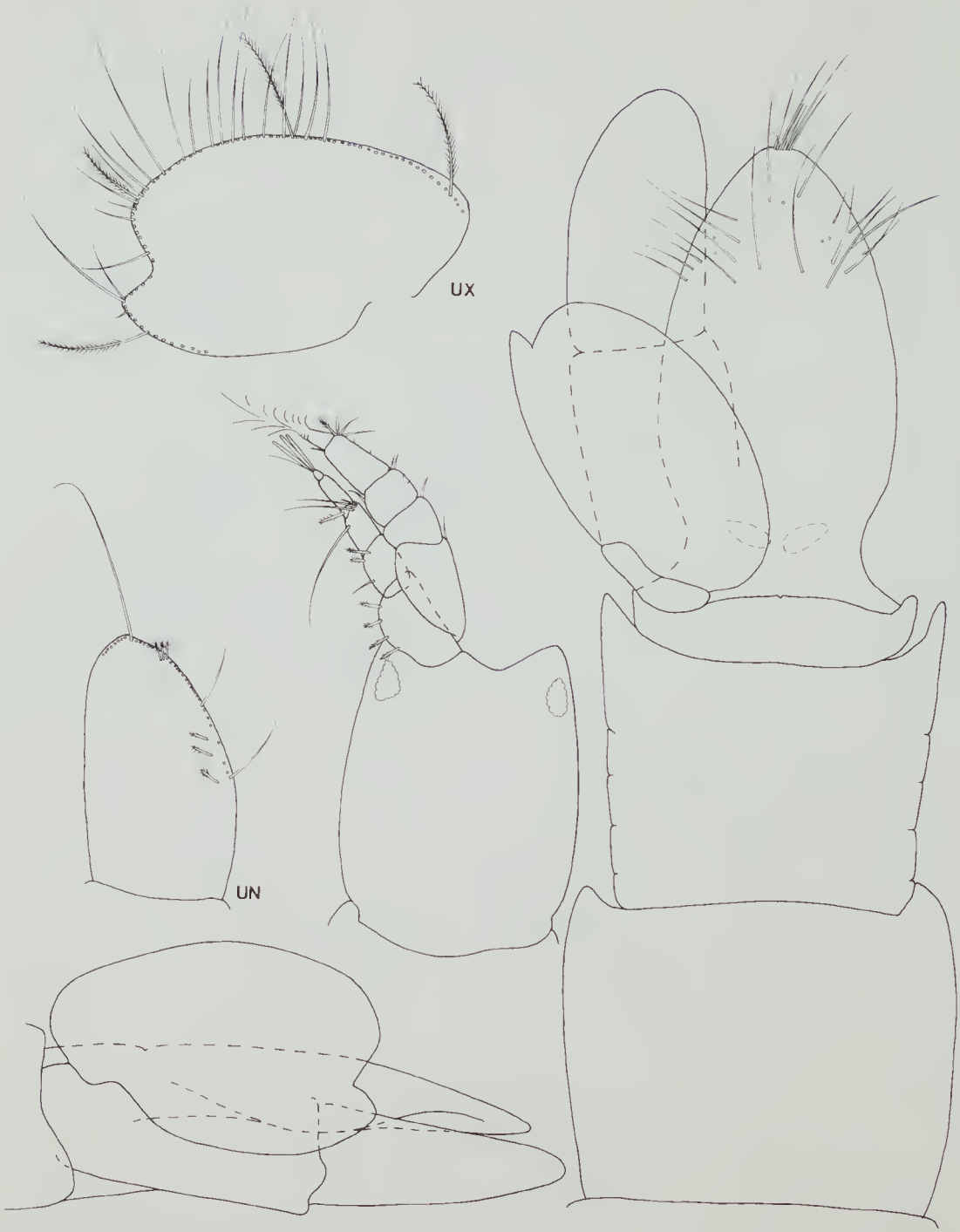

Figure 20. *Apanthura thryptomene*. Holotype juvenile, 10.7 mm.

Figure 21. *Apanthura thryptomene*. Holotype juvenile, 10.7 mm.

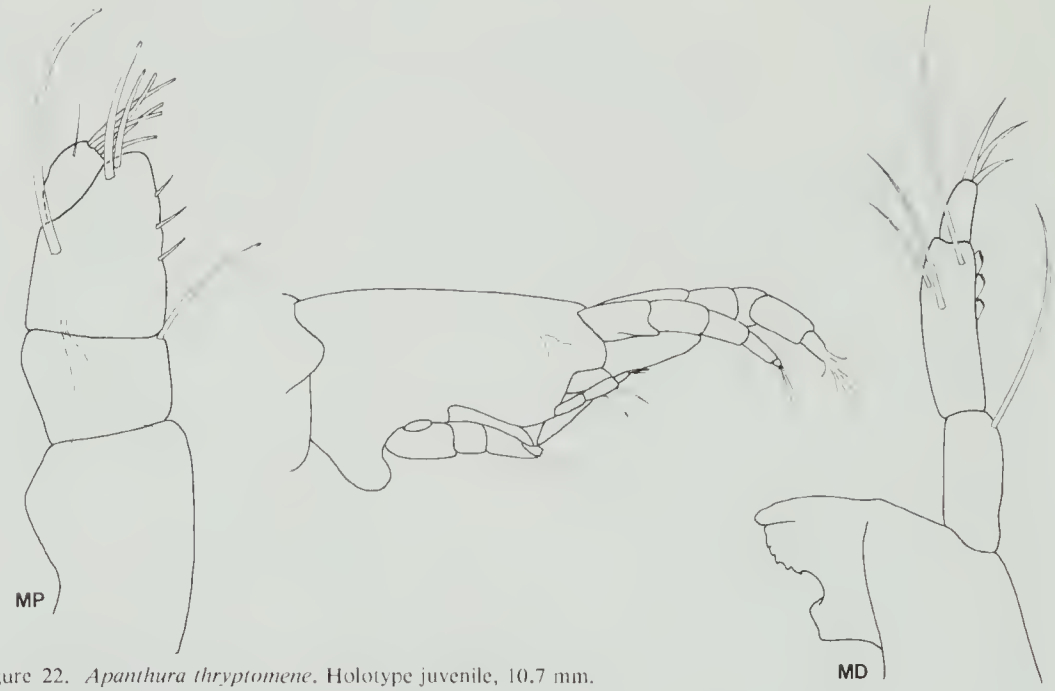

Figure 22. *Apanthura thryptomene*. Holotype juvenile, 10.7 mm.

marginal brush-seta on both articles 1 and 2. Mandibular palp articles with 1, 3 and 3 setae respectively. Maxilliped article 4 with 3 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, exceeding end of article 4.

Pereopod 1 article 5 with 8 mesial setae along anterior margin and with a pronounced distal tooth; article 6 palm with a pronounced tooth at midpoint, 11 marginal setae and about 20 setae on mesial face. Pereopod 2 article 4 with 4 anterior setae, with a sparsely setose posterior margin barely produced distally; article 5 produced distally into an acute lobe; article 6 linear-ovoid, with few mesial setae and no long setae on anterior margin. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with article 4 having a convex posterior margin bearing few long setae, article 5 with a short truncate distal lobe.

Uropodal endopod with a continuous row of long setae along lateral and terminal margin; 3 brush-setae on distolateral margin and 3 others dorsally. Exopod 1.6× as long as greatest width, ventral distal lobe acute and separated from broader dorsal lobe and convex dorsal margin by an obtuse notch.

Telson 1.4× as long as pleon, 1.9× as long as greatest width, lateral margins strongly convex and tapering from proximal third to a narrowly rounded apex; about 6 pairs of long dorsal setae on distal third.

Male: Unknown.

Distribution: Victoria, Western Port, 8-18 m; sandy substrates.

Remarks: *Apanthura thryptomene*, a typical member of *Apanthura* species-group 1, is separated from all others by the prominent ventral lobe at the base of the maxillipeds. A similar lobe is found in males of *A. xanthorrhoea*, for example, but is not well-developed in juveniles of any other species. The male of *A. thryptomene* is not known. The telson of this species is especially setose distally.

Apanthura xanthorrhoea sp. nov.

Figures 23, 24

Mesanthura maculata.—Tubb, 1937: 409 (not Haswell, 1881).

Material examined: 2 males, 19 juveniles, 10.3-16.4 mm:

Holotype: juvenile, 12.7 mm, NMVJ2992 (with one slide), Western Port, Corinella (38°25'S., 145°26'E.), Marine Study Group, 9 Dec 1969.

Paratypes: Vic., type locality, NMVJ2993 (1 specimen). Point Lonsdale, Marine Study Group, 12 Mar 1972, NMVJ2995(10). Western Port, Honeysuckle Point, T. Crawford, 29 Dec 1962, NMVJ2996(2). Phillip Island, Red Rock, sublittoral, W. F. Seed *et al.*, 29 Sept 1974, NMVJ2997(1). Western Port, Crib Point, CPBS stn 34N, NMVJ3035(1). Harmers Haven, intertidal, G. Poore, 6 Mar 1982 (CPA stn 23), NMVJ2998(1). Lady Julia Percy Island, Dinghy Bay, 6 m, McCoy Society, summer 1935-6, NMVJ2994(1).

Tas., Greens Beach, QVM 1982/10/1 (1 male, 2 juveniles). Cape Portland, 3 m, G. Edgar, 11 Jan 1981, NMVJ2999 (1 male). Schouten Passage, N. of Schouten Is., 12 m, A. J. Dartnall, 8 Jun 1977, NMVJ4444(6).

NSW, Jervis Bay, off Moona Moona Creek, 3 m, algae and sediment, J. K. Lowry (stn NSW-115), AMP33585(1). Port Hacking, Gunnamatta Bay, NMVJ3057(1). North Head, 29 m, 26 May 1972, AMP22810(1); 33 m, 23 May 1972, AMP24352(1). Lord Howe Island, reef front S. of North Passage, eelgrass, 3m, J. K. Lowry, 11 May 1977, AMP29808(2).

SA, Sellicks Beach, underside of boulders on reef, H. M. Hale, 27 Jan 1937. SAM(4).

Description: Integument pigmented; head, pereonites, pleon and telson with dendritic dorsal pigment patches. Eyes present. Head 1.3× as long as wide, not tapering anteriorly; with a prominent ventral lobe at the base of the maxillipeds. Antenna 1 peduncle with 1 long marginal seta on article 3, 1 short seta and marginal brush-setae on both articles 1 and 2. Mandibular palp articles with 1, 2 and 4 setae respectively. Maxilliped article 4 with 3 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, exceeding end of article 4.

Percopod 1 article 5 with only 2 mesial setae near anterior margin and with pronounced distal tooth; article 6 palm with pronounced tooth at midpoint, 8 marginal setae and about 11 setae on mesial face. Pereopod 2 article 4 with 4 anterior setae, with a sparsely setose posterior margin, not produced distally; article 5 produced distally into a truncate lobe; article 6 linear-ovoid, with few mesial setae, and no long setae on anterior margin. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with article 4 having convex posterior margin bearing few long setae, article 5 with a short truncate distal lobe.

Uropodal endopod with a continuous row of long setae along lateral and terminal margin; 3 brush-setae on distolateral margin and 4 others dorsally. Exopod 1.7× as long as greatest width, ventral distal lobe small and acute, separated from rounded dorsal lobe by a deep notch; dorsal margin convex. Telson 1.4× as long as pleon, 2.2× as long as greatest width, lateral margins evenly convex and tapering from midpoint to a rounded apex; 6 pairs of dorsal setae on distal third.

Male: Antenna 1 with flagellum of 8 articles reaching back to pereonite 1. Eyes enlarged. Ventral lobe on head grossly expanded. Pereopod 1 with article 5 having a prominently projecting tooth; article 6 swollen, possessing a palmar tooth; mesial setae more numerous. Other pereopods with distal articles more elongate than in juvenile. Appendix masculina on pleopod 2 a simple rod not reaching to the end of the endopod. Uropodal rami not more elongate than in juvenile.

Distribution: South Australia, Victoria, Tasmania and New South Wales; intertidal-33 m.

Remarks: *Apanthura xanthorrhoea* has a more elongate telson than the other species of *Apanthura* species-group 1 to which it belongs. There is a slight ventral lobe at the base of the maxillipeds of juveniles but this is extraordinarily well developed in males. The palm of pereopod 1 is more oblique and shorter than in other species and in males is complemented by a tooth on article 5.

The species is notable for the possession of persistent dorsal pigmentation which probably induced Tubb (1937) to place his specimen from Lady Julia Percy Island in *Mesanthura*. *Apanthura xanthorrhoea* is similar to *A. dimorpha* (Kensley) from South Africa particularly in the male pereopod 1 and head.

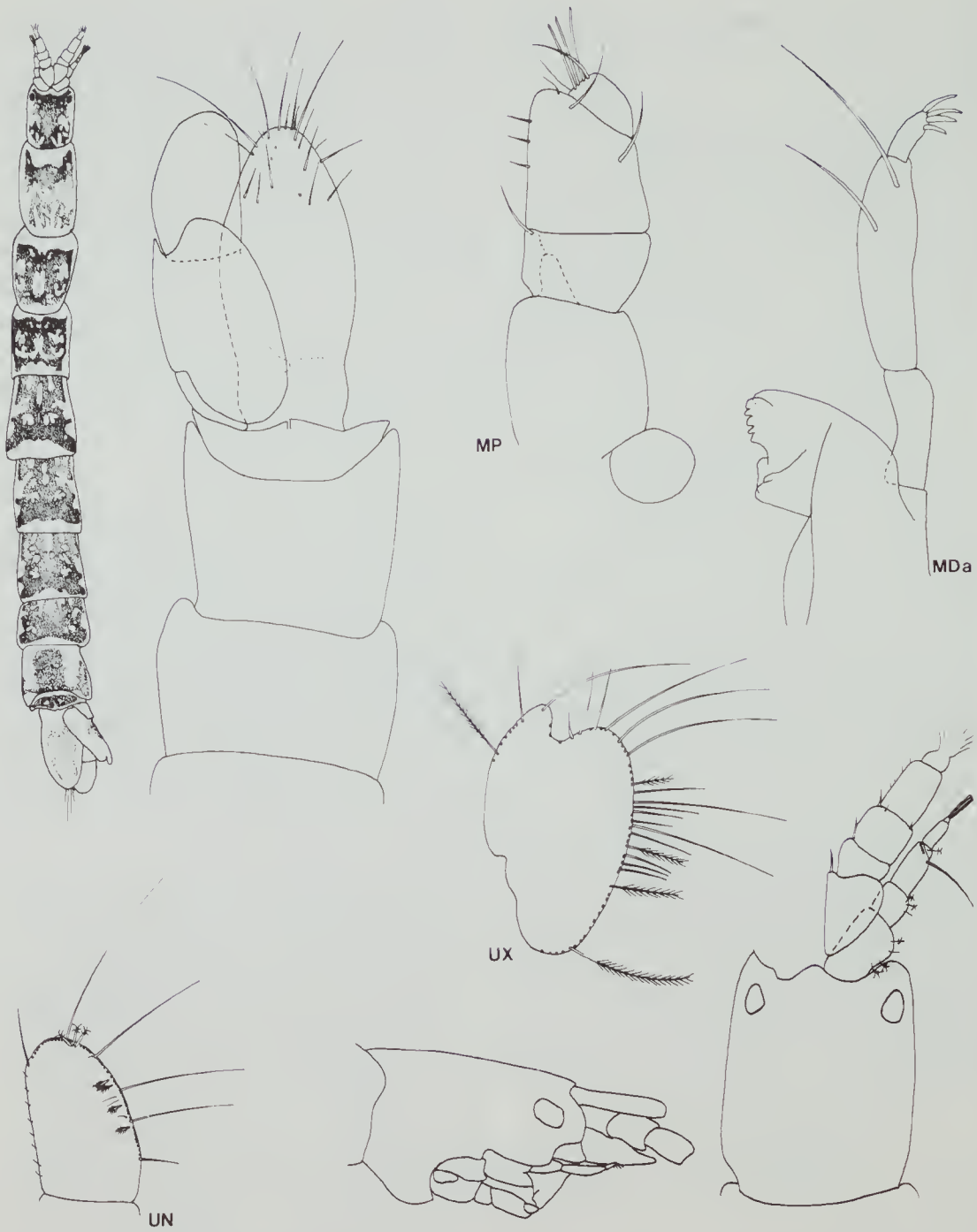

Figure 23. *Apanthura xanthorrhoea*. Holotype juvenile, 12.7 mm; a, paratype male, 14.0 mm, NMVJ2999.

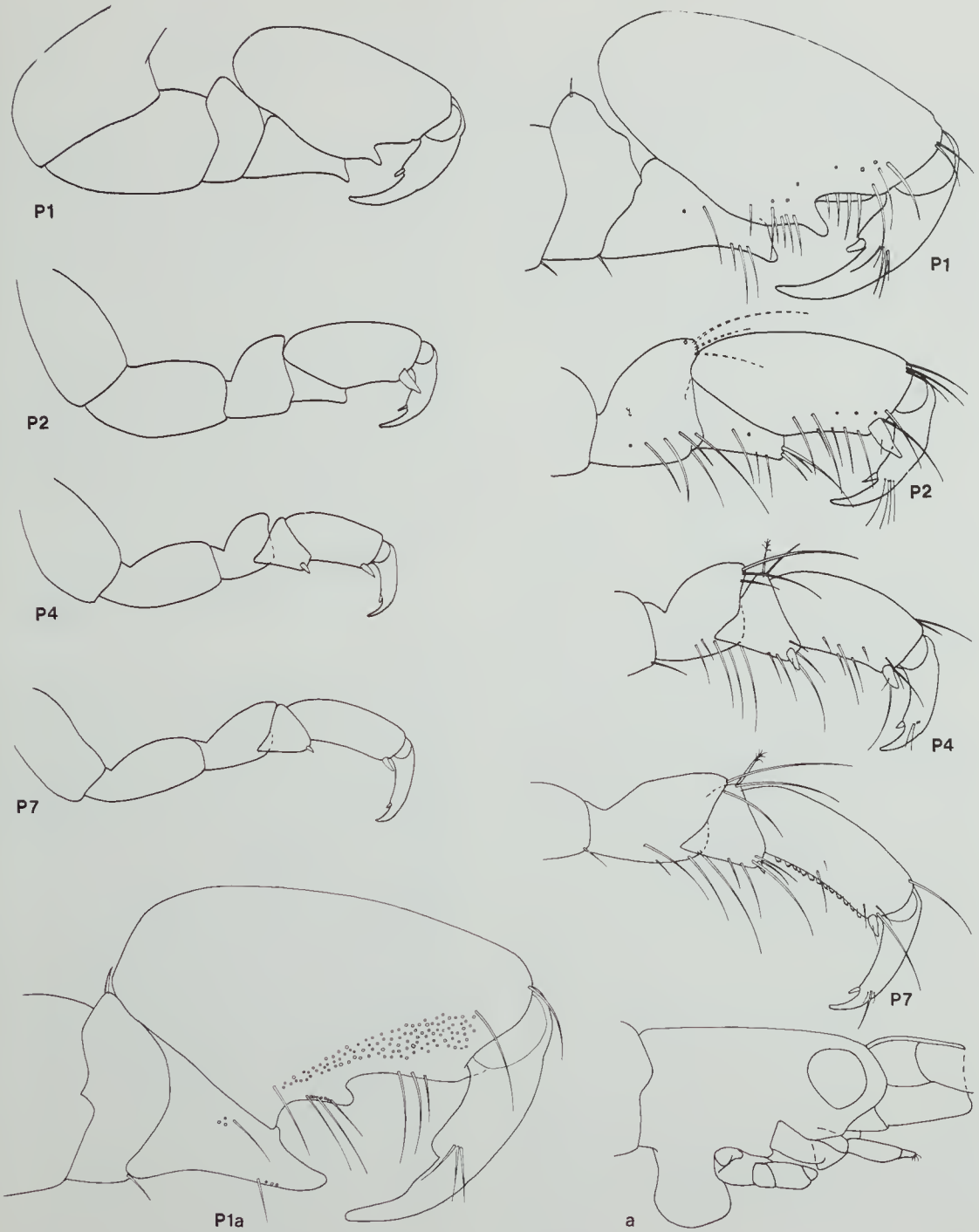

Figure 24. *Apanthura xanthorrhoea*. Holotype juvenile, 12.7 mm; a, paratype male, 14.0 mm, NMVJ2999.

Apanthura sp.

Figure 25

Material examined: Vic., Port Phillip Bay (38°14.0'S., 144°46.3'E.), sand, 8 m (PPBES stn 968), NMVJ3056 (1 male, 12.1 mm).

Remarks: A single male specimen from Port Phillip Bay could not be assigned to any of the species described here. The pereopods are similar to males of *A. lambertia* from Moreton Bay, Qld, but sufficient differences could be found in this character and between the telsons of the two species to distinguish them. Being male, the species does not appear in the key.

Apanthuretta Wägele

Apanthuretta (nomen nudum) Wägele, 1981a: 85, 112, fig. 37.
Apanthuretta Wägele, 1981b: 134-5.

Diagnosis: Integument smooth, sometimes pigmented. Eyes present. Antenna 1 flagellum short, of 3 articles, the last minute and bearing 3 aesthetascs. Antenna 2 flagellum short, of 2-4 articles. Mandibles symmetrical, not sexually dimorphic; incisor, lamina dentata and blunt molar present; palp 3-articled, article 3 one-third length of article 2, with 3-4 terminal setae. Maxilliped of five articles and bearing an acute endite with terminal seta; article 3 wider than long; article 4 usually with row of mesial setae; article 5 oblique, subterminal, much smaller than 4, with 4-5 apical setae.

Pereopod 1 subchelate, article 6 swollen, palm stepped (sometimes toothed), with stout mesial setae. Pereopods 2 and 3 with article 6 only little more robust than on posterior pereopods. Pereopods 4-7 with triangular-trapeziform article 5, with free anterior margin.

Pleon as long as pereonite 7, longer than wide; pleonites 1-4 separated dorsally by an integumental fold, 4-5 fused mid-dorsally, pleonite 6 free from others and from telson. Pleopod 1 exopod operculiform, endopod setose; pleopods 2-5 setose. Uropodal endopod as long as peduncle, its margin setose; exopod narrow, dorsal margin sinuous, or broad and with a definite dorso-distal lobe. Telson with two basal statocysts, apex with long setae.

Male antenna 1 flagellum with more than 10 isometric articles, bearing numerous aesthetascs; much longer than head.

Type-species.: *Apanthuretta pori* Wägele, 1981.

Remarks: Wägele (1981a) first mentioned the name "*Apanthuretta* gen. n." and listed several included species. None was listed as type-species and accordingly the name *Apanthuretta* remained invalid (ICZN Article 13(b)). In a later publication the name was published again as new with a valid type-species (Wägele, 1981b) and this must be taken as its first publication.

The three new Australian species are distinguished by subtle morphological differences in the form of the telson and uropods and in setation of antenna 1. The northern Australian species, *A. coppingeri* Barnard is also a species of *Apanthuretta* (examination of holotype).

Apanthuretta correa sp. nov.

Figures 26, 27

Material examined: 1 male, 11 juveniles; 7.0-9.5 mm:

Holotype: juvenile, 8.3 mm, QMW8460 (with one slide). Qld, Moreton Bay, Bramble Bay (27°18'S., 153°06'E.), Oct 1977 (QUBS station).

Paratypes: Qld, type locality, QMW10003 (4 specimens); Moreton Bay, Bramble Bay, QUBS stations: QMW8453(1) (with one slide); QMW8461(4); NMVJ3212(2).

Description: Integument not pigmented. Eyes present. Head little longer than wide, tapering anteriorly. Antenna 1 peduncle with a single long marginal seta only on article 3, 1 minute seta and marginal brush-setae on both articles 1 and 2. Mandibular palp articles with 1, 2 and 3 setae respectively. Maxilliped article 4 with 2 mesial setae, 1 laterally and 2 distally; article 5 with 5 setae, just exceeding distal margin of article 4.

Pereopod 1 article 4 with 2 mesial setae on anterior margin; article 5 with a strong distal truncate tooth, with 3 mesial stout setae; article 6 twice as long as greatest width, its palm with an obscure step at midpoint, with 8 marginal setae and 10 stout setae on mesial face.

Figure 25. *Apanthura* sp. Male, 12.1 mm, NMVJ3056.

Pereopod 2 article 4 with a convex setose posterior margin; article 5 barely produced distally; article 6 linear, with few mesial setae. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with articles 4-6 having convex posterior margins bearing several long setae.

Uropodal endopod about 1.5× as long as wide, with a continuous row of long setae along lateral and terminal margin; 3 brush-setae on distolateral margin and 3 others dorsally. Exopod 2.3× as long as greatest width, lateral margin most curved in distal half and tapering to rounded apex; 2 pairs of long dorsal setae two-thirds way along and few near apex.

Male: Antenna 1 flagellum of 20 articles, reaching back to posterior margin of pereonite 1. Eyes enlarged. Head with a ventral lobe at base of maxillipeds. Pereopod 1 with longer palm than in juvenile, bearing numerous mesial setae. Other pereopods more elongate than in juvenile. Appendix masculina on pleopod 2 with a terminal hook, extending beyond end of endopod. Uropodal rami more elongate than in juvenile. Telson tapering more sharply and with fewer setae than in juvenile.

Distribution: *Apanthuretta correa* co-occurs in Moreton Bay with *A. pimelia*; the species is recognised by the absence of long setae on the first two articles of antenna 1 and the strong tooth on article 5 of pereopod 1. The male has a well-developed chin posterior to the base of the maxillipeds.

Apanthuretta olearia sp. nov.

Figures 1b, 28-30

Material examined: 1 male, 8 submales, 362 juveniles; 4.0-13.2 mm:

Holotype: juvenile, 10.3 mm, NMVJ2110 (with one slide), Vic., Port Phillip Bay (37°57.7′S., 144°44.7′E.), sand, 5 m, 3 Feb 1972 (PPBES stn 907).

Paratypes: Vic., type locality, NMVJ2111 (1 specimen), NMVJ2112(10), NMVJ2113(1).

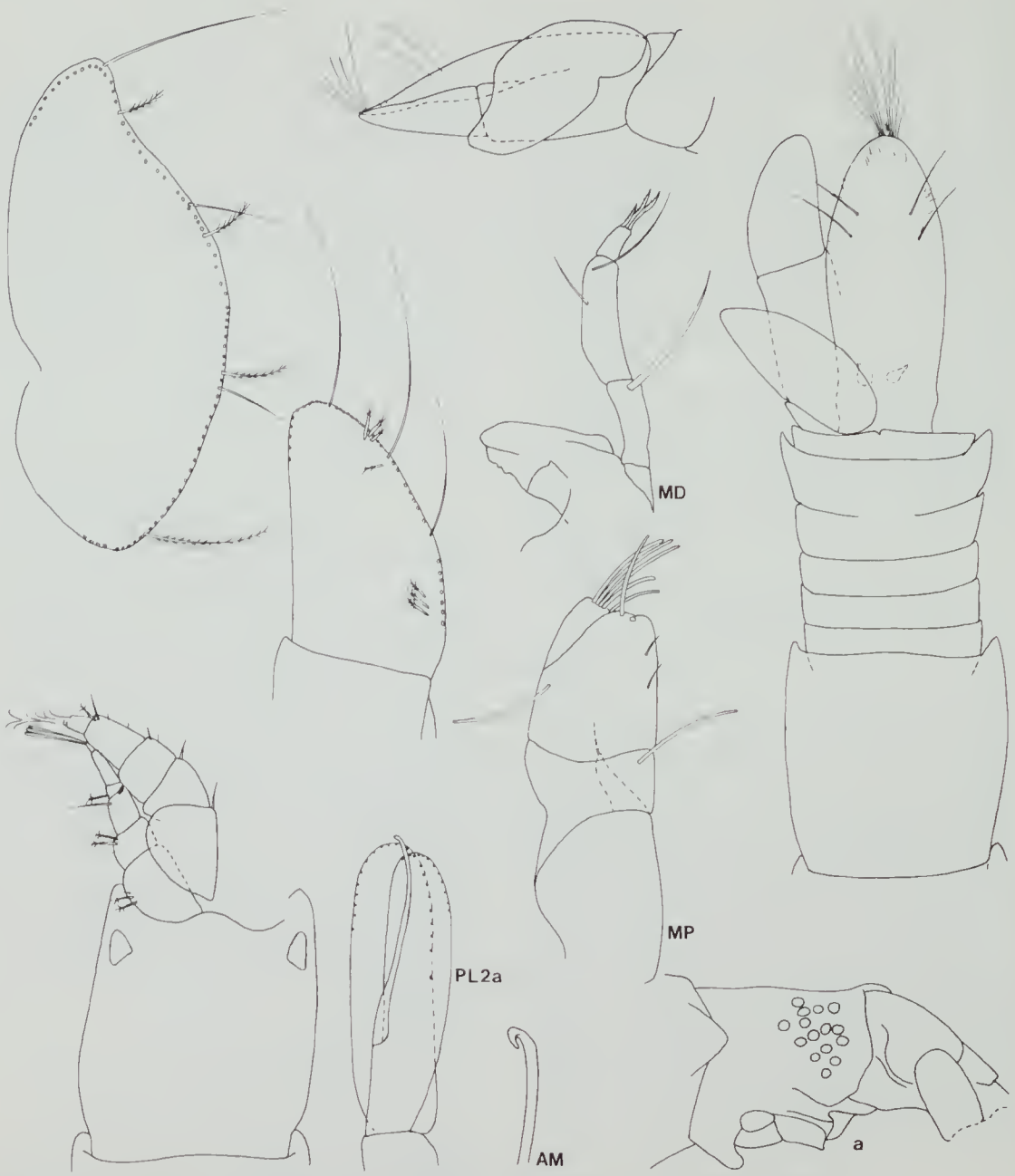

Figure 26. *Apanthuretta correa*. Holotype juvenile, 8.3 mm; a, paratype male, 7.0 mm, QMW8453.

Port Phillip Bay, PPBES stations: stn 931, NMVJ2172(2); stn 944, AMP33568(2); stn 984, NMVJ2114(1); NMVJ2171(1), NMVJ2231(17).

Other material: NSW, Careel Bay, Pittwater, AMP21086(1). E. of Malabar, AMSBS stn III, AMP22825(1), AMP33569(3); NSWSF stn K80-20-11, AMP32653(2). Port Jackson, AMP33570(1). Botany Bay, 25 specimens from samples collected by D. Dexter: AMP24987, P31040-2, P32646, NMVJ3024, J3025. Port

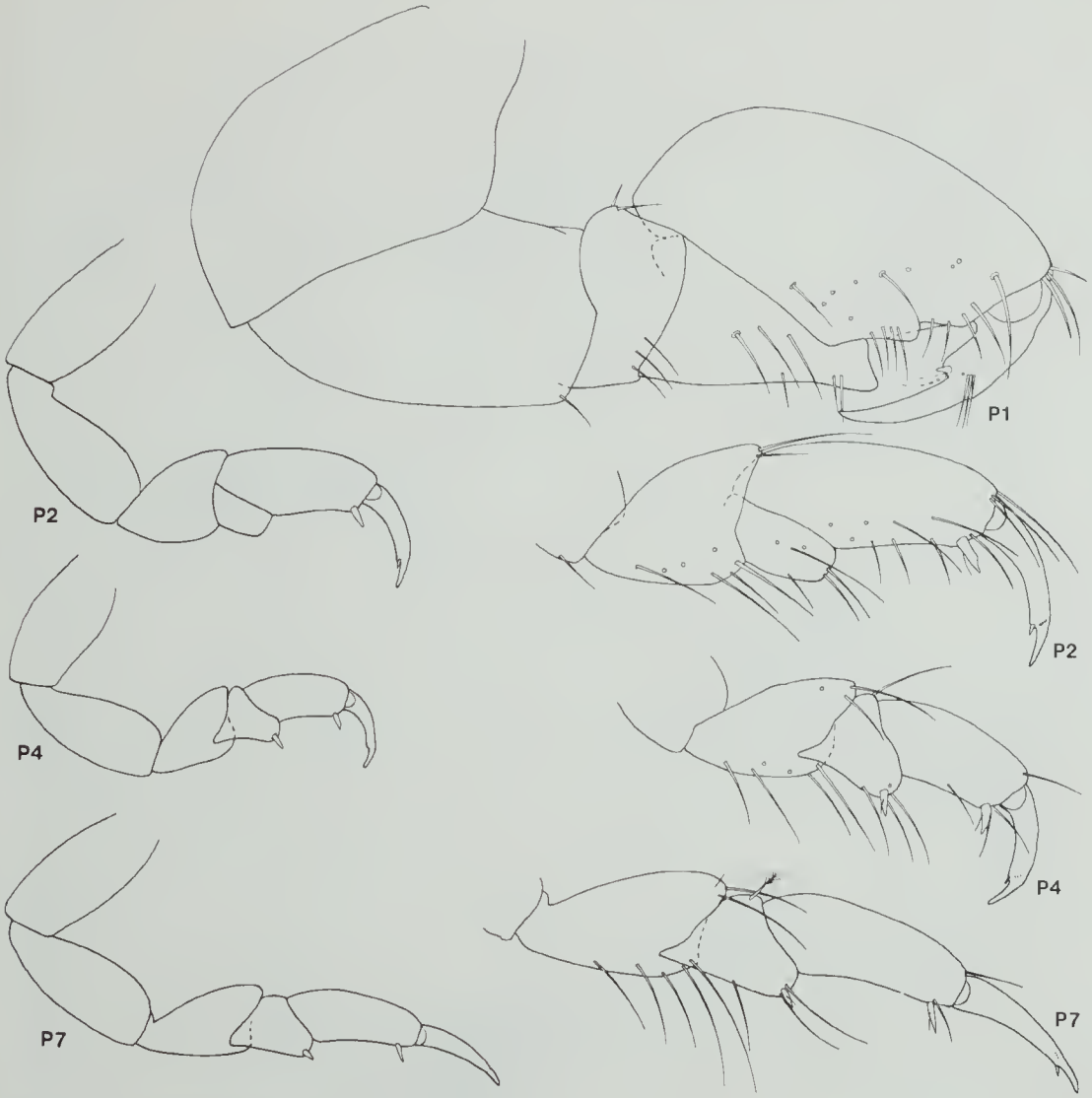

Figure 27. *Apanthuretta correa*. Holotype juvenile, 8.3 mm.

Hacking, Gunnamatta Bay, 12 specimens from CSIRO and NSWSF samples: AMP32542, P32523, P32525, P32679, NMVJ2292, J3026. Jervis Bay, 21 specimens from 7 NSWSF stations, AMP32613, P32616-18, P32623, P32625, P33571-3.

Bass Strait, 40°43.9′S., 148°32.5′E. (BSS stn 163), NMVJ3028(5).

Tas., east coast, 83 specimens from 7 samples collected by A. J. Dartnall: NMVJ2283-9, TMG2644.

Vic. Port Phillip Bay, 18 specimens from 8 PPBES stations, NMVJ2232-40. Western Port, Crib Point, 149 specimens from 19 CPBS stations, NMVJ2246-82, J3032. Western Port, 14 specimens from 6 WBES stations, NMVJ2240-5.

SA, Kangaroo Island, Kingscote, SAM(1).

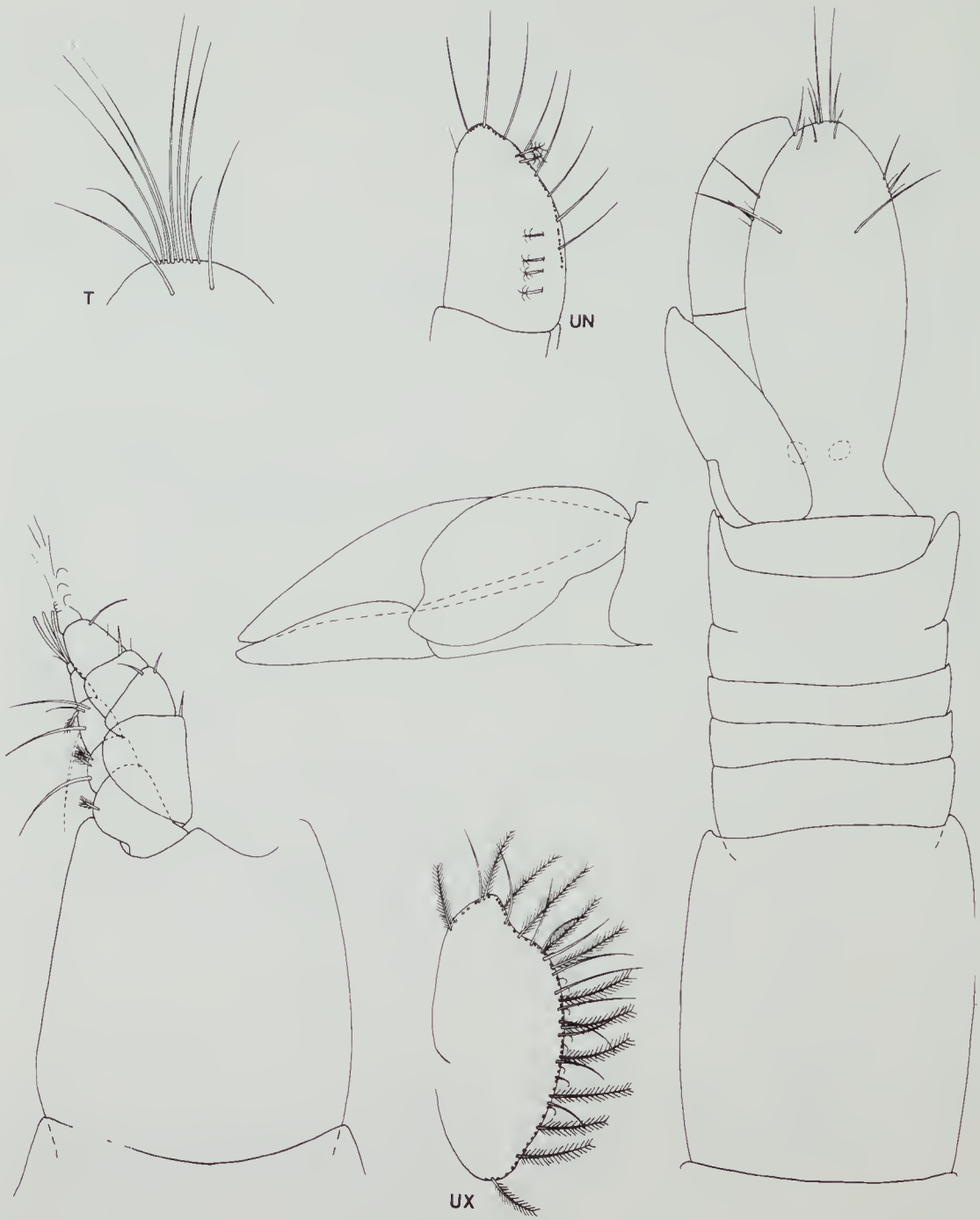

Figure 28. *Apanthuretta olearia*. Holotype juvenile, 10.3 mm.

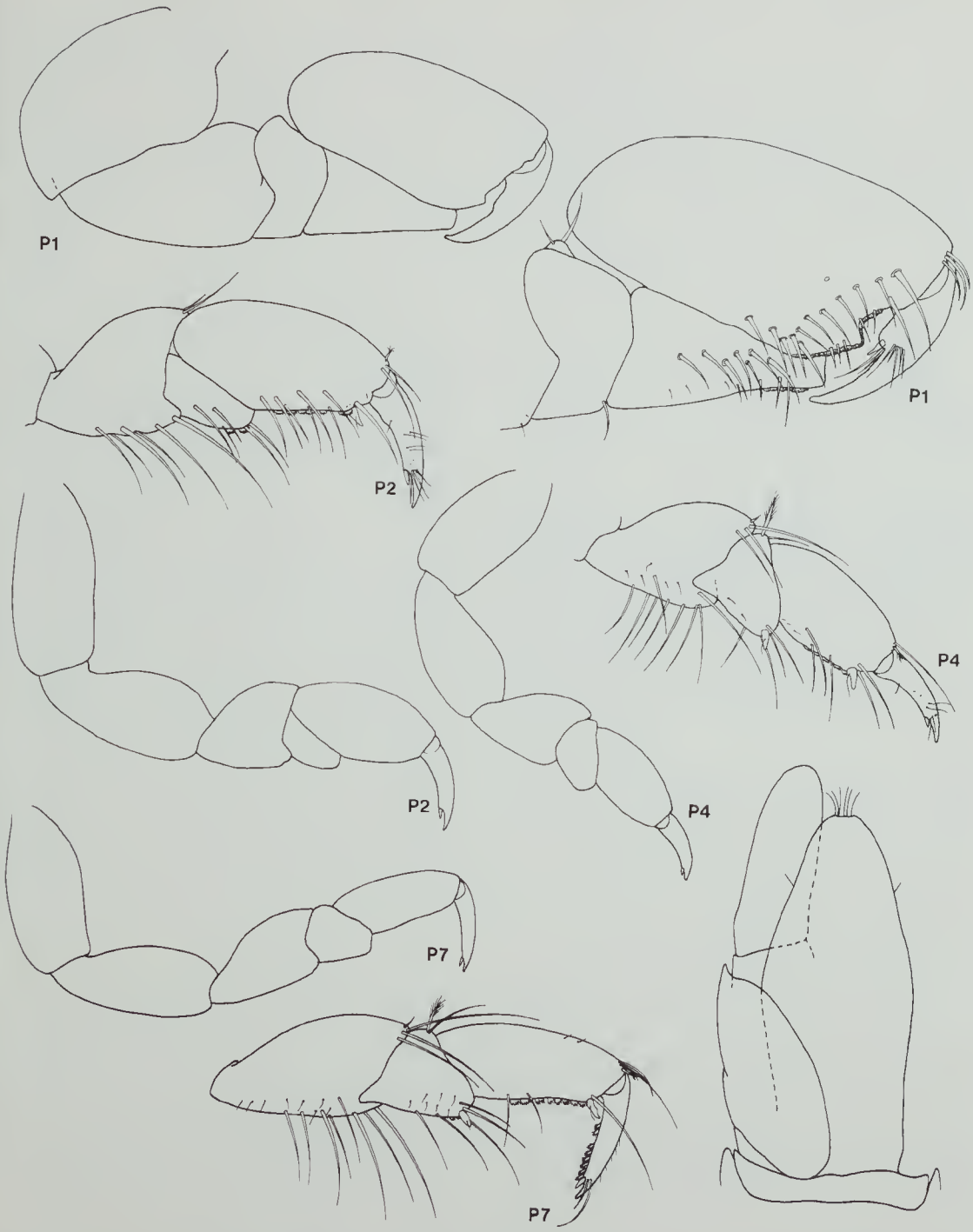

Figure 29. *Apanthuretta olearia*. Holotype juvenile, 10.3 mm; a, paratype male, 10.7 mm, NMVJ2111.

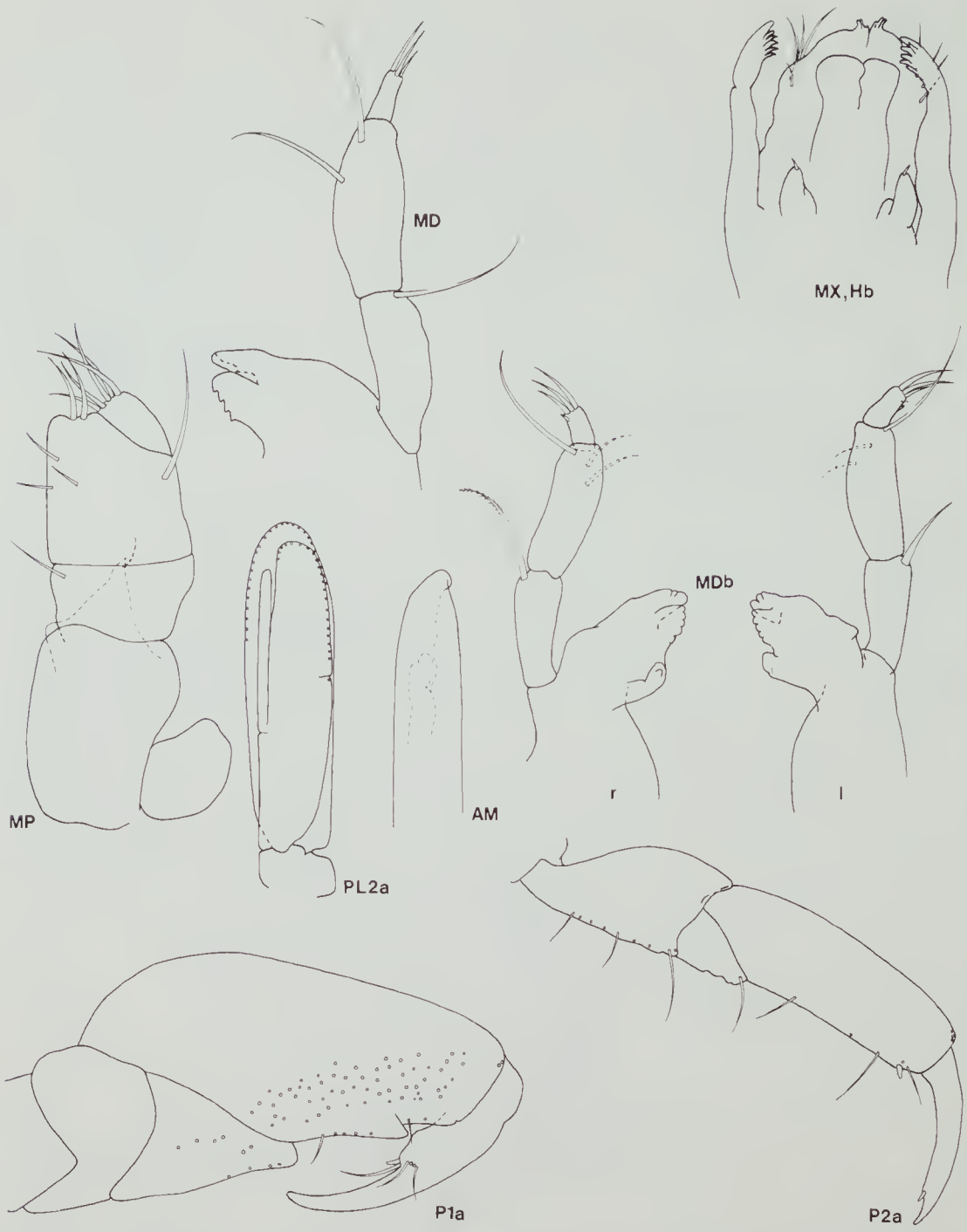

Figure 30. *Apanthuretta olearia*. Holotype juvenile, 10.3 mm; a, paratype male, 10.7 mm, NMVJ2111; b, paratype juvenile, 13.1 mm, NMVJ2114.

Description: Integument not pigmented. Eyes present. Head about as long as wide, tapering anteriorly. Antenna 1 peduncle with a single long marginal seta on each of articles 2 and 3 and with marginal brush-setae on articles 1 and 2. Mandibular palp articles with 1, 3 and 3 setae respectively. Maxilliped article 4 with 3 setae near mesial margin, 1 laterally and 2 distally; article 5 with 5 setae, exceeding distal margin of article 4.

Pereopod 1 articles 4 and 5 each with 1-2 mesial setae along anterior margin; article 5 truncate distally, with 7 mesial stout setae; article 6 twice as long as greatest width, its palm with a pronounced step at midpoint, a marginal row of 6 setae and 12 stout setae on mesial face. Pereopod 2 article 4 with a convex setose posterior margin; article 5 not produced distally; article 6 ovoid, with few mesial setae. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with articles 4-6 having convex posterior margins bearing several long setae.

Uropodal endopod about 1.5× as long as wide, with a continuous row of long setae along lateral and terminal margin; 2 brush-setae on distolateral margin and others dorsally. Exopod 2.3× as long as greatest width, widest distally, distal lobe short and acute, dorsal margin concave only distally. Telson almost as long as pleon, 2.4× as long as greatest width, lateral margins evenly convex (barely more sharply curved at midpoint and tapering to a broadly rounded apex; evenly domed in longitudinal section; 2 long dorsal setae three-quarters way along and few near apex; lateral setae only on distal third.

Male: Antenna 1 flagellum of 28 articles, reaching back to middle of pereonite 3. Eyes enlarged. Pereopod 1 with longer palm than in juvenile, bearing numerous mesial setae, palmer tooth more pronounced and more distal. Other pereopods, especially pereopod 2, more elongate than in juvenile; article 6 of pereopod 2 linear. Appendix masculina on pleopod 2 simple, not reaching to end of endopod. Uropodal rami narrower than in juvenile and extending well beyond end of telson. Telson tapering more sharply and with fewer setae than in juvenile.

Distribution: Southern New South Wales, Victoria, Tasmania and South Australia, intertidal to 56 m.

Remarks: *Apanthuretta olearia* is the most abundant and widespread species of the *Apanthura*-complex from south-eastern Australia. The presence of a single lateral long seta on the second article of antenna 1 and broader telson distinguish it from other species.

Apanthuretta pimelia sp. nov.

Figures 31-33

Material examined: 2 males, 3 submales, 56 juveniles, 5.1-13.2 mm:
Holotype: juvenile, 13.2 mm, QMW10004 (with one slide). Qld, Moreton Bay, Middle Banks (27°25′S., 153°20′E.), Jun 1973 (QUBS station).
Paratypes: Qld, Moreton Bay, QUBS stations: QMW10006 (with one slide) (1 specimen), QMW10005(5), QMW6126 (with one slide)(1), QMW6128(1), QMW8132(1), QMW8281(2), QMW8454(6), QMW8455(1), QMW8458(2), NMVJ2290(5), NMVJ2291(6), AMP33590(4), AMP33591(3).
Other material: Qld, Moreton Bay, QUBS stations, QMW10007-16(21 specimens).

NSW, Off Belmont Beach, HDWBS station, AMP24367(1).

Description: Integument not pigmented. Eyes present. Head almost as long as wide, tapering anteriorly. Antenna 1 peduncle with 2, 3 and 1 long marginal setae on articles 1, 2 and 3 respectively, and with marginal brush-setae on articles 1 and 2. Mandibular palp articles with 1, 5 and 3 setae respectively. Maxilliped article 4 with 3 mesial setae, 2 near mesial margin, 1 laterally and 2 distally; article 5 with 6 setae, just exceeding distal margin of article 4.

Pereopod 1 articles 4 and 5 each with 1-2 mesial setae along anterior margin; article 5 truncate distally, with 7 mesial stout setae; article 6 2.5× as long as greatest width, its palm with pronounced step at midpoint, a marginal row of 7 setae and 16 stout setae on mesial face. Pereopod 2 article 4 with a convex setose posterior margin; article 5 scarcely produced distally; article 6 ovoid, with few mesial setae, with a distal spine on posterior margin.

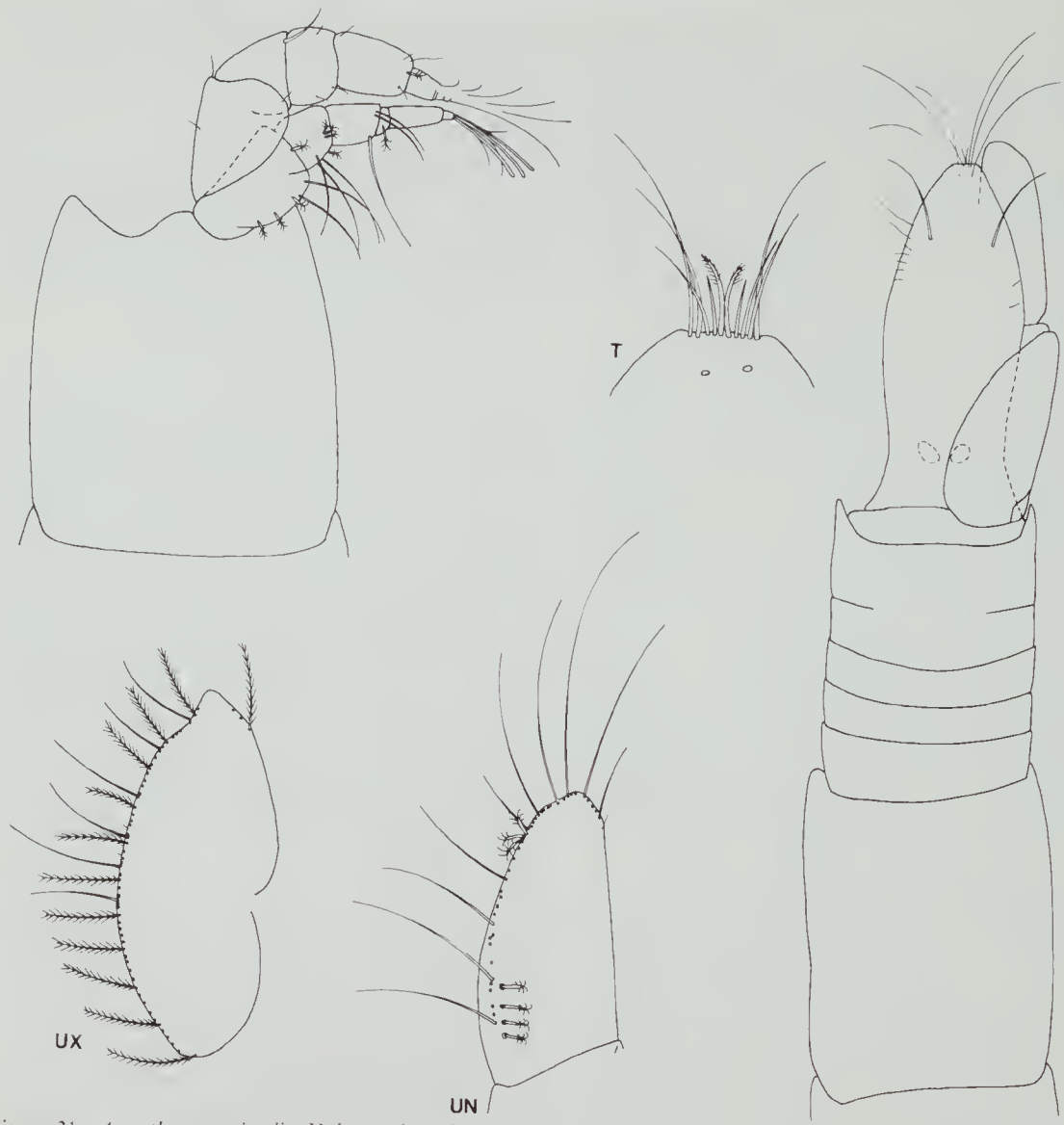

Figure 31. *Apanthuretta pimelia*. Holotype juvenile, 13.2 mm.

Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with articles 4-6 having convex posterior margins bearing numerous long setae.

Uropodal endopod almost twice as long as wide, with a continuous row of long setae along lateral and terminal margin; 3 brush-setae on distolateral margin and others dorsally. Exopod 2.3× as long as greatest width, widest at midpoint, distal lobe acute, dorsal margin evenly convex and barely concave distally. Telson almost as long as pleon, 2.4× as long as greatest width, lateral margins evenly convex and tapering sharply to a truncate apex; 1 pair of dorsal setae near apex and another pair three-quarters way along.

Male: Antenna 1 with flagellum of about 23 articles, whole about 7× as long as head. Eyes enlarged. Pereopod 1 with longer palm than in juvenile, bearing numerous mesial setae rather than spines, palmar tooth more produced.

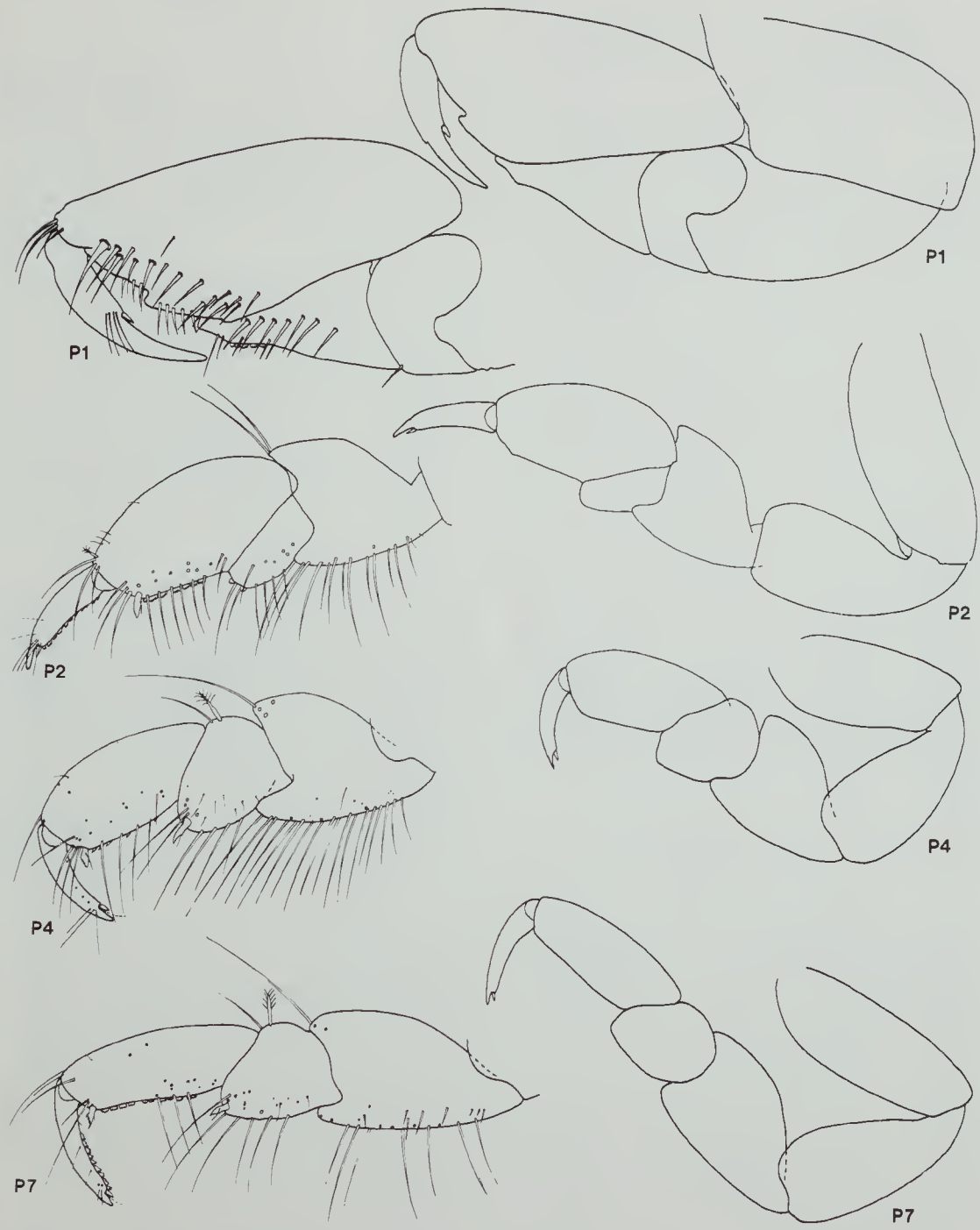

Figure 32. *Apanthuretta pimelia*. Holotype juvenile, 13.2 mm.

Figure 33. *Apanthuretta pimelia*. Holotype juvenile, 13.2 mm; l, left; r, right.

Other pereopods with article 6 more elongate than in juvenile. Appendix masculina on pleopod 2 simple, reaching to end of endopod. Uropodal endopod narrower, extending well beyond end of telson. Telson widest in proximal half and tapering more sharply than in juvenile.

Distribution: Southern Queensland and northern New South Wales; shelf and bays.

Remarks: *Apanthuretta pimelia* is a more elongate species than others from Australia. The sixth article of pereopod 1 is especially narrow but distal articles of the walking legs are broader and more setose than in *A. correa* with which it co-occurs.

Apanthuropsis gen. nov.

Diagnosis: Integument smooth, pigmentation not known. Eyes present. Antenna 1 flagellum short, of 3 articles, the last minute and bearing 3 aesthetascs. Antenna 2 flagellum short with 4 articles. Mandibles asymmetrical, not sexually dimorphic; incisor, short lamina dentata and molar present (molar of right side with a tooth fitting into a socket on molar of left side); palp 3-articled, article 3 one-third length of article 2, with 3 terminal setae. Maxilliped without an endite, of five articles; article 3 longer than wide; article 4 without mesial setae; article 5 subterminal, oblique, much smaller than 4, with 5 terminal setae.

Pereopod 1 subchelate; article 6 swollen, palm very short, stepped (not toothed) and lacking mesial spines. Pereopods 2 and 3 article 6 swollen, with short dactyl. Pereopods 4-7 with triangular-trapeziform article 5, its anterior margin free.

Pleon longer than pereonite 7, as long as wide; pleonites 1-5 fused; pleonite 6 free from others but fused to telson. Pleopod 1 exopod operculiform, endopod setose; pleopods 2-5 setose. Uropodal endopod shorter than peduncle, with a setose margin; exopod dorsally sinuous but not excavate. Telson with 2 basal statocysts, apex with long setae.

Male antenna 1 flagellum with about 20 articles bearing numerous aesthetascs, reaching posterior margin of pereonite 2.

Type-species: *Apanthuropsis richea* sp. nov.

Apanthuropsis richea sp. nov.

Figures 1e, 34-37

Material examined: 1 male, 11 juveniles; 5.6-8.4 mm:

Holotype: juvenile, 5.9 mm, NMVJ2299 (with one slide). Vic., Western Port, Crib Point (38°21'S., 145°14'E.), 11 m, Marine Studies Group, 26 Aug 1964 (CPBS stn C3).

Paratypes: Vic., Western Port, Crib Point, CPBS stations: stn C2, NMVJ2300 (1 specimen); stn 23S, NMVJ2301(1); stn 32S, NMVJ2302(1); stn 33N, NMVJ2303(1); stn 41N, NMVJ2304(1); stn 21N (1973), NMVJ2305(1), NMVJ2306(1), NMVJ2916 (1 male); stn 32N (Apr 1968), NMVJ2307(1). Western Port, WBES stn 1730, AMP33588 (1). *Other material:* Vic., Western Port, Crib Point, CPBS stn 32N (Aug 1970), NMVJ2308(1).

Description: Integument not pigmented. Eyes present. Head about as long as wide, lateral margins convex, rostrum broadly rounded. Antenna 1 pedunele with 1 long marginal seta on article 2 and with marginal brush-setae on articles 1 and 2. Mandibular molar with a blunt tooth on the right side, fitting into a socket on the left side; lamina dentata with 4 teeth; incisor blunt; palp articles with 1, 1 and 3 setae respectively. Maxilliped with no endite, article 3 with 1 seta near distomesial corner; article 4 with 1 submesial seta, 1 laterally and 1 distally; article 5 with 5 setae, just exceeding distal apex of article 4.

Pereopod 1 articles 4 and 5 each with 1-2 mesial setae along anterior margin; article 5 truncate distally; article 6 about 1.7× as long as greatest width, its short palm with pronounced step at midpoint, 6 marginal setae and 8 fine setae on mesial face; article 7 basally very broad, supplementary claw on a lobe at base of unguis. Pereopod 2 article 4 with 5 anterior setae, not posteriorly lobed; article 5 without posterior tooth; article 6 broadly ovoid, mesially sparsely setose, with a distal spine on posterior margin; daetyl distally densely setose. Pereopod 3 similar to 2, but smaller. Pereopods 4-7 with articles 4-6 having convex posterior margins bearing few long setae, daetyl distally densely setose.

Uropodal endopod with a continuous row of long setae along lateral and terminal margin; 6 brush-setae dorsally. Exopod 2.0× as long as greatest width, distal lobe broadly rounded; dorsal margin almost evenly convex.

Telson as long as pleon, 2.1× as long as greatest width, lateral margins abruptly curved two-thirds way along and tapering sharply from there to an acutely-rounded apex; dorsal setae in 2 submarginal rows on distal third.

Male: Antenna 1 with flagellum of 20 articles reaching back to posterior margin of pereonite 2. Eyes enlarged; head wider anteriorly; rostrum more pronounced than in juvenile and with a dorsal depression. Pereopod 1 similar to that of juvenile except palmar tooth more pronounced and mesial setae more numerous. Other pereopods more elongate than in juvenile. Appendix masculina on pleopod 2 a simple rod reaching just beyond end of endopod. Uropodal rami not modified. Telson broader than in juvenile and more abruptly tapering; strongly concave dorsally and sharply deflexed at tip.

Distribution: Western Port, Victoria, muddy and gravelly sand sediments, 8-14 m.

Remarks: The relationship of the genus *Apanthuropsis* to *Apanthura* and *Apanthuretta* was discussed above. Its only known species is quickly distinguished from species of the other genera by similar ovoid form of the first three pereopods.

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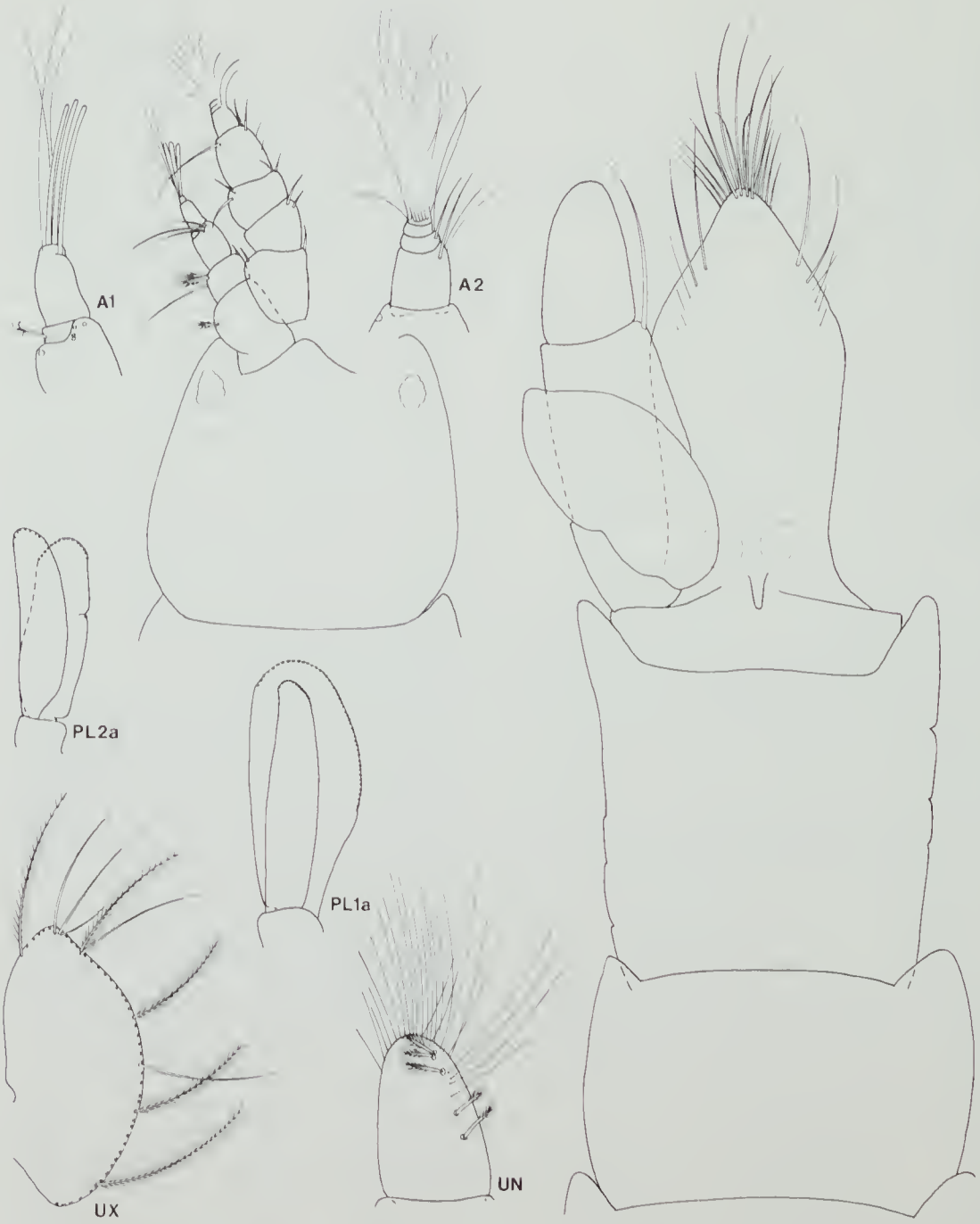

Figure 34. *Apanthuropsis richea*. Holotype juvenile, 5.9 mm.

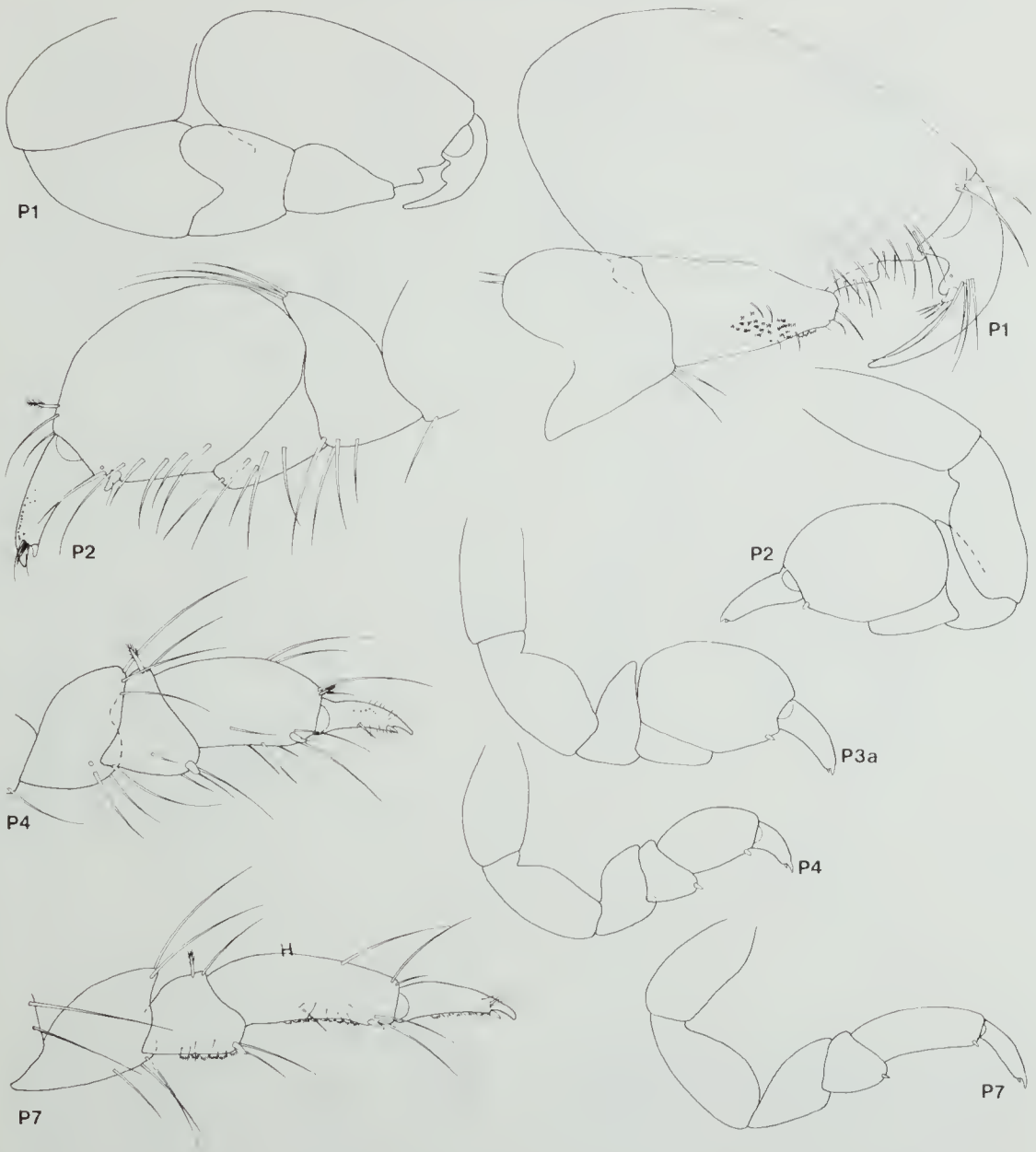

Figure 35. *Apanthuropsis richea*. Holotype juvenile, 5.9 mm; a, paratype juvenile, 8.4 mm, NMVJ2305.

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Figure 36. *Apanthuropsis richea*. Paratype juvenile, 10.5 mm, NMVJ2304; a, paratype male, 10.1 mm, NMVJ2916; l, left; r, right.

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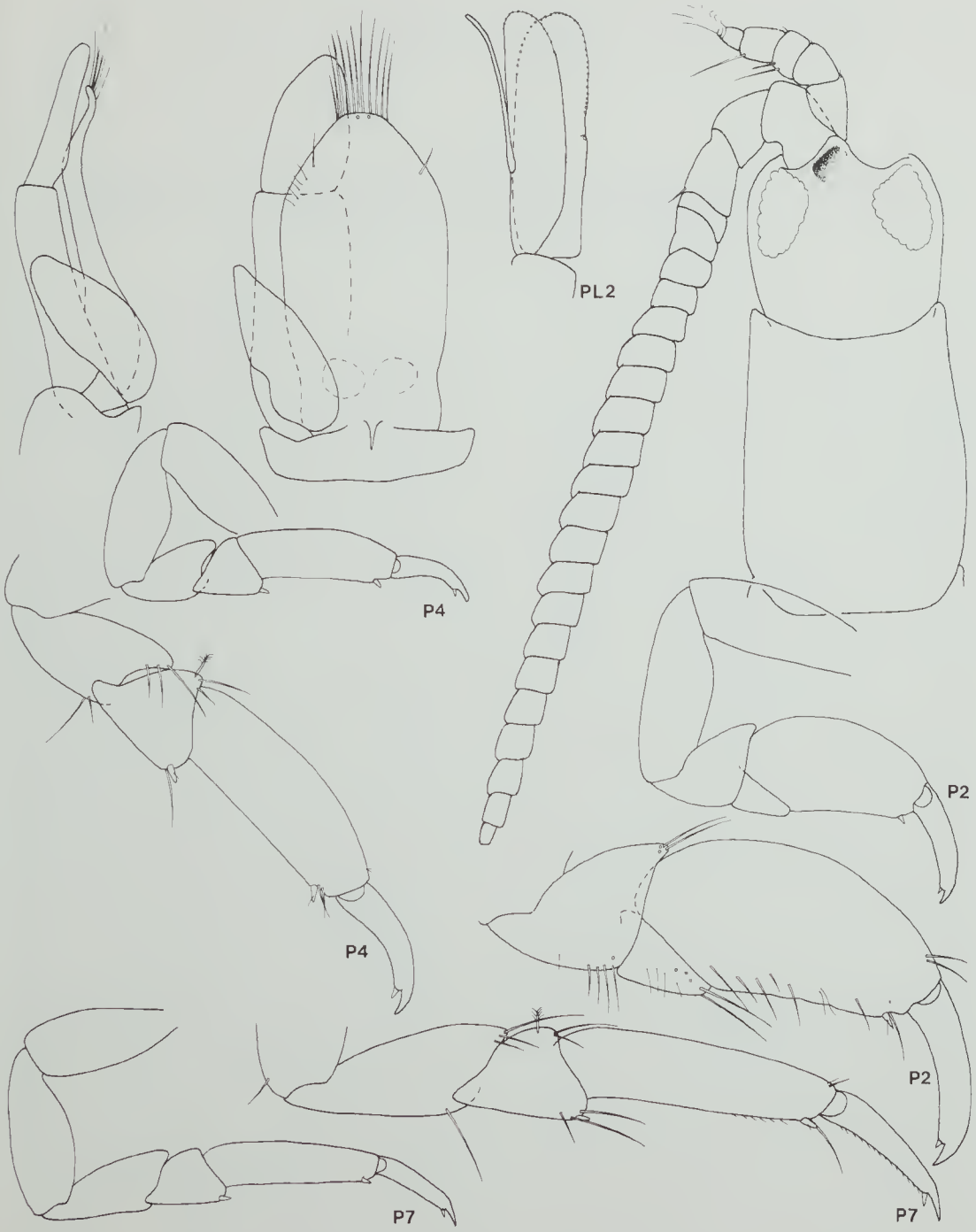

Figure 37. *Apanthuropsis richea*. Paratype male, 10.1 mm, NMVJ2916. Aesthetascs on antenna 1 not figured.