

# PARANTHURA (CRUSTACEA, ISOPODA, PARANTHURIDAE) FROM SOUTH-EASTERN AUSTRALIA

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## Abstract

Eleven new species of *Paranthura* (Paranthuridae) are described from the south-eastern Australian coast and shelf: *P. acacia*, *P. boronia*, *P. caesia*, *P. dryandra*, *P. epacris*, *P. grevillea*, *P. kunzea*, *P. lobelia*, *P. microtis*, *P. senecio* and *P. telopea*. *Paranthura ciliata* Whitelegge, 1901, and *P. involuta* Whitelegge, 1901, are redescribed. A key to their identification is presented.

Australian species of *Paranthura* are sexually dimorphic; males differ from juveniles and females in antenna 1, pereopods, uropods and telson. However, the ways in which dimorphism is expressed are various.

## Introduction

In two previous papers (Poore, 1978, 1981) species of six paranthurid genera from south-eastern Australia were described. These are *Acacalathura* Barnard, *Aenigmathura* Thomson, *Bullowanthurus* Poore, *Colanthura* Richardson, *Leptanthura* Sars, and *Ulakanthurus* Poore. Here, species of *Paranthura* Bate & Westwood are dealt with.

To date four Australian species have been referred to *Paranthura*. *Paranthura australis* Haswell is a nomen dubium, possibly a species of *Leptanthura* (Poore, 1978). Miers' (1884) specimen referred to as *Paranthura australis* became the type of *Apanthura coppingeri* Barnard, 1925. The other two, *Paranthura ciliata* Whitelegge and *P. involuta* Whitelegge, and eleven new species are dealt with here.

The genus *Paranthura*, although clearly distinct from other paranthurids (Poore, 1980) is remarkably homogeneous both in Australia and world-wide. Prior to this work about 28 species were known. Species are distinguished by subtle differences in the shape and proportions of articles of pereopods, uropods and telson. Setation is generally consistent. In several cases morphological differences between juveniles of different species only became apparent after quite distinct males were found (e.g., *P. acacia* and *P. microtis*). In this study relationships between Australian species and those in other parts of the world are not explored. Given the apparent richness of the Australian fauna it is probable that other areas also possess endemic cryptic species as yet undescribed.

Sexual dimorphism occurs as in all Anthuridea (Poore, 1980), males being characterised by the possession of a multiarticulate flagellum on antenna 1, each article bearing numerous aesthetascs, and of a stylet-like appendix masculina on the endopod of pleopod 2. In the south-eastern Australian fauna new forms of modification are noted:

1. Antenna 1. In one species, *P. epacris*, each flagellar article possesses only two aesthetascs, not many.

2. Appendix masculina. In *P. boronia* the appendix masculina is exceptionally broad, half as wide as the uropodal endopod, not stylet like. The appendix reaches further in some species than in others.

3. Pereon. In *P. epacris* the pereon is considerably elongated compared with the female and with males of other species.

4. Pleon. The pleon of the male of *P. caesia* is more shortened than that of the female. Extreme shortening of the pleon is a feature of *P. infundibulata* Richardson from Bermuda and of *P. bellicauda* Miller & Menzies from Hawaii.

5. Telson. The telson may be elongated and dorsally setose as in *P. caesia*. Both sexes of *P. infundibulata* Richardson exhibit this phenomenon.

6. Pereopod 1. The mesial setae along the palm of males are more numerous than in females, as is the case in several anthurideans.

7. Pereopods 2 and 3. Article 6 is more elongate in males than in females.

8. Pereopods 4-7. Particularly in the most posterior limbs, basal articles may be either broader in females (*P. acacia*, *P. caesia*) or

more elongated (*P. dryandra*, *P. microtis*). The South African species, *P. latipes* Barnard, known only from males, possesses an extremely broad basis on pereopod 7 and is probably conspecific with *P. punctata* (Stimpson).

9. Uropod. Rami may be broader than in females and mesially setose (*P. acacia*, *P. caesia*) or narrower (*P. dryandra*, *P. microtis*). Again, *P. infundibulata* Richardson shows extreme broadening of the male uropodal rami.

The differences between the kinds of sexual dimorphism shown raise serious questions about the taxonomic reality of the genus *Paranthura*. Species groups based on morphology of males are not readily apparent. While *Paranthura epacris* may be separated from all other species on male characters as well as on non-sexual features, among the others there is little correlation between male characters. For example, species with a shortened pleon include those with both broadened and elongated pereopods.

Knowledge of sexual differentiation in Anthuridea is based on work with the genus *Cyathura* which is a protogynous hermaphrodite (Amanieu, 1969; Burbanck and Burbanck, 1974). No similar ecological or experimental study has been attempted with any member of the Paranthuridae which, it appears, may have a different life history.

The descriptions which follow are of ovigerous females or of the largest juvenile. Smaller individuals usually have shorter, broader limbs with fewer spines and setae. After consideration of many characters, only those which are most useful in distinguishing species are used in species descriptions. For example, mouthparts have not been discussed because they are very similar throughout the genus. The written descriptions, therefore, are short, intended only to complement the figures. The sixth article of pereopod 1 bears three rows of setae; the numbers in the setal formula refer to the mesial, palmar, and lateral rows respectively. Only the first two rows mentioned are illustrated. The angle between the palm and the margin of article 5 is given in the descriptions to differentiate axial, oblique and transverse palms. The proportions of distal articles on the walking legs is a useful specific character; the

length:breadth ratios used to quantify these are measured from limbs on permanent slides. Similarly, the proportions of uropodal rami and the telson are measured on flattened individuals. For males, only the differences from the main description are noted. In descriptions of the flagellum of antenna 1 the number of articles includes the short basal article and the two minute terminal articles.

Illustrations of limbs are from permanent slides (Gurr's Aquamount). Pereopod 1 is in lateral view, pereopods 2, 4 and 7 mesial views. Uropodal rami and telson are figured flattened, antennae as seen in a horizontal plane attached to head. The figure scale is 1 mm and referable to the whole animal only. In all figures the following abbreviations are used: A1, A2, antennae 1 and 2; P1-P7, pereopods 1-7; PL1, 2, pleopods 1, 2; UN, uropodal endopod; UX, uropodal exopod. Specific epithets of new species are chosen from genera of the Australian flora, used as nouns in apposition. These names allude to the stem *-anthura* (flower tail) in many genera of the Anthuridea.

Material for this study has come from the following surveys and institutions:

Port Phillip Bay Environmental Study, 1969-73 (PPBES) carried out in Port Phillip Bay, Victoria, by the Marine Studies Group, Ministry for Conservation, Melbourne, Vic.;

Crib Point Benthic Survey, 1965-72 (CPBS) and Westernport Bay Environmental Study, 1973-4 (WBES), both carried out in Western Port, Victoria, by the same group;

Bass Strait Survey, 1980-3 (BSS) carried out by the National Museum of Victoria, Melbourne;

Shelf Benthic Survey, 1973 (AMSBS) carried out on the New South Wales shelf by the Australian Museum, Sydney, NSW;

Hawkesbury River Study, 1977-8 (AMHRS) carried out in the Hawkesbury River estuary by the same museum;

and other material from the Museum of Victoria (formerly National Museum of Victoria, Melbourne, NMV), the Australian Museum, Sydney (AM), the South Australian Museum, Adelaide (SAM), the Zoologisk Museum, Copenhagen (ZMC), and the Zoologisches Museum, Universitat Hamburg, West Germany (ZMH).

### Key to South-Eastern Australian Species of *Paranthura*

1. Pereopods 1 and 2 with articles 6 of same length; telson  $3\times$  as long as wide, more or less parallel-sided for most of length. Pereon of males grossly elongate ( $14\times$  as long as wide); male antenna 1 articles each with only 2 aesthetascs ..... 2
  - Pereopod 1 article 6 longer than that of pereopod 2; telson at most  $2.5\times$  as long as wide, usually tapering from midpoint (if not tapering other characters apply). Pereon of males not especially elongated (about  $10\times$  as long as wide); male antenna 1 articles each with numerous aesthetascs (males of some species not known) ..... 3
2. Uropodal endopod about as long as wide, inner angle of peduncle sharply produced; pleopod 1 exopod widest at midpoint and tapering to an acutely rounded apex ..... *P. ciliata*
  - Uropodal endopod shorter than wide, inner angle of peduncle square, not produced; pleopod 1 exopod widest proximally and tapering to a rounded apex ... *P. epacris*
3. Pleon wider than long; telson  $2\times$  as long as pleon ..... 4
  - Pleon longer than wide; telson at most  $1.5\times$  as long as pleon ..... 5
4. Pleonites 1-5 fused; telson ovate; palm of pereopod 1 almost transverse. Posterior legs and uropodal rami of male more elongate than in juveniles and females ..... *P. telopea*
  - Pleonites all free; telson tapering; palm of pereopod 1 axial-oblique. Basis of posterior legs and uropodal rami of male broader than in juveniles and females ..... *P. senecio*
5. Pleonites 2-5 fused dorsally. Basis of posterior pereopods of male broader than in females and juveniles ..... *P. grevillea*
  - Pleonites free. Basis of posterior pereopods of males only slightly broadened if at all ... 6
6. Telson about as long as pleon ..... 7
  - Telson longer than pleon (usually  $1.5\times$  as long) ..... 8
7. Telson parallel-sided for most of length; pereopod 1 palm moderately oblique, proximal thumb separated from cutting edge by an obtuse angle (fig. 17) ..... *P. kunzea*
  - Telson tapering from midpoint; pereopod 1 palm strongly oblique, proximal thumb separated from convex cutting edge by a deep angle (fig. 10) ..... *P. dryandra*
8. Pereopod 1 palm oblique and stepped away from axis of limb (fig. 3); antenna 1 flagellum with 6 articles ..... 9
  - Pereopod 1 palm more or less axial (fig. 2); antenna 1 flagellum with 7 or more articles ..... 10
9. Head about  $0.7\times$  as wide as long; articles 6 of pereopods 1 and 2 similar in size; adults about 11 mm ..... *P. involuta*
  - Head about as wide as long; article 6 of pereopod 1 much larger than that of pereopod 2; adults about 7 mm. Appendix masculina of male robust, one-third width of pleopodal endopod ..... *P. boronia*
10. Telson broad over most of length and rounded terminally (fig. 5); articles 5 and 6 of pereopods 4-7 with 2 and 3 spines respectively; antenna 1 flagellum with 7 articles. Male uropodal rami broadened, these and dorsum of telson especially setose ..... *P. caesia*
  - Telson widest proximally and tapering distally (fig. 18); articles 5 and 6 of pereopods 4-7 with 4-5 and 5-6 spines respectively; antenna 1 flagellum with 9 or more articles. Male uropodal rami narrowed or only slightly broadened, especially setose only if rami narrowed ..... 11
11. Pereopod 7 article 6 is  $3.5\times$  as long as broad; uropodal endopod shorter than wide. Male telson and uropodal rami mesially setose, telson proportionally longer than in female or juvenile ..... *P. lobelia*
  - Pereopod 7 article 6 is  $4\times$  as long as broad; uropodal endopod longer than wide. Male telson and uropodal rami not especially setose, telson of similar proportions to female and juvenile ..... 12
12. Uropodal endopod narrowing sharply; with little if any colour; telson moderately tapering. Posterior pereopods and uropodal rami of male slightly broader than in female and juveniles ..... *P. acacia*
  - Uropodal endopod broadly rounded;

densely pigmented; telson strongly tapering. Posterior pereopods and uropodal rami of male more elongate than in female and juveniles ..... *P. microtis*

Paranthuridae Menzies & Glynn, 1968

**Paranthura** Bate & Westwood, 1868

*Description:* Paranthuridae with eyes. Pereon with feeble dorsolateral grooves, otherwise smooth; pereonites 4-6 without a dorsal pit. Pleonites usually distinct from each other and from telson, rarely pleonites 2-5 fused dorsally. Telson thin, narrow, not indurate and with long terminal setae; statocyst absent. Uropodal endopod usually reaching to end of telson, richly setose; exopod usually lanceolate but rarely broadly so, setose. Antenna 1 flagellum never longer than peduncle, of fewer than 10 articles. Antenna 2 flagellum a short flat setose plate of fused articles, shorter than peduncle. Mandible with an acute incisor, its palp with 3 articles, the last bearing a comb of about 12 setae. Maxilla a sharp, barely-serrate spine. Maxilliped elongate, the suture between head and basis clear; without an endite; palp of 1-2 articles, the terminal one minute if present; palp with a proximal seta, a dorsal seta and 12-13 terminal setae. Pereopod 1 subchelate, palm axial or moderately oblique, with a mesial cutting edge. Pereopods 4-7 article 5 quadrate, anterior and posterior margins equal. Pleopod 1 exopod operculiform, only slightly indurate.

Adult male usually only slightly more elongate than juvenile or female, sometimes considerably so. A 6- to 8-articled flagellum on antenna 1 bearing fine aesthetascs. Uropodal rami either broader or narrower than in female. Pereopod 7 proximal articles sometimes broadened, sometimes elongated. Telson and uropods sometimes dorsally setose.

Usually with brown pigment dorsally and on some limbs.

*Type-species:* *Paranthura costana* Bate & Westwood

***Paranthura acacia* sp. nov.**

Figures 1, 2

*Material examined:* 4 males, 3 females, 7 juveniles; 9.5-16.2 mm:

Holotype: female, 14.0 mm: NMV J1531. Vic., Western Port, Crib Point, (38°20.6'S, 145°14.9'E), shelly-sand sediment, 13 m, 4 Mar. 1965 (CPBS stn 35N).

Paratypes: Vic., Western Port, Crib Point, 5-15 m, CPBS stations: stn 32N, AM P32604 (2 specimens); stn 21S, NMV J1534(2); stn 11N, NMV J1535(1); stn C4, NMV J1536(2); stn A4, NMV J1537(1); stn 300, NMV J1531(1). Western Port, 9-18 m, WBES stations: stn 1735, NMV J1538(1); stn 1747, NMV J1539(1).

Other material: Vic., Western Port, Crib Point, CPBS stations: stn 32S, NMV J1540(1); stn C4, NMV J1541(1).

*Description:* Female. Head almost as wide as long. Pleon  $2\times$  as long as pereonite 7, pleonites 1-6 free. Antenna 1 flagellum of 9 articles. Antenna 2 flagellum  $0.8\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.6\times$  as long as wide; palm axial ( $10^\circ$ ); proximal thumb broad, separated from the strongly convex cutting edge by a shallow, obtuse angle; setal formula 12, 17, 45. Pereopod 2 article 6 shorter than that of pereopod 1,  $1.8\times$  as long as broad, palm with 11 spines. Pereopod 4 articles 5 and 6 each with 5 spines, dactyl fine,  $0.8\times$  length of article 6. Pereopod 7 articles 5 and 6 each with 5 spines; article 6  $4\times$  as long as wide; dactyl fine,  $0.6\times$  length of article 6.

Pleopod 1 endopod bearing 37 setae; exopod widest at midpoint and tapering distally, bearing 53 setae. Pleopod 2 endopod  $3\times$  as long as broad, with 11 setae distally; exopod with a partial suture laterally, with 3 setae proximal to suture and 25 setae distally.

Uropodal endopod reaching just beyond end of telson,  $1.2\times$  as long as wide, lateral margin weakly convex; exopod  $2.2\times$  as long as wide, proximal lobe broadly rounded, distal lobe very broad, tapering to an obtuse apex; with scattered setae on mesial surface. Telson  $1.3\times$  as long as pleon,  $2.5\times$  as long as wide, widest proximally and tapering to an evenly rounded apex; with numerous terminal long setae, dorsal submarginal short setae on distal half, and scattered dorsal setae elsewhere.

Male. Pereon, pleon, and telson of similar proportions to female. Antenna 1 with 9

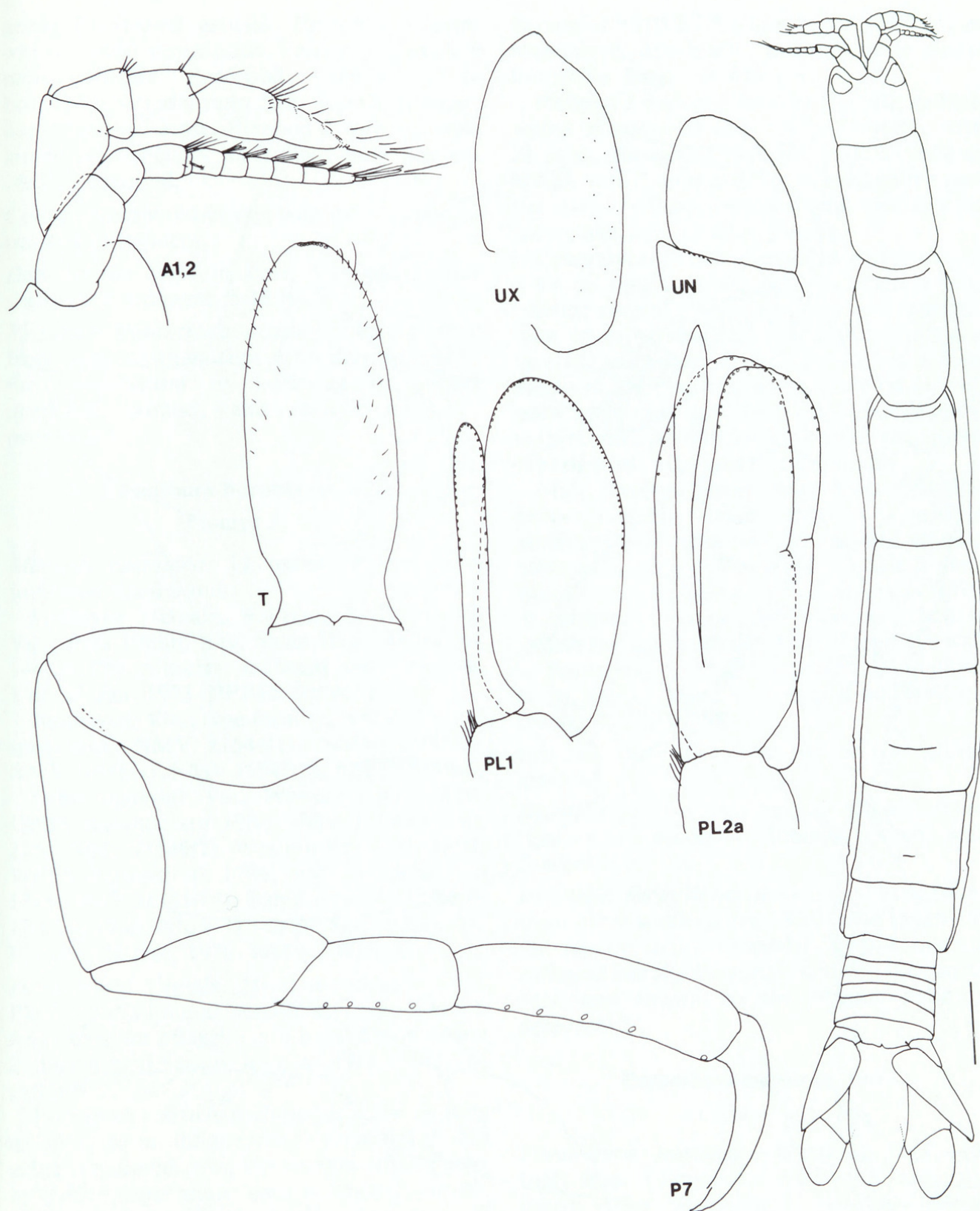


Figure 1. *Paranthura acacia*. Holotype female; a, male, NMV J1532.

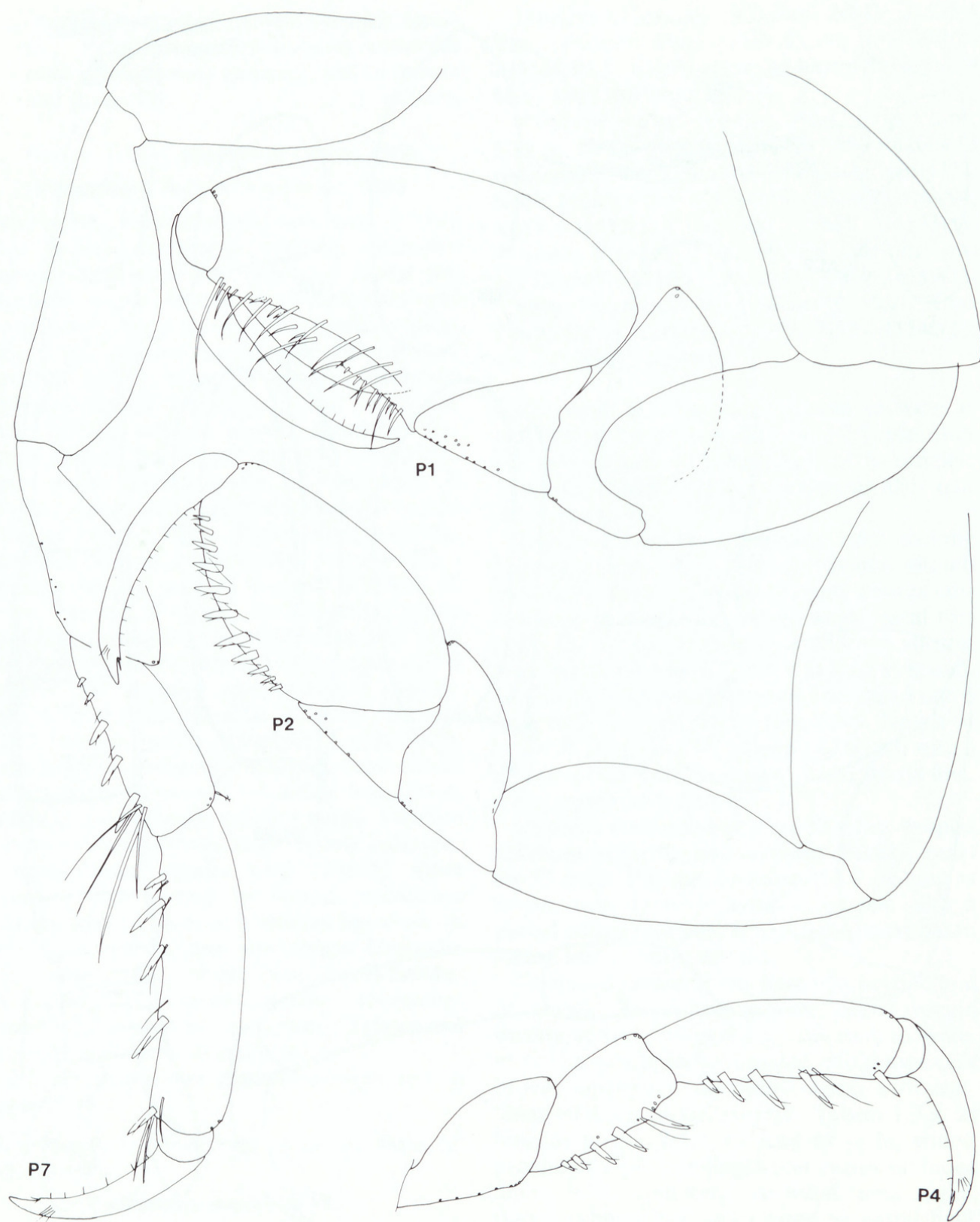


Figure 2. *Paranthura acacia*. Holotype female.

aesthetasc-bearing articles. Pereopod 1 palm with about 60 mesial setae. Pereopod 2 article 6 more elongate. Pereopod 7 basis slightly broader. Uropodal rami only slightly broader, not especially setose. Pleopod 2 with a simple lanceolate appendix masculina, only just exceeding endopod.

**Colour:** Evenly red-brown with diffuse concentrations of pigment.

**Distribution:** Western Port, Victoria. Coarse shelly-sand sediment, 5-18 m.

**Remarks:** *Paranthura acacia* is distinguished from other south-eastern Australian species by the combination of finer dactyls, broad uropodal exopod, and convex palm of pereopod 1.

### ***Paranthura boronia* sp. nov.**

Figures 3, 4

**Material examined:** 13 males, 9 females, 9 juveniles; 4.2-6.9 mm:

Holotype: female, 6.4 mm, NMV J1542. Vic., Port Phillip Bay, Swan Bay, (38°14.0'S, 144°39.5'E), silt-clay sediment with *Zostera*, 1 m, 23 Jan. 1973 (PPBES stn 966).

Paratypes: Vic., type-locality, NMV J1543 (1 specimen), NMV J1544(1), NMV J1545(2), NMV J1546(1), NMV J1547(2); AM P32605(4).

Other material: Vic., Western Port, 2-8 m, CPBS stations: stn 12N, NMV J1548(1); stn 21N, NMV J1549(1). Western Port, intertidal, WBES stations: stn 1706, NMV J1550(2); stn 1718, NMV J1551(13). Balnarring, W. F. Seed, 12 Dec. 1968, NMV J1552(2). Apollo Bay, W. F. Seed, 22 Dec. 1970, NMV J1608(1).

**Description:** Female. Head as wide as long. Pleon  $2\times$  as long as pereonite 7, pleonites 1-6 free. Antenna 1 flagellum of 6 articles. Antenna 2 flagellum  $0.5\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.5\times$  as long as wide; palm oblique ( $30^\circ$ ); proximal thumb acute, separated from the straight cutting edge by a deep acute angle; setal formula 7, 10, 30. Pereopod 2 article 6 shorter than that of pereopod 1,  $1.8\times$  as long as broad, palm with 8 spines. Pereopod 4 articles 5 and 6 each with 3 spines; dactyl fine,  $0.9\times$  length of article 6.

Pereopod 7 articles 5 and 6 with 2 and 3 spines respectively; article 6  $3\times$  as long as wide; dactyl fine,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 12 setae; exopod widest at midpoint and tapering distally, with 26 setae. Pleopod 2 endopod  $3.5\times$  as long as broad, with 7 setae distally; exopod with a partial suture laterally, without setae proximal to suture and with 12 setae distally.

Uropodal endopod reaching to end of telson,  $1.4\times$  as long as wide, lateral margin weakly convex; exopod  $2.1\times$  as long as wide, proximal lobe broadly rounded, distal lobe strongly tapering to an acute apex. Telson  $1.3\times$  as long as pleon,  $2.4\times$  as long as wide, widest at midpoint and tapering to an evenly rounded apex; with numerous terminal long setae and dorsal submarginal short setae on distal half.

Male. Pereon, pleon, and telson of similar proportions to female. Antenna 1 with 4 aesthetasc-bearing articles. Pereopod 1 setation same as in female. Pereopod 2 article 6 more elongate, but pereopod 7 of similar proportions to female. Uropodal rami narrower than in female but not especially setose. Pleopod 2 with a particularly robust appendix masculina, about half as broad as endopod and well exceeding it.

**Colour:** No pigmentation on preserved material.

**Distribution:** Victoria, bays and coast. Intertidal-8 m, muddy sediments, often with *Zostera*.

**Remarks:** *Paranthura boronia* is distinguished from other south-eastern Australian species by the narrow acute uropodal exopod, narrow endopod and the deep angle between the cutting edge and thumb on the oblique palm of pereopod 1.

### ***Paranthura caesia* sp. nov.**

Figures 5, 6

*Paranthura punctata*.—Barnard, 1925: 154 (part from Tasmania).—Nierstrasz, 1941: 252 (part). [Not *Paranthura punctata* (Stimpson)—South Africa].

**Material examined:** 10 males, 3 female, 89 juveniles; 2.0-15.4 mm:

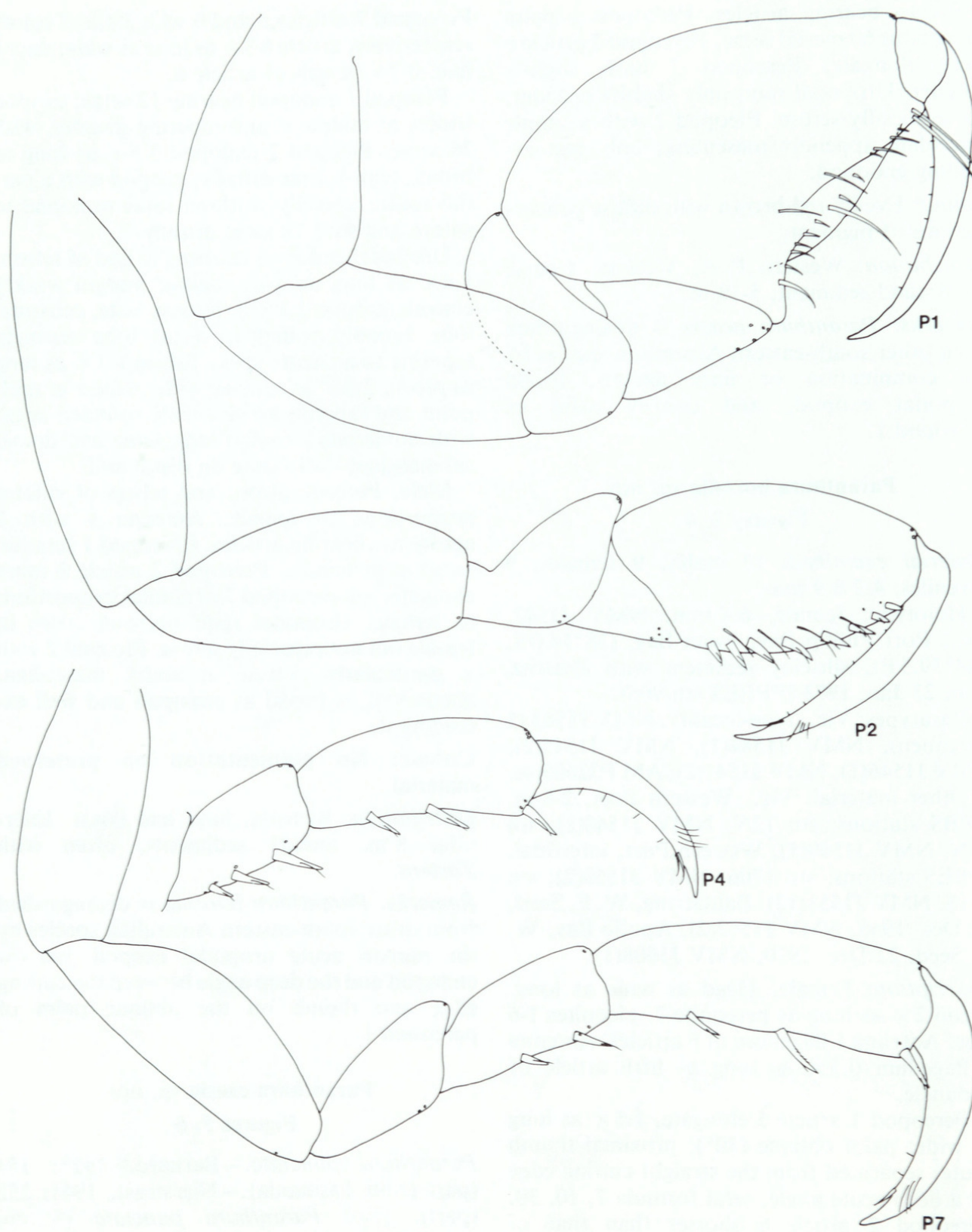


Figure 3. *Paranthura boronia*. Holotype female; a, male, 5.8 mm, NMV J1544.

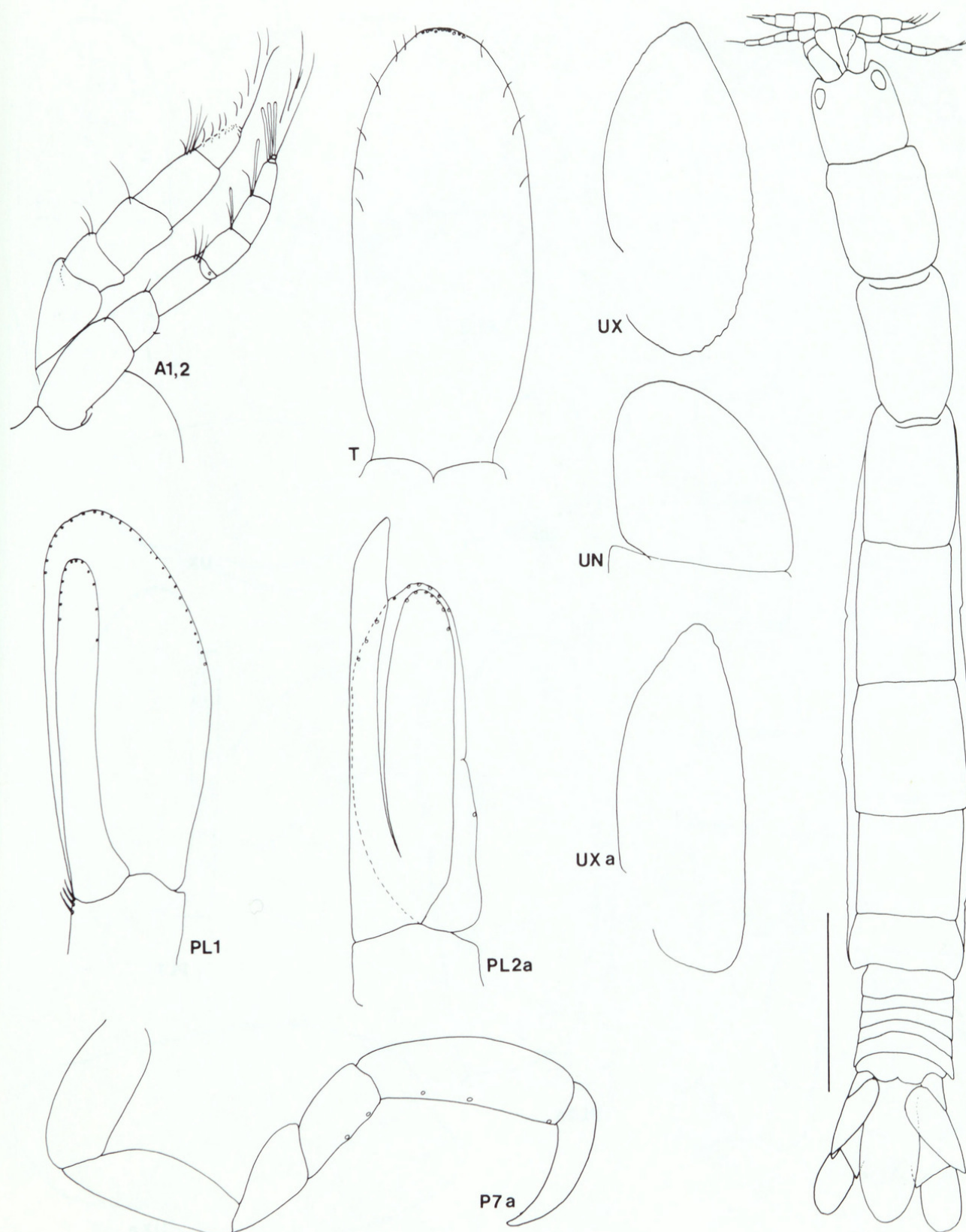


Figure 4. *Paranthura boronia*. Holotype female.

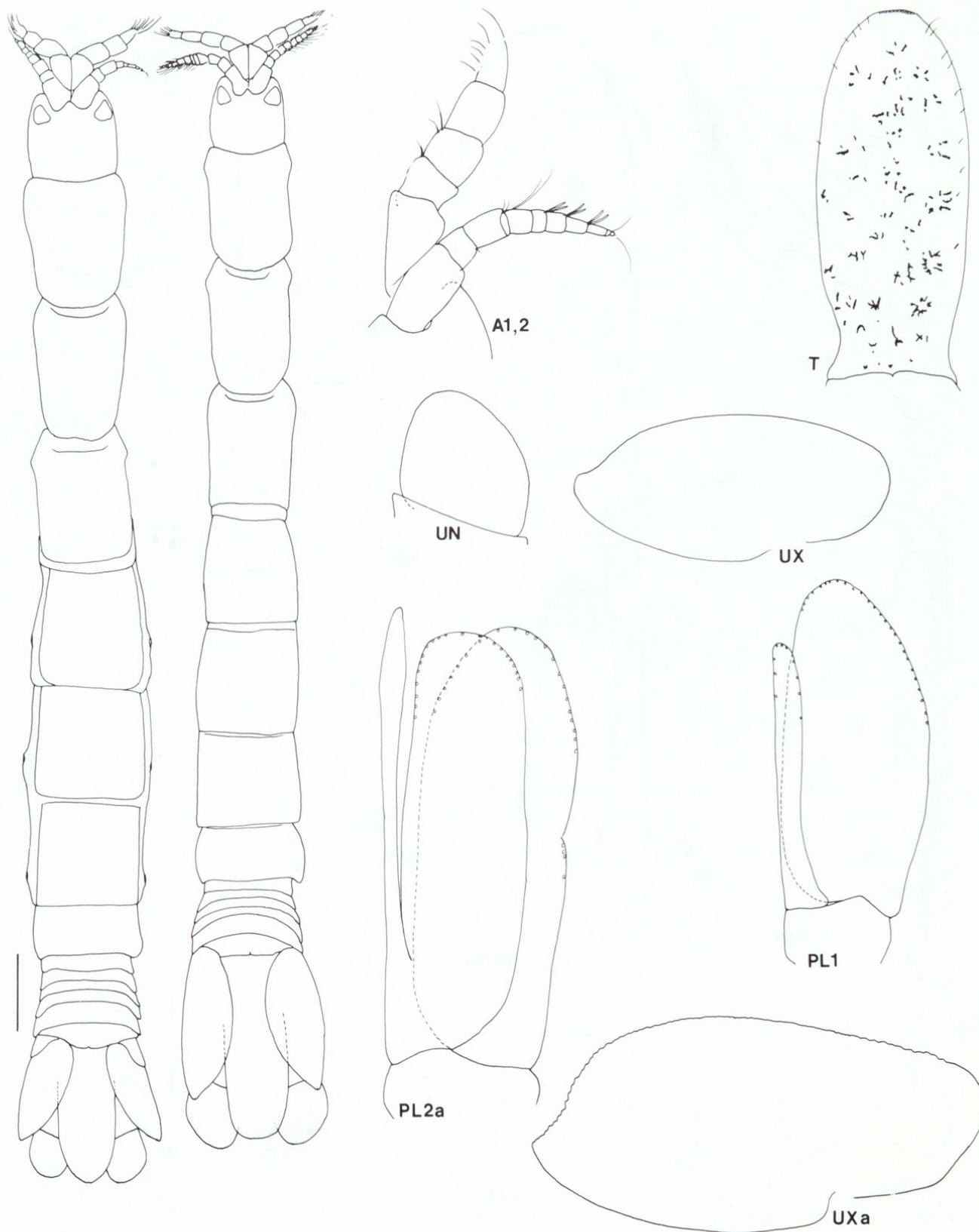


Figure 5. *Paranthura caesia*. Holotype juvenile; a, male, 14.9 mm, NMV J1554.

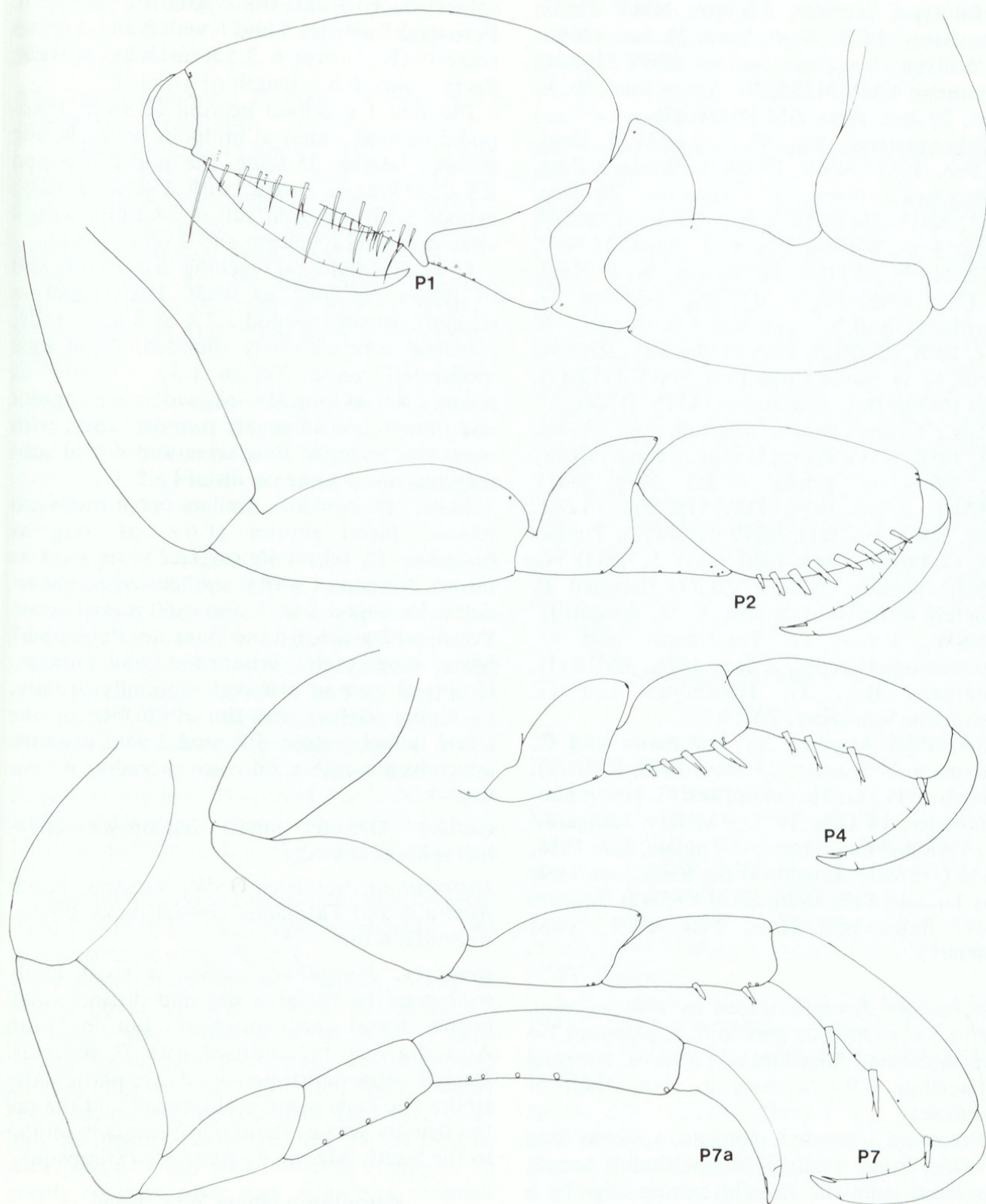


Figure 6. *Paranthura caesia*. Holotype juvenile; a, male, 14.9 mm, NMV J1554.

Holotype: juvenile, 8.6 mm, NMV J1553. Vic., Aireys Inlet, W. F. Seed, 23 Jan. 1968.

Paratypes: Vic., type-locality, NMV J1554 (1 specimen); NMV J1555(33). Aireys Inlet, W. F. Seed, 29 Jan. 1968, AM P32606(7).

Other material: Vic., Shoreham, W. F. Seed, 29 Feb. 1957, NMV J1609(1). Western Port, Honeysuckle Point, T. Crawford, 29 Dec. 1962, NMV J1610(3). Western Port, Crawfish Rock, J. E. Watson and W. F. Seed, 25 Nov. 1972, NMV J1611(1). Balnarring, W. F. Seed, 12 Dec. 1965, NMV J1630(6). Geelong, G. Hartmann and G. Hartmann-Schroeder, 24 Dec. 1975, ZMH(2). Port Phillip Bay, Ricketts Point, O. A. Sayce Collection, NMV J1529(1). Port Phillip Bay, Beaumaris, NMV J1530(6).

Tas., Greens Beach, intertidal, G. Poore, Jan. 1980, NMV J1616(1). Fancy Point, Bruny Is., 3-6 m, G. Edgar: 4 Jul. 1978, NMV J1524(1); 4 Sep. 1978, NMV J1527(1); 10 Oct. 1980, NMV J1525(1), NMV J1526(12). Tinderbox, G. Edgar, 5 Sep. 1980, NMV J1528(1). No specific locality, SAM C3912(1) [labelled *P. punctata* (Stimpson) determ. K. H. Barnard].

NSW, Eden, G. Hartmann and G. Hartmann-Schroeder, 2 Jan. 1976, ZMH(11); Batemans Bay, G. Hartmann and G. Hartmann-Schroeder, ZMH(2).

SA, Port Augusta, G. Hartmann and G. Hartmann-Schroeder, 13 Nov. 1975, ZMH(2). Kangaroo Is., G. Hartmann and G. Hartmann-Schroeder, 14 Dec. 1975, ZMH(1). Kangaroo Is., Vivionne Bay, Hale and Tindale, Jan. 1926, SAM C3910(1). Kangaroo Is., Kingscote, Hale and Tindale, Feb. 1926, SAM C859(2). Marino Reef, Baker and Hale, Feb. 1924, SAM C3908(1).

**Description:** Juvenile. Head as wide as long. Pleon  $2\times$  as long as pereonite 7, pleonites 1-6 free. Antenna 1 flagellum of 7 articles. Antenna 2 flagellum  $0.9\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.7\times$  as long as wide; palm axial; proximal thumb broad, separated from the straight cutting edge by a shallow obtuse angle; setal formula 12, 14, 20. Pereopod 2 article 6 shorter than that of pereopod 1;  $1.9\times$  as long as broad, palm with 8 spines. Pereopod 4 articles 5 and 6 each with 4

spines; dactyl stout,  $0.8\times$  length of article 6. Pereopod 7 articles 5 and 6 with 2 and 3 spines respectively; article 6  $3.5\times$  as long as wide; dactyl stout,  $0.6\times$  length of article 6.

Pleopod 1 endopod bearing 12 setae. Pleopod 2 exopod widest at midpoint and tapering distally, bearing 25 setae. Pleopod 2 endopod  $2.5\times$  as long as broad, with 4 setae distally; exopod with a partial suture laterally, with 4 setae proximal to suture and 9 setae distally.

Uropodal endopod reaching just beyond end of telson, as long as wide, lateral margin strongly convex; exopod  $2.2\times$  as long as wide, proximal lobe narrowly rounded, distal lobe moderately acute. Telson  $1.3\times$  as long as pleon,  $2.4\times$  as long as wide, widest at midpoint and tapering to an evenly rounded apex; with numerous terminal long setae and dorsal submarginal short setae on distal half.

Male. Pereon of similar proportions to female, pleon shorter ( $1.6\times$  as long as pereonite 7), telson longer ( $2.2\times$  as long as pleon). Antenna 1 with 6 aesthetasc-bearing articles. Pereopod 1 with about 60 mesial setae. Pereopod 2 article 6 more elongate. Pereopod 7 basis moderately broadened and longer. Uropodal exopod broader, especially distally, its mesial surface and dorsal surface of the telson densely setose. Pleopod 2 with a simple appendix masculina, only just exceeding the endopod.

**Colour:** Distinct small red-brown chromatophores dorsally.

**Distribution:** Southern NSW, Victoria, South Australia and Tasmania, coastal rocky shores. Intertidal-6 m.

**Remarks:** *Paranthura caesia* is most easily recognised by its large size and distinct small brown dorsal chromatophores but in South Australia may be confused with *P. microtis*. Dactyls on posterior pereopods are particularly stout. The male pleon is shortened and the tail fan densely setose. *Paranthura caesia* is similar to the South African *P. punctata* (Stimpson).

### ***Paranthura ciliata* Whitelegge**

Figures 7, 8

*Paranthura ciliata* Whitelegge, 1901: 216-20, figs. 17a-f. — Poore, 1980: 63.

*Paranthura flagellata*. — Barnard, 1925: 155 (part). — Nierstrasz, 1941: 252 (part). [Not *P. flagellata* (Chilton)].

**Material examined:** 1 male, 1 female, 2 juveniles; 7.9–12.5 mm:

NSW, E. of Green Cape (37°18'S, 150°19'E), 156 m, trawl, 29 Oct. 1979 (Kapala stn K79-17-17), AM P32658(1). Off Eden (37°05'S, 150°05'E), 70–100 m, T. Mortensen on F.I.S. Endeavour, 30 Sep. 1914, ZMC (1 male).

Bass Strait. Eastern Bass Strait, Flinders Canyon (39°40.3'S, 148°46.5'E), 293–329 m, coarse shell, 27 Mar. 1979 (BSS stn 33), NMV J3001(2).

**Description:** Juvenile. Head  $0.8\times$  as wide as long, tapering only beyond eyes. Pleon little longer than pereonite 7, pleonites 1–6 free. Antenna 1 flagellum of 6 articles. Antenna 2 flagellum  $0.5\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 globose,  $1.5\times$  as long as wide; palm oblique (20°); proximal thumb broad, barely separated from the convex cutting edge by a shallow angle; setal formula 3, 13, 16. Pereopod 2 total length decidedly longer than pereopod 1. Article 6 as long as that of pereopod 1,  $2.0\times$  as long as broad, palm with 10 spines. Pereopod 4 articles 5 and 6 with 4 and 5 spines respectively; dactyl fine,  $0.7\times$  length of article 6. Pereopod 7 articles 5 and 6 with 3 and 4 spines respectively; article 6  $5\times$  as long as wide; dactyl fine,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 6 setae; exopod widest at midpoint and tapering sharply to an acute apex, bearing 25 setae.

Uropodal endopod not reaching to end of telson, about as long as wide, lateral margin strongly convex (internal distal angle of peduncle prominently projecting, acute) exopod  $2\times$  as long as wide, proximal lobe broadly rounded, distal lobe rounded. Telson  $1.2\times$  as long as pleon, little more than  $3\times$  as long as wide, more or less parallel-sided, ending in an evenly rounded apex with numerous terminal long setae but without dorsal short setae.

Male. Pereon, pleon and telson of similar proportions to juvenile. Antenna 1 with 4 articles, each bearing 2 aesthetascs. Pereopod 1

palm with about 25 mesial setae. Pereopod 2 article 6 more elongate. Pereopod 7 and uropodal rami not different from female. Pleopod 2 appendix musculina narrow, with an acute tip, reaching well beyond the endopod.

**Distribution:** Southern NSW shelf and eastern Bass Strait, 98–329 m.

**Remarks:** Although Whitelegge's type-material cannot be found, these specimens clearly belong to this species. The critical features which were figured by Whitelegge (1901) are the narrow, parallel-sided telson, pleopod 1, uropodal rami, and the internal distal projection of the uropodal peduncle. A very similar species (*Paranthura epacris*) is described here from shallower samples in NSW and Victoria. Both are very narrow species with a short pleon, parallel-sided telson and pereopods 1 and 2 of similar size. The difference between them are discussed with remarks on *P. epacris*.

Barnard (1925) referred to this species under the name of the New Zealand species *Paranthura flagellata* (Chilton) but the telsons of the two species differ.

### *Paranthura dryandra* sp. nov.

Figures 9, 10

**Material examined:** 10 males, 7 females, 39 juveniles; 2.0–7.2 mm:

Holotype: female, 6.9 mm, NMV J1560. Vic., Aireys Inlet, W. F. Seed, 29 Jan. 1968.

Paratypes: Vic., type-locality, NMV J1561 (1 specimen); NMV J1562(28). Aireys Inlet, W. F. Seed, 23 Jan. 1968, AM P32607(12).

Other material: Vic., Shoreham, W. F. Seed, 28 Feb. 1959, NMV J1612(5); 30 May 1962, NMV J1613(2).

Tas., Cape Portland, 3 m, G. Edgar, 11 Jan. 1981, NMV J1578(3). Fisher Is., with *Caulocystis*, 2 m, G. Edgar, 1 Aug. 1980, NMV J1649(4).

**Description:** Female. Head  $0.9\times$  as wide as long. Pleon almost  $2\times$  as long as pereonite 7, pleonites 1–6 free. Antenna 1 flagellum of 6 articles. Antenna 2 flagellum  $0.8\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 globose,  $1.3\times$  as long as wide; palm oblique (30°); proximal thumb acute, separated from the convex cutting edge

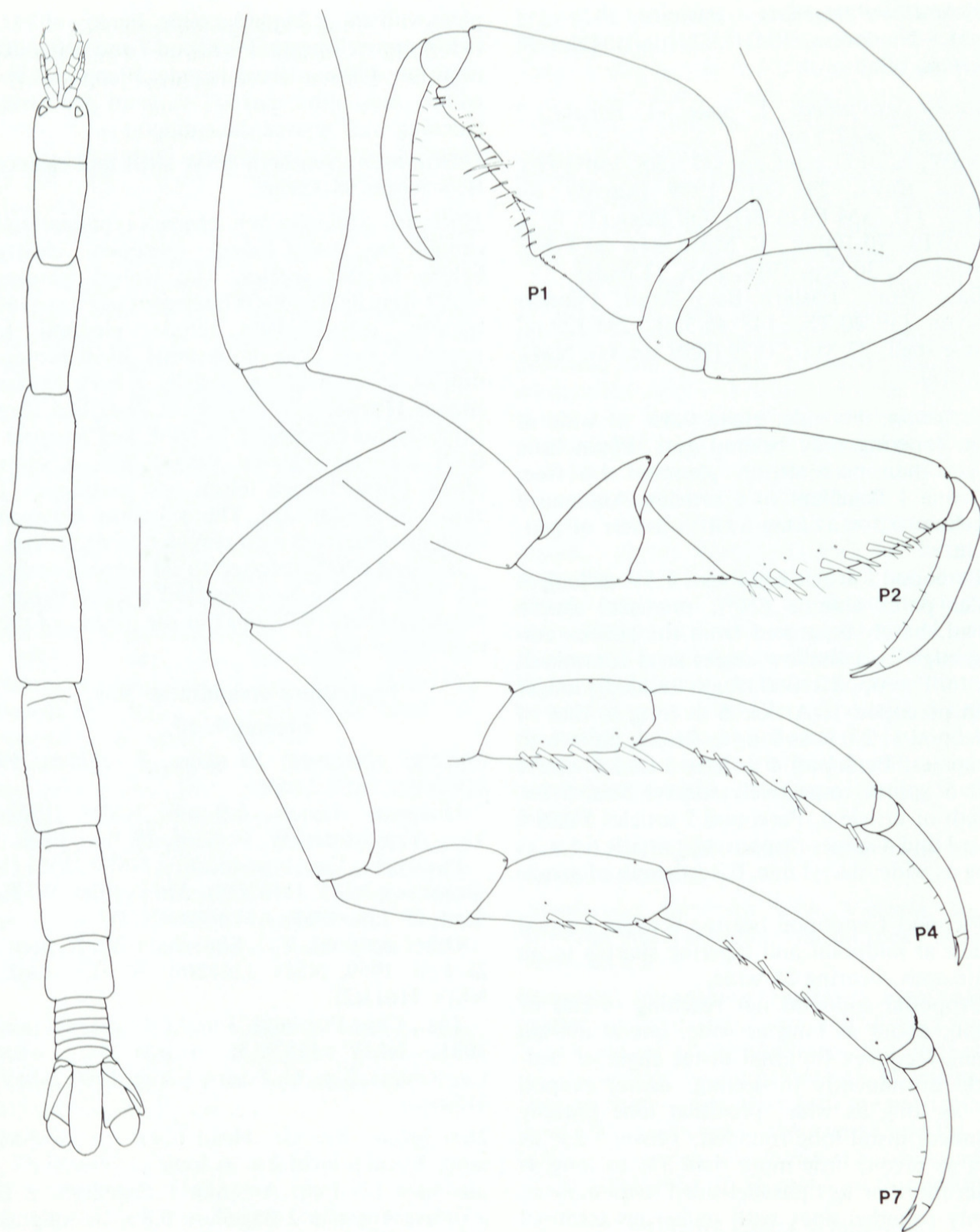


Figure 7. *Paranthura ciliata*. Juvenile, 12.5 mm, AM P32658.

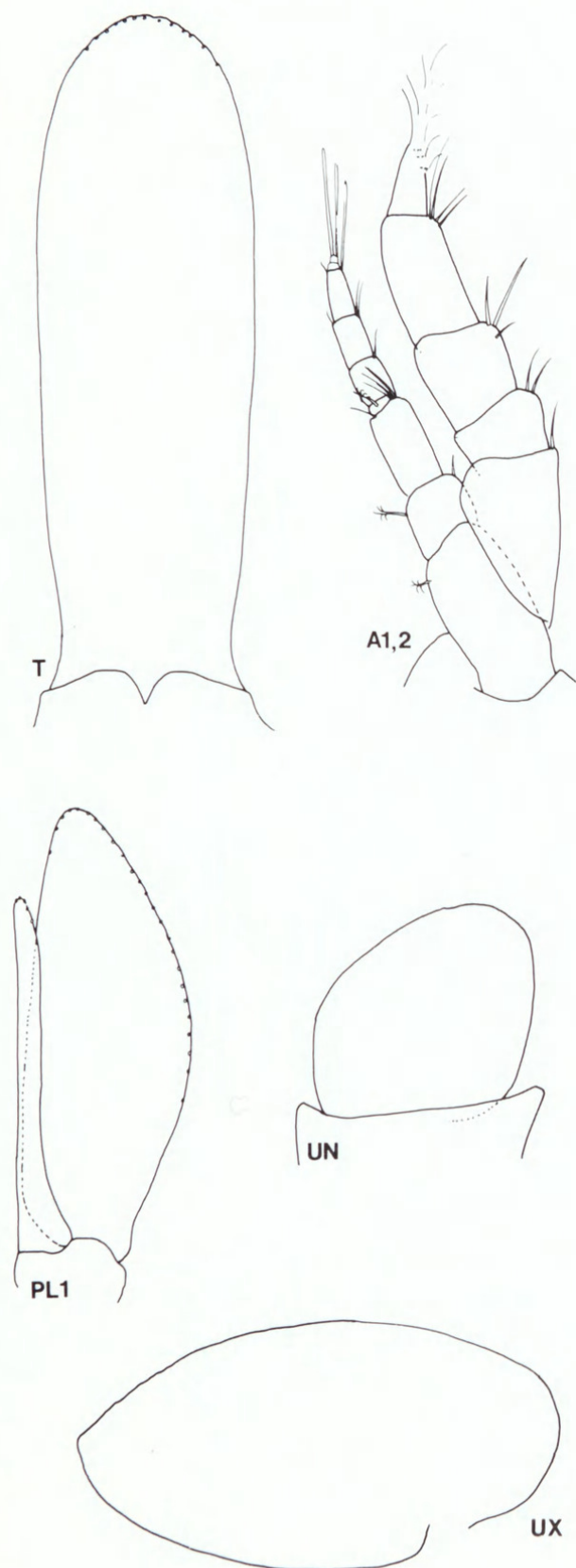


Figure 8. *Paranthura ciliata*. Juvenile, 12.5 mm, AM P32658.

by a deep, obtuse angle; setal formula 5, 9, 15. Pereopod 2 article 6 shorter than that of pereopod 1,  $1.6\times$  as long as broad, palm with 7 spines. Pereopod 4 articles 5 and 6 each with 4 spines; dactyl stout,  $0.9\times$  length of article 6. Pereopod 7 articles 5 and 6 with 3 and 4 spines respectively; article 6  $4\times$  as long as wide; dactyl stout,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 16 setae; exopod widest in distal half and with rounded apex, bearing 22 setae. Pleopod 2 endopod  $3\times$  as long as broad, with 6 setae distally; exopod with a partial suture laterally, with 1 seta proximal to suture and 13 setae distally.

Uropodal endopod reaching to end of telson, as long as wide, lateral margin weakly convex; exopod  $2\times$  as long as wide, proximal lobe broadly rounded, distal lobe ending in an obtuse apex. Telson as long as pleon,  $2.5\times$  as long as wide, widest at midpoint and tapering to an evenly rounded apex with numerous terminal long setae and dorsal submarginal short setae on distal half.

Male. Pereon a little more elongate than female, pleon and telson of similar proportions. Antenna 1 with 6 aesthetasc-bearing articles. Pereopod 1 palm with about 35 mesial setae. Pereopod 2 article 6 more elongate. Pereopods 4-7 more elongate, basis not broadened. Uropodal rami narrower than in female. Pleopod 2 with a simple appendix masculina, reaching well beyond the endopod.

**Colour:** Dorsally with dense red-brown chromatophores.

**Distribution:** Victoria and Tasmania. Inter-tidal—3 m, rocky shores in algae.

**Remarks:** *Paranthura dryandra* is notable for its small size, dark colour, and its particularly short telson (only as long as the pleon). The palm of pereopod 1 is especially oblique and its proximal thumb quite acute.

### ***Paranthura epacris* sp. nov.**

Figures 11,12

**Material examined:** 8 males, 12 females, 147 juveniles; 5.7-18.0 mm:

Holotype: female, 12.8 mm, NMV J1564. Vic., Western Port, Crib Point ( $38^{\circ}21.3'S$ ,

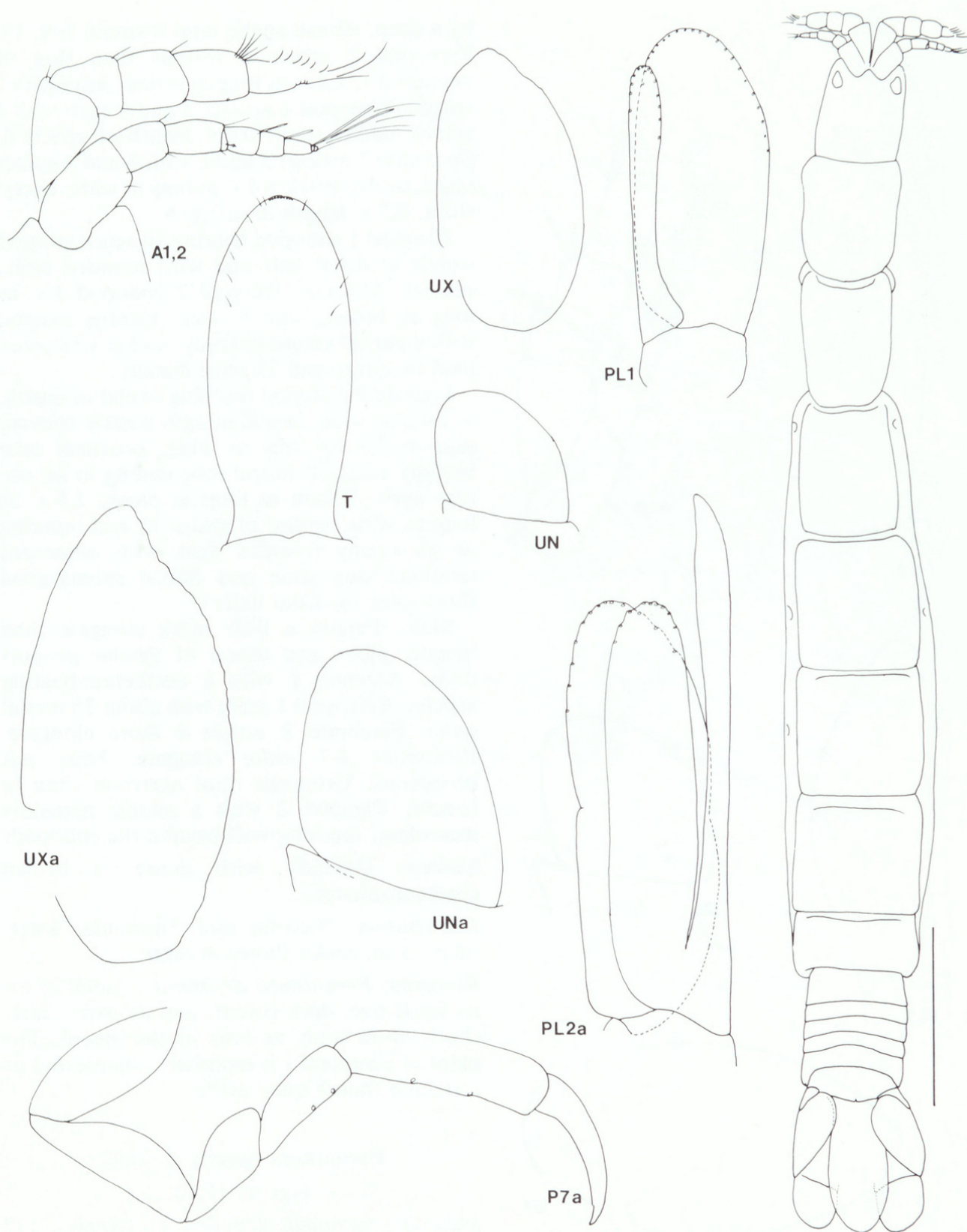


Figure 9. *Paranthura dryandra*. Holotype female; a, male, 7.2 mm, NMV J1561.

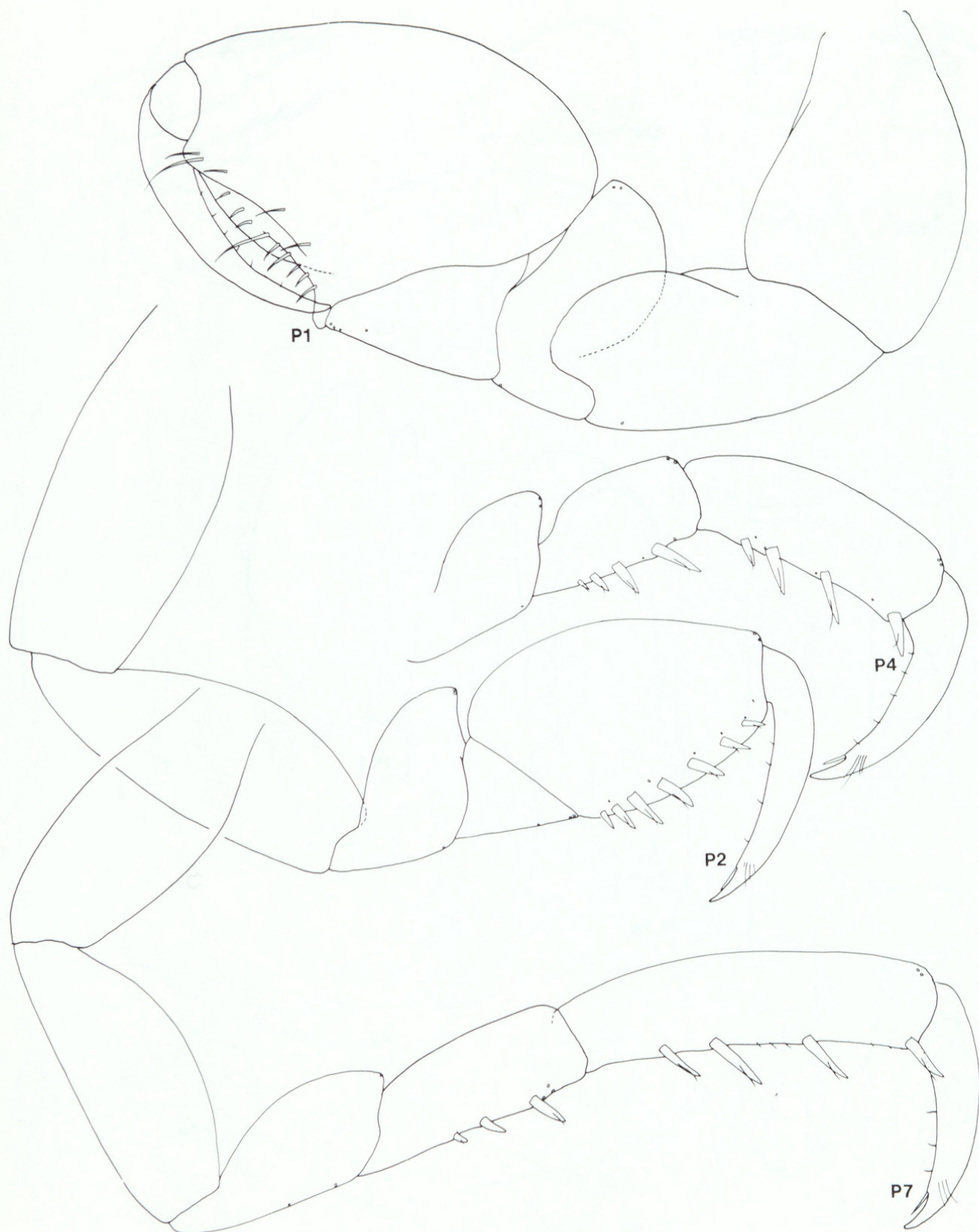


Figure 10. *Paranthura dryandra*. Holotype female.

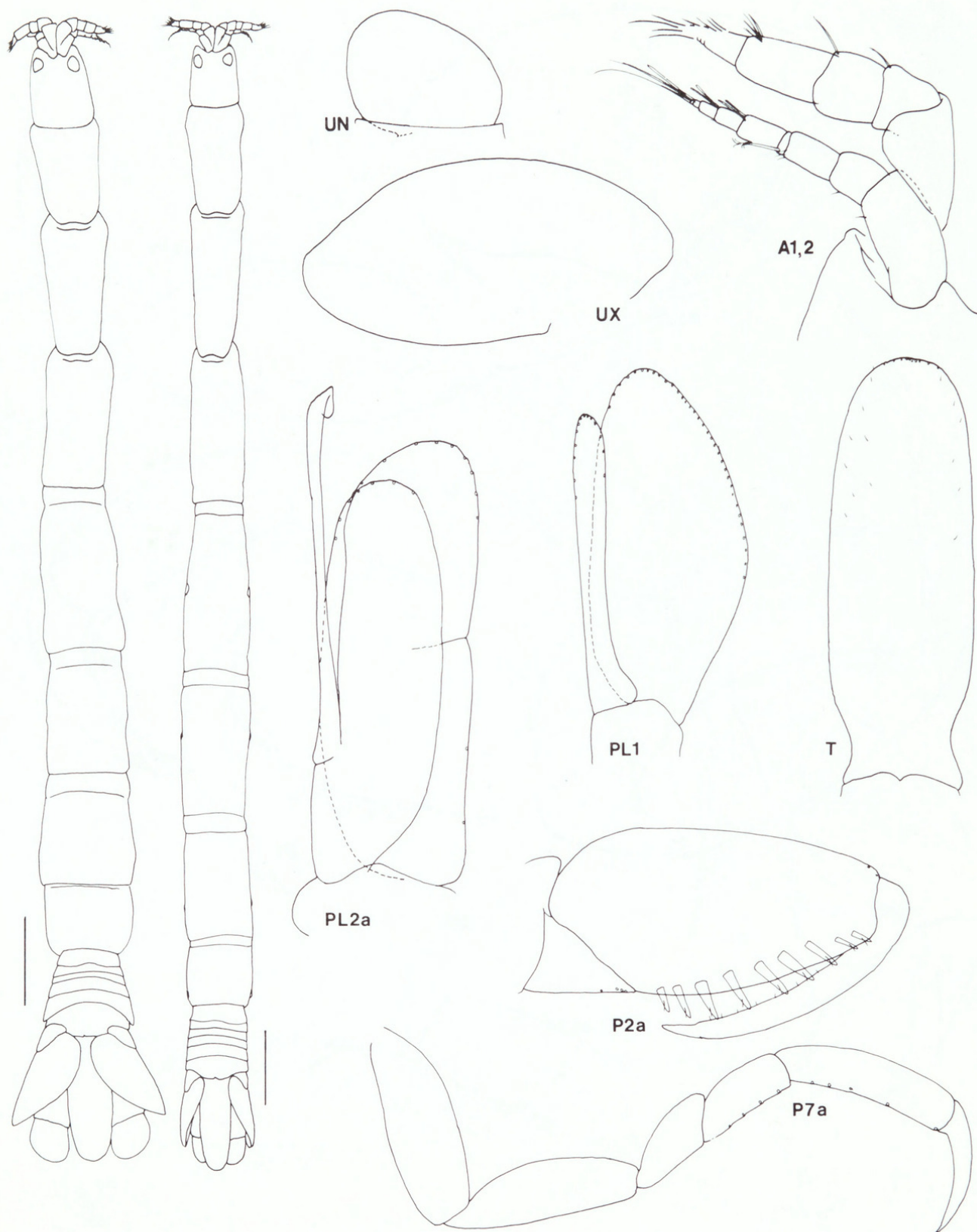


Figure 11. *Paranthura epacris*. Holotype female; a, male, 15.8 mm, NMV J1565.

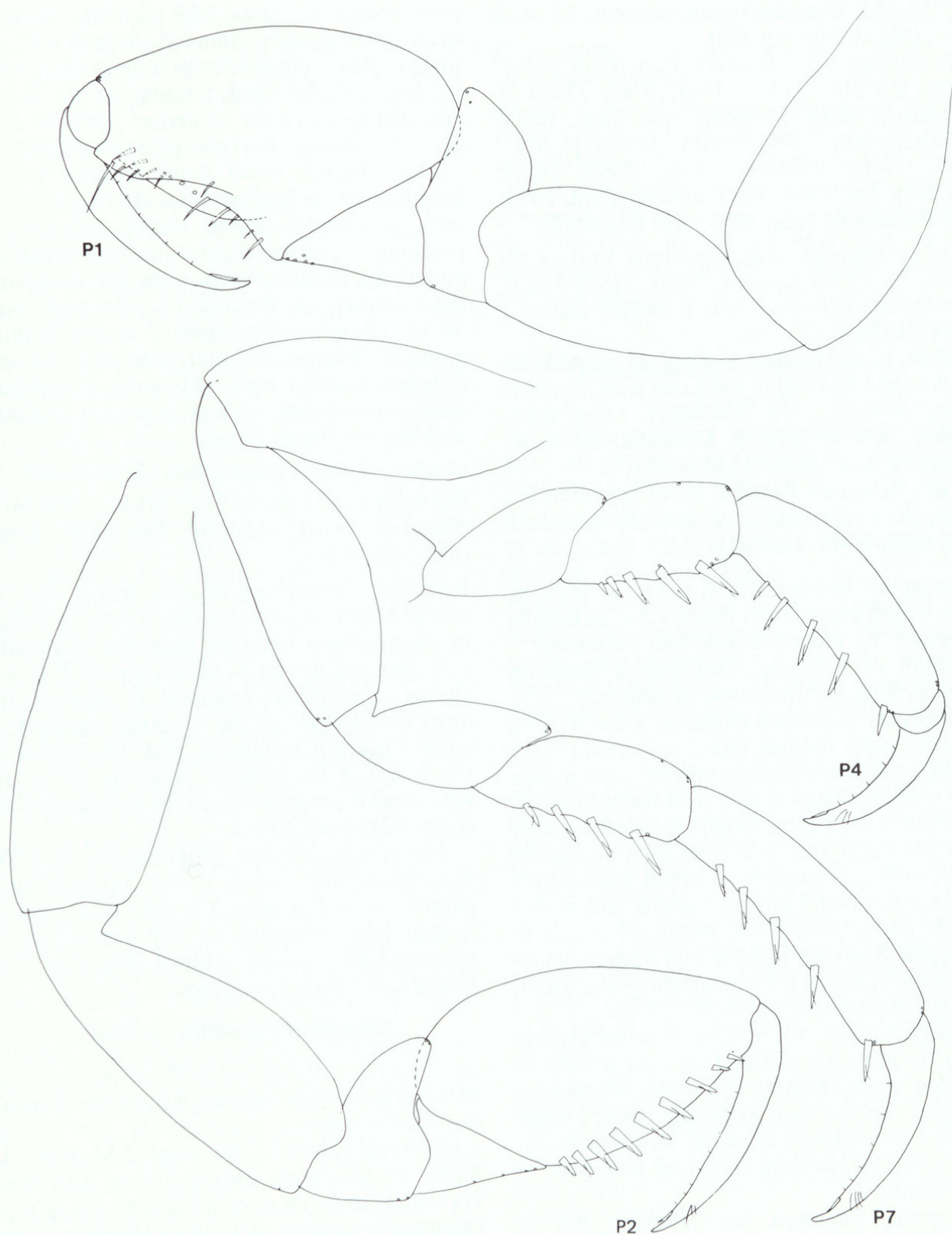


Figure 12. *Paranthura epacris*. Holotype female.

145°13.6'E), fine sand/mud sediment, 15 m, 8 Apr. 1965 (CPBS stn 31S).

Paratypes: Vic., Western Port, Crib Point, CPBS stn 31S; 8 Apr. 1965, NMV J1565 (1 specimen); NMV J1566(8); Apr. 1966, NMV J1567(1); Aug. 1966, NMV J1568(1); Mar. 1967, NMV J1569(4); Aug. 1967, NMV J1570(1); Jul. 1969, NMV J1571(1); Jul. 1970, AM P32608(3); Aug. 1970, AM P32609(2).

Other material: Vic., Western Port, Crib Point; 16 CPBS stations, NMV J1574-5 (131 specimens). Western Port, 4 WBES stations, NMV J1576(4).

NSW, E. of Malabar, Sydney, 31 m, AMSBS stn A1, AM P24348(2). Off Long Reef, Sydney, 24 m, AMSBS, AM P24360(1). Long Reef, Sydney, AM P32610(1). Ulladulla, 80 m, K. Sheard, 9 Aug. 1944, SAM C3911(2).

Tas., Schouten Passage, N. of Schouten Is., 12 m, A. J. Dartnall on F.R.V. Penghana, 8 Jun, 1977, NMV J1615(1).

**Description:** Female. Head  $0.8\times$  as wide as long, widest posteriorly. Pleon  $1.3\times$  as long as pereonite 7, pleonites 1-6 free. Antenna 1 flagellum of 6 articles. Antenna 2 flagellum  $0.5\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.6\times$  as long as wide; palm oblique ( $20^\circ$ ); proximal thumb broad, separated from the convex cutting edge by a shallow obtuse angle; setal formula 6, 13, 16. Pereopod 2 total length decidedly longer than pereopod 1, article 6 as long as that of pereopod 1,  $1.8\times$  as long as broad, palm with 9 spines. Pereopod 4 articles 5 and 6 each with 5 spines, dactyl fine,  $0.7\times$  length of article 6. Pereopod 7 articles 5 and 6 with 4 and 5 spines respectively; article 6  $4\times$  as long as wide; dactyl fine,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 15 setae; exopod widest in proximal half and tapering distally to rounded apex, bearing 34 setae; Pleopod 2 endopod  $3\times$  as long as broad, with 6 setae distally; exopod with a partial suture laterally, without setae proximal to suture and with 13 setae distally.

Uropodal endopod just reaching end of telson,  $0.8\times$  as long as wide, lateral margin strongly convex (internal distal angle of peduncle not projecting, square); exopod  $2\times$  as

long as wide, proximal lobe narrowly rounded, distal lobe broadly rounded. Telson  $1.4\times$  as long as pleon, almost  $3\times$  as long as wide, more or less parallel-sided, ending in an evenly rounded apex; with numerous terminal long setae and dorsal short setae on distal half.

Male. Pereon much more elongate than in female ( $14\times$  as long as wide, cf.  $9\times$  as long as wide in female). Pleon shorter (as long as pereonite 7), telson shorter (as long as pleon). Antenna 1 flagellum with 4 articles, each bearing 2 aesthetascs. Pereopod 1 palm with about 30 mesial setae. Pereopod 2 article 6 more elongate. Pereopod 7 and uropodal rami not different from female. Pleopod 2 appendix masculina narrow, with an acute tip, reaching well beyond the endopod.

**Colour:** None on most preserved material.

**Distribution:** Southern NSW, Victoria (Western Port), eastern Tasmania. Inter-tidal—80 m.

**Remarks:** *Paranthura epacris* shares with *P. ciliata* a narrow non-tapering telson. It differs in several minor features: flagellum of antenna 1 is shorter; article 6 of pereopod 2 is less elongate; uropodal endopod is shorter; the inner distal angle of the uropodal peduncle is square and not produced; and the exopod of pleopod 1 is less sharply tapering. These are very small differences but so far no intermediate forms have been found.

The species overlap geographically in NSW but *Paranthura epacris* is not found in such deep water as *P. ciliata*. The male of *P. epacris* is especially elongate and the aesthetascs of antenna 1 are poorly developed. The male of *P. ciliata* is similarly specialised.

#### ***Paranthura grevillea* sp. nov.**

Figures 13, 14

**Material examined:** 3 males, 5 juveniles, 3 man-cas; 2.5-7.3 mm:

Holotype: juvenile, 5.6 mm, AM P24364. NSW, E. of North Head, Sydney ( $33^\circ49'S$ ,  $151^\circ18'E$ ), 20 m, in association with the sponge *Polymastrea craticia*, SCUBA (AMSBS station).

Paratypes: NSW, E. of North Head, Sydney, AMSBS stations; 21 m, AM P22812 (1 specimen); 21-27 m, AM P22823(1).

Other material: NSW, Lord Howe Is., Old Gulch, among algae on midlittoral boulders, J. Lowry, 17 May 1977, AM P29811(1). Lord Howe Is., between Comet Hole and reef, 2-3 m, J. K. Lowry, 10 May 1977, AM P29807(6), NMV J1533(1).

**Description:** Juvenile. Head  $0.8\times$  as wide as long. Pleon  $1.8\times$  as long as pereonite 7, pleonites 1 and 6 free, 2-5 fused dorsally. Antenna 1 flagellum of 5 articles. Antenna 2 flagellum  $0.7\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.5\times$  as long as wide; palm oblique ( $30^\circ$ ); proximal thumb broad, separated from the convex cutting edge by a shallow obtuse angle; setal formula 5, 6, 10. Pereopod 2 total length about as long as pereopod 1; article 6  $2\times$  as long as broad, palm with 6 spines. Pereopod 4 articles 5 and 6 each with 3 spines; dactyl stout,  $0.8\times$  length of article 6. Pereopod 7 articles 5 and 6 with 1 and 2 spines respectively; article 6  $3\times$  as long as wide; dactyl stout,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 5 setae; exopod widest in proximal half and tapering distally, bearing 15 setae. Pleopod 2 endopod  $3\times$  as long as broad, with 3 setae distally; exopod with partial suture laterally, without setae proximal to suture and with 7 setae distally.

Uropodal endopod reaching beyond end of telson, almost as long as wide, lateral margin strongly convex; exopod  $2.1\times$  as long as wide, proximal lobe narrowly rounded, distal lobe tapering to rounded apex. Telson  $1.2\times$  as long as pleon,  $2.5\times$  as long as wide, widest at midpoint and tapering to a broadly rounded apex; with numerous terminal long setae and dorsal submarginal short setae on distal half.

Male. Pereon of similar proportions to juvenile. Pleon shorter ( $1.6\times$  as long as pereonite 7), telson longer ( $1.7\times$  as long as pleon) than in juvenile. Antenna 1 with 5 aesthetasc-bearing articles. Pereopod 1 palm with about 35 mesial setae. Pereopod 2 article 6 more elongate than in juvenile. Pereopod 7 articles (especially basis) broader than in juvenile. Uropodal rami narrower than in juvenile. Pleopod 2 with a long simple appendix masculina, well exceeding the endopod.

**Colour:** Scattered dorsal red-brown pigment.

**Distribution:** NSW shelf and Lord Howe Is., on algae and sponges. Intertidal–27 m.

**Remarks:** Fused pleonites distinguish *Paranthura grevillea* from all other species. Like some other small species (*P. boronia*, *P. dryandra*) *P. grevillea* possesses an oblique palm on pereopod 1. However, the species is distinguished from these by the rounded apex to the uropodal exopod and the broadened basis in posterior pereopods of the male.

### ***Paranthura involuta* Whitelegge**

Figure 15

*Paranthura involuta*. Whitelegge, 1901: 220-4, figs. 18a-g. — Barnard, 1925: 156. — Nierstrasz, 1941: 252. — Poore, 1980: 63.

**Material examined:** Holotype: juvenile, 11 mm, AM G2403. NSW, off Botany Bay, 90-93 m. (Thetis stn 37).

**Description:** Holotype juvenile. Head  $0.7\times$  as wide as long, widest posteriorly. Pleon about  $2\times$  as long as pereonite 7, pleonites 1-6 free. Antenna 1 flagellum of 6 articles. Antenna 2 flagellum  $0.7\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.6\times$  as long as wide; palm oblique ( $20^\circ$ ); proximal thumb broad, well separated from the convex cutting edge by a shallow obtuse angle; setal formula 5, 11, 13. Pereopod 2 article 6 about as long as that of pereopod 1,  $1.5\times$  as long as broad, palm with 10 spines. Pereopod 4 articles 5 and 6 each with 4 spines; dactyl stout,  $0.6\times$  length of article 6. Pereopod 7 articles 5 and 6 with 3 and 4 spines respectively; article 6  $5\times$  as long as wide; dactyl moderately stout,  $0.6\times$  length of article 6.

Uropodal endopod  $2\times$  as long as wide, lateral margin weakly convex; exopod  $3\times$  as long as wide. Telson about  $2.5\times$  as long as wide, widest at midpoint and tapering to an acute apex; with numerous terminal long setae.

Male. Unknown.

**Colour:** "Pale creamy-white" (Whitelegge, 1901).

**Distribution:** NSW shelf, 90-93 m.

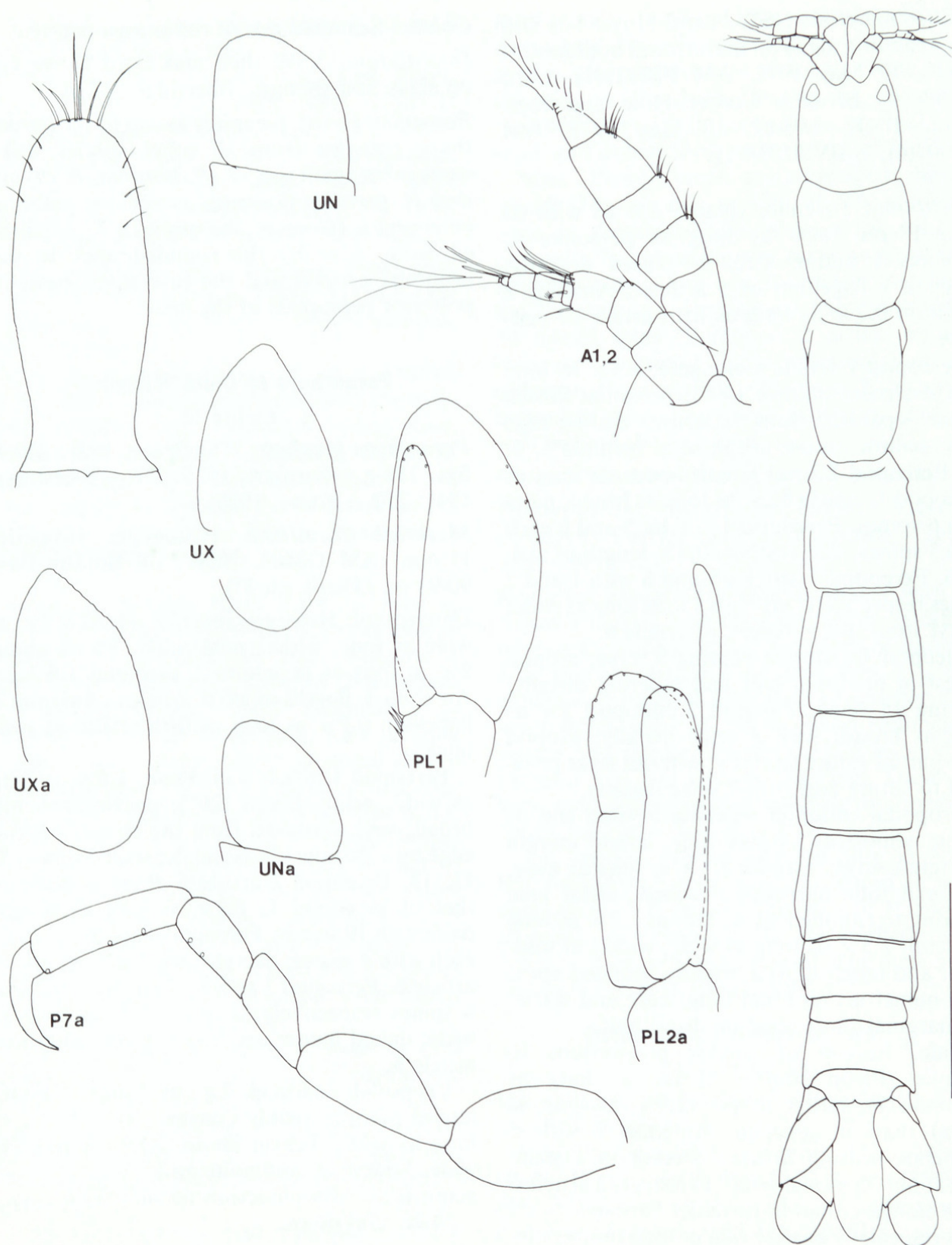


Figure 13. *Paranthura grevillea*. Holotype juvenile; a, male, 7.3 mm, AM P22821.

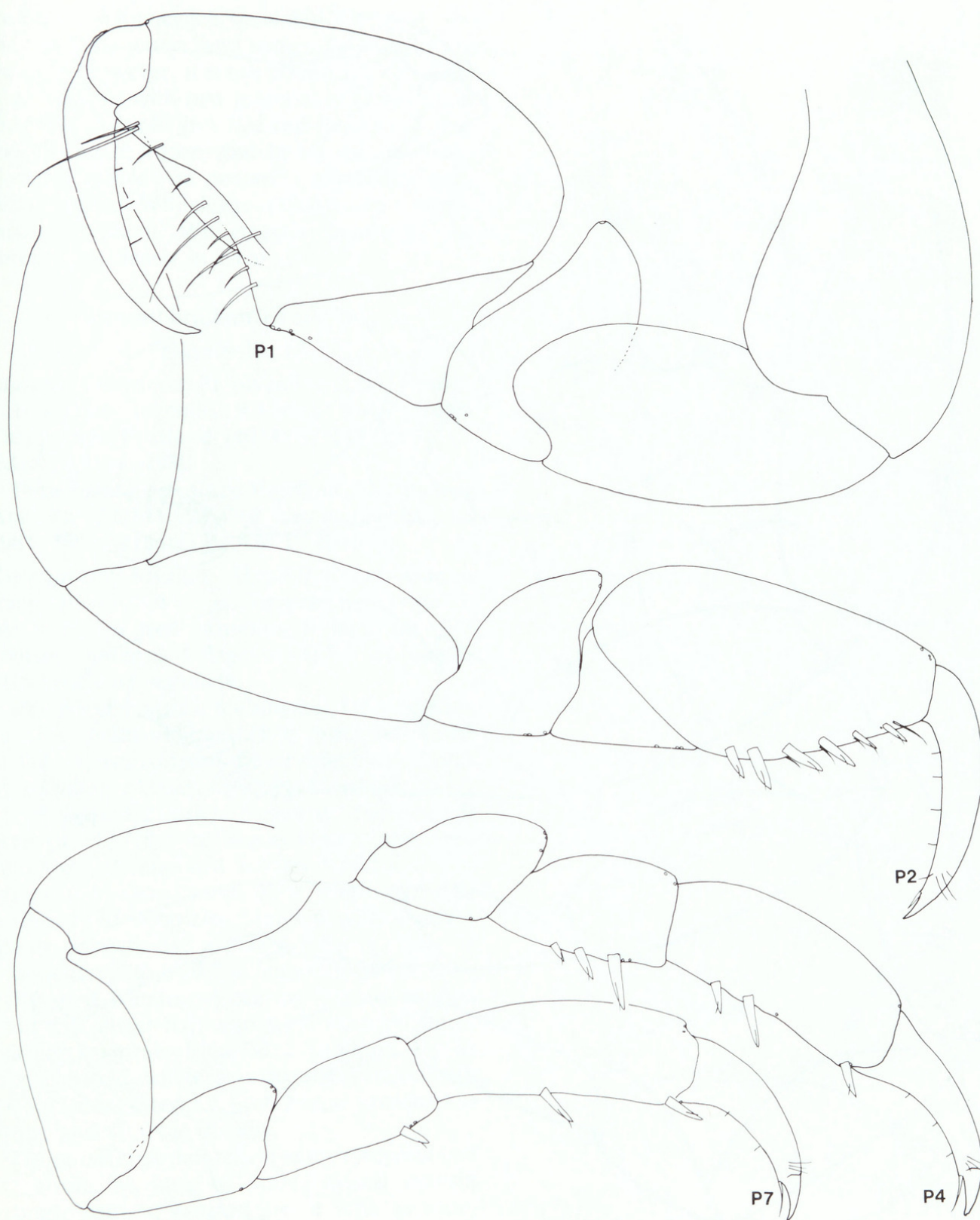


Figure 14. *Paranthura grevillea*. Holotype juvenile.

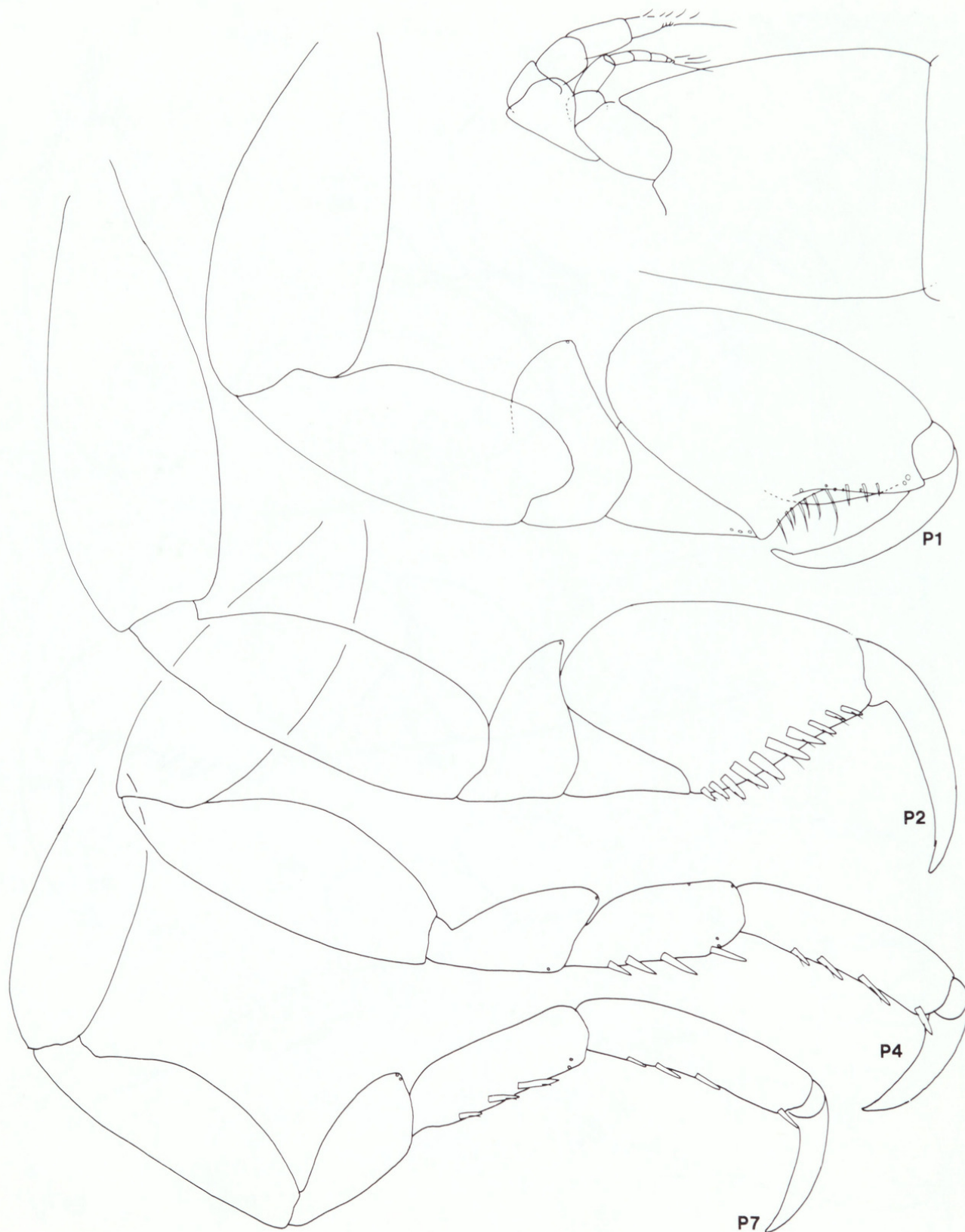


Figure 15. *Paranthura involuta*. Holotype juvenile.

*Remarks:* Whitelegge's specimen is incomplete, the uropods, telson, and some of the limbs are missing. However, it is not possible to reconcile what remains with new material collected from the NSW shelf (*P. grevillea* and *P. epacris*). The species can be recognized by its narrow head, elongate articles on posterior pereopods and, according to Whitelegge (1901), the sharply tapering telson. Whitelegge's figure of the antennae is clearly in error.

***Paranthura kunzea* sp. nov.**

Figures 16, 17

*Material examined:* 21 juveniles; 2.5-9.1 mm:

Holotype: juvenile, 9.1 mm, NMV J1646. Tas., Cape Portland (40°45'S, 147°57'E), G. Edgar, 6 Apr. 1980.

Paratypes: Tas., Cape Portland, G. Edgar; 6 Apr. 1980, NMV J1647(3 specimens); 11 Jan. 1981, NMV J1648(13), AM P32601(4).

*Description:* Juvenile. Head  $0.9\times$  as wide as long. Pleon  $1.4\times$  as long as pereonite 7, pleonites 1-6 free. Antenna 1 flagellum of 6 articles. Antenna 2 flagellum  $0.7\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.5\times$  as long as wide; palm oblique ( $25^\circ$ ); proximal thumb broad, separated from the straight cutting edge by a shallow obtuse angle; setal formula 13, 13, 45. Pereopod 2 article 6 shorter than that of pereopod 1,  $1.8\times$  as long as broad, palm with 10 spines. Pereopod 4 articles 5 and 6 with 5 spines each; dactyl stout,  $0.9\times$  length of article 6. Pereopod 7 articles 5 and 6 with 4 and 5 spines respectively; article 6  $3.5\times$  as long as wide; dactyl stout,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 8 setae; exopod widest in distal half and with rounded apex, bearing 21 setae. Pleopod 2 endopod  $4\times$  as long as broad, with 6 setae distally; exopod with partial suture laterally, with 2 setae proximal to suture and 10 setae distally.

Uropodal endopod reaching little beyond end of telson, as long as wide, lateral margin strongly convex; exopod  $2\times$  as long as wide, proximal lobe as long as wide, parallel-sided for much of its length ending with an evenly rounded apex; with numerous terminal long setae and dorsal submarginal short setae on distal half.

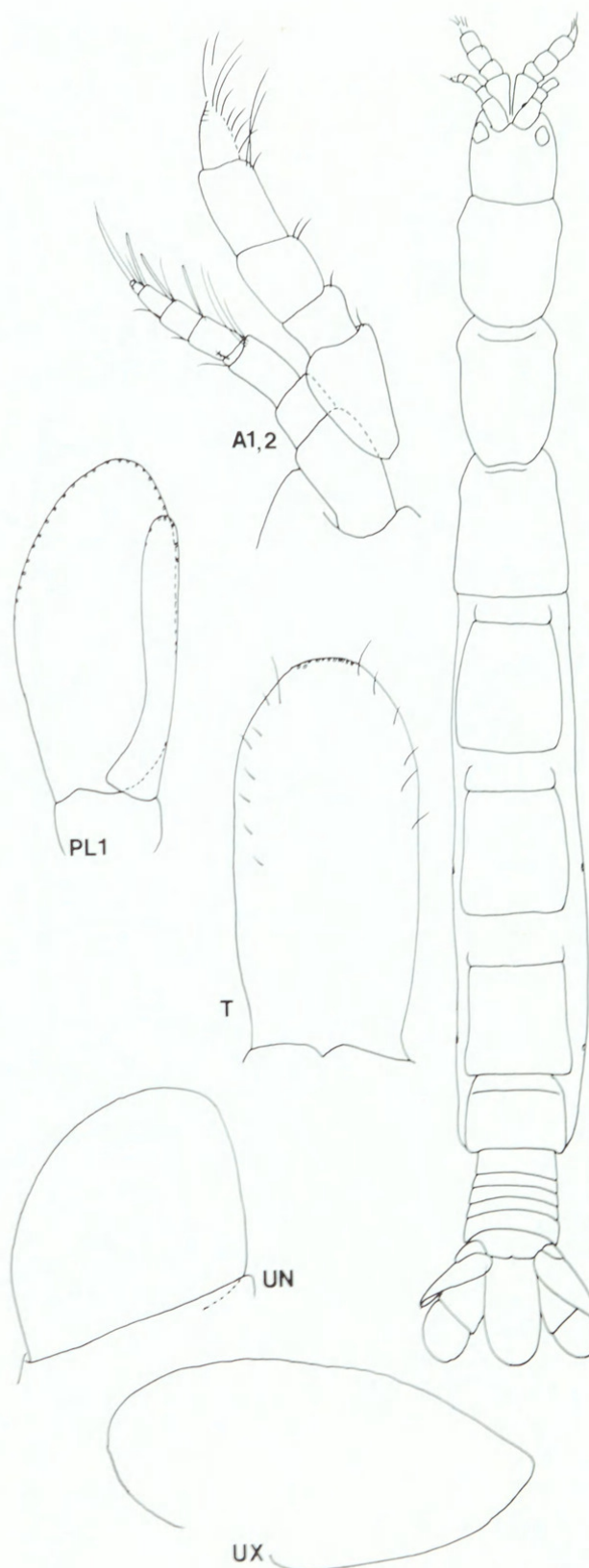


Figure 16. *Paranthura kunzea*. Holotype juvenile.

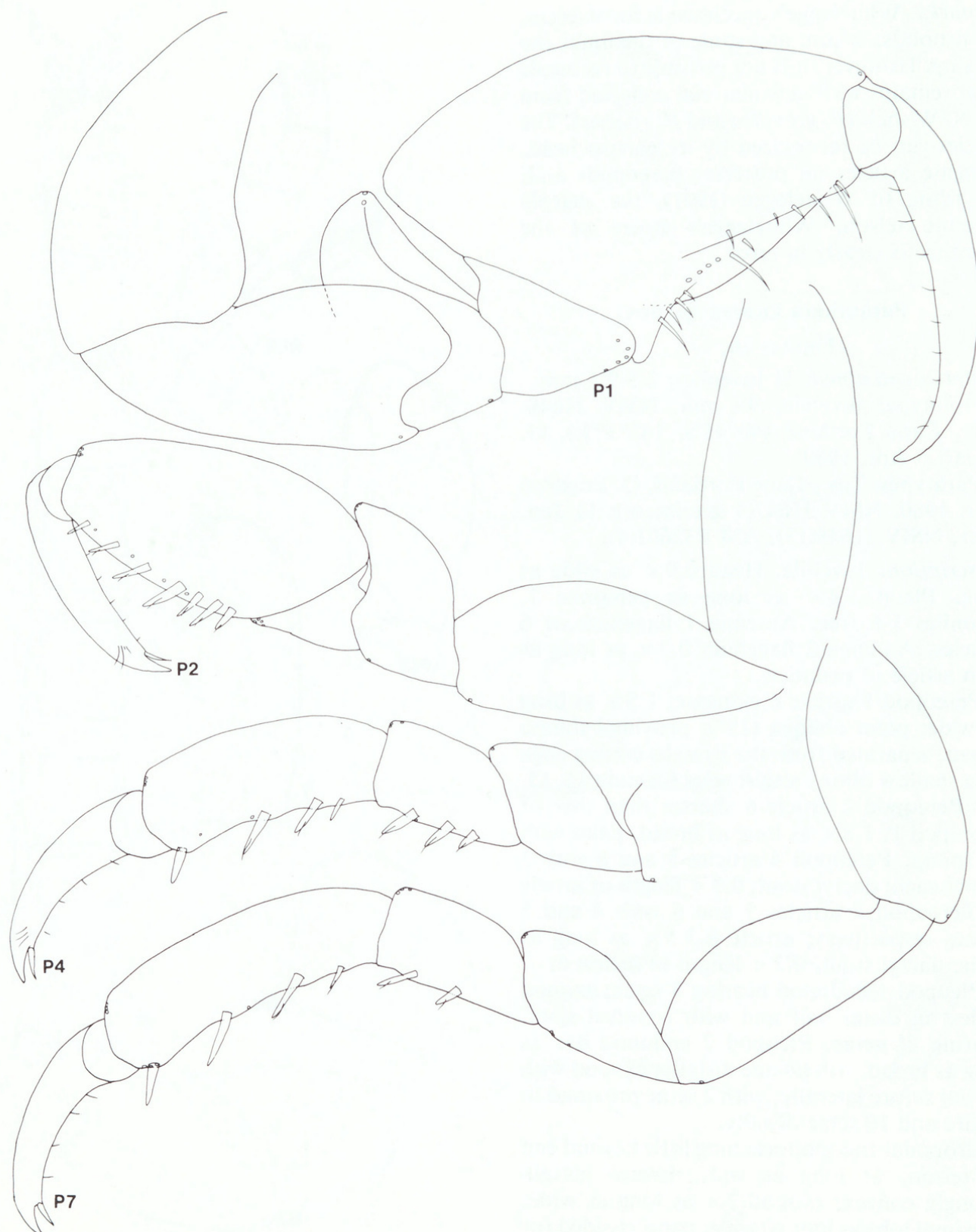


Figure 17. *Paranthura kunzea*. Holotype juvenile.

Male. Unknown.

*Colour*: Brown on head, only small patches elsewhere dorsally.

*Distribution*: Tasmania. Algae to 3 m.

*Remarks*: *Paranthura kunzea* is a moderately-sized species best recognised by its short, relatively broad telson and short pleon. The pereopods are relatively indistinguished.

***Paranthura lobelia* sp. nov.**

Figures 18, 19

*Material examined*: 1 female, 3 males, 1 juvenile; 6.8–11.6 mm:

Holotype: female, 10.9 mm, AM P32602. NSW, Port Stephens, off Shoal Bay (32°41'S, 152°09'E), in coarse sand with *Posidonia australis*, 2.5 m, P. Gibbs, 1 Sep. 1976.

Paratypes: NSW, type-locality, AM P32603 (3 specimens), NMV J1556(1).

*Description*: Female. Head almost as wide as long. Pleon  $1.5\times$  as long as pereonite 7, pleonites 1–6 free. Antenna 1 flagellum of 9 articles. Antenna 2 flagellum  $0.8\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.6\times$  as long as wide; palm axial ( $0^\circ$ ); proximal thumb very broad, separated from the convex cutting edge by a shallow obtuse angle; setal formula 13, 13, 45. Pereopod 2 article 6 shorter than that of pereopod 1,  $1.8\times$  as long as broad, palm with 10 spines. Pereopod 4 articles 5 and 6 with 5 spines each; dactyl stout,  $0.9\times$  length of article 6. Pereopod 7 articles 5 and 6 with 4 and 5 spines respectively; article 6  $3.5\times$  as long as wide; dactyl stout,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 21 setae; exopod widest in distal half and with rounded apex, bearing 34 setae. Pleopod 2 endopod  $3.5\times$  as long as broad, with 9 setae distally; exopod with partial suture laterally, with 3 setae proximal to suture and 14 setae distally.

Uropodal endopod reaching to end of telson,  $0.9\times$  as long as wide, lateral margin strongly convex; exopod  $2.1\times$  as long as wide, proximal lobe narrowly rounded, distal lobe broad then steeply tapering. Telson  $1.5\times$  as long as pleon,  $2.6\times$  as long as wide, widest in proximal half and tapering gradually to a rounded apex; with

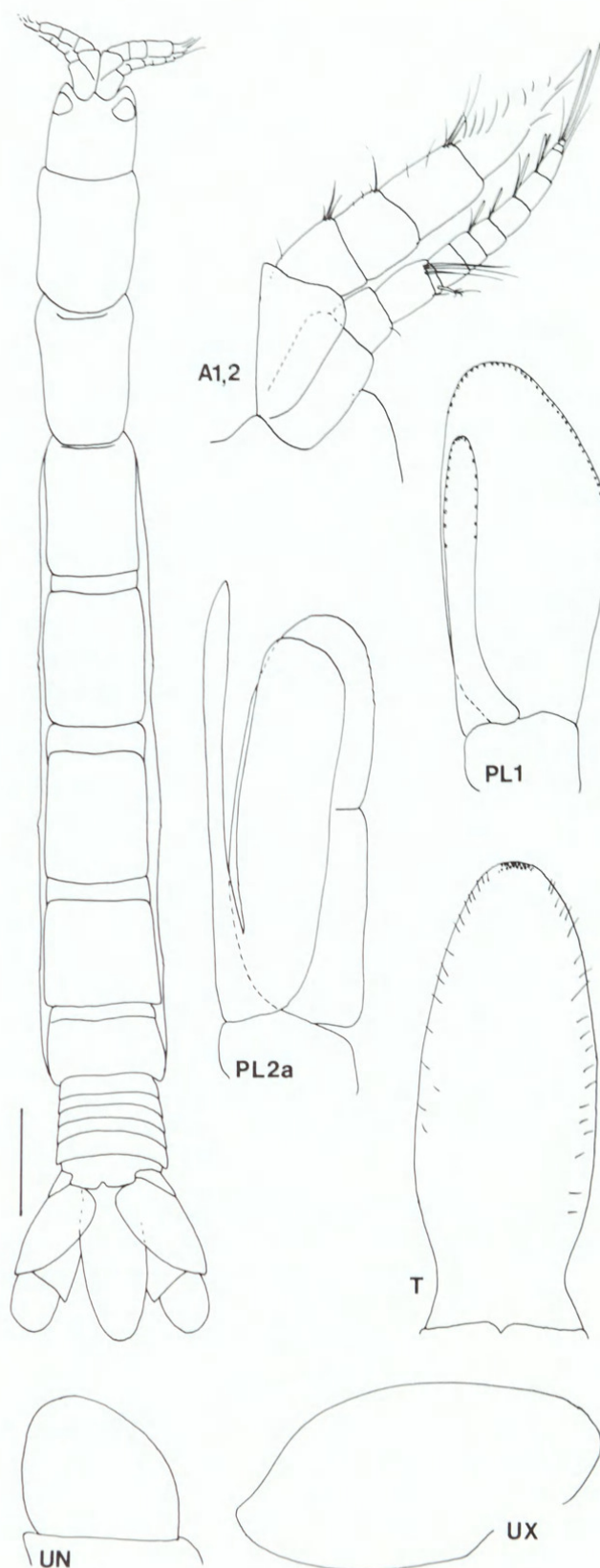


Figure 18. *Paranthura lobelia*. Holotype female; a, male, 11.6 mm, AM P32603.

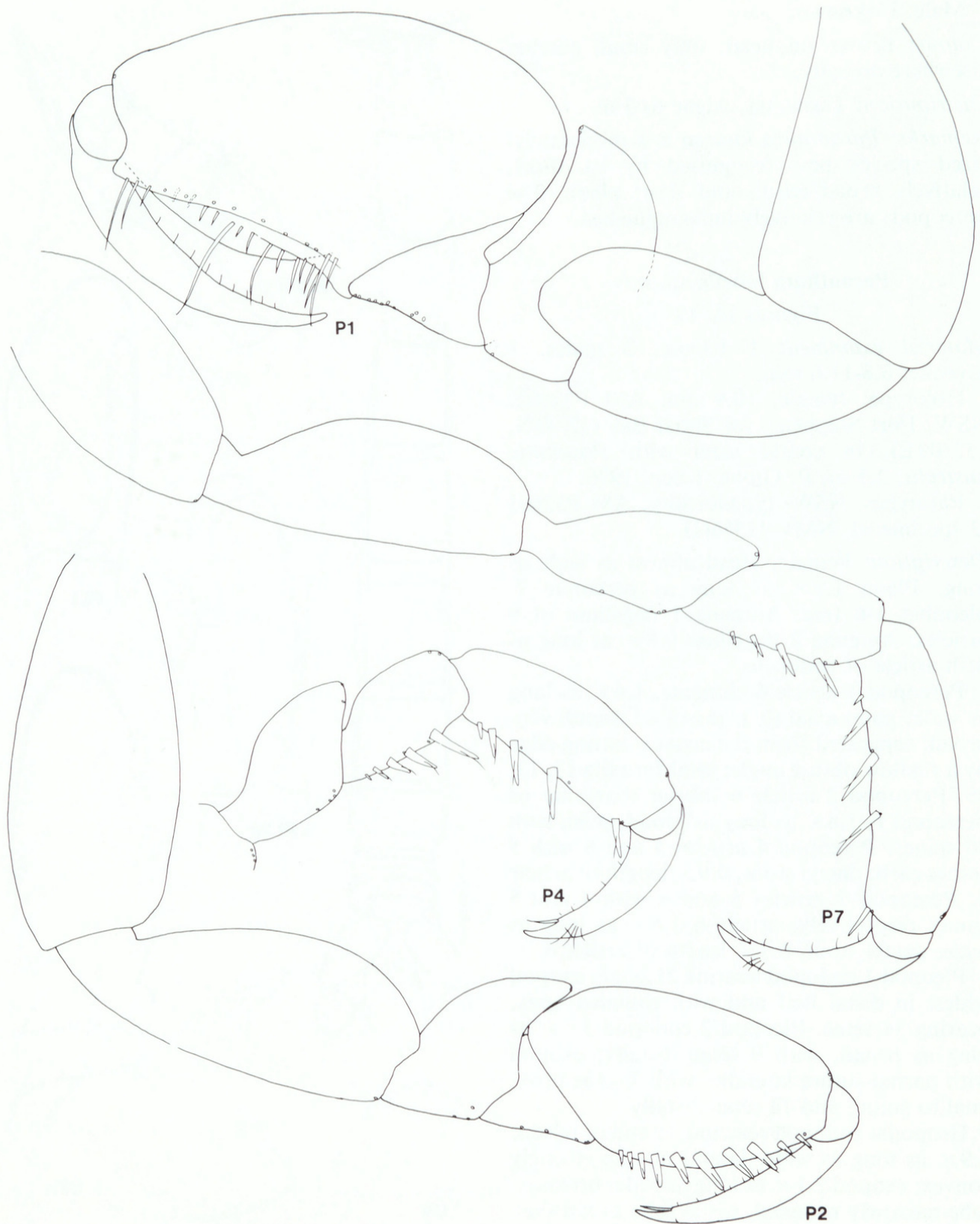


Figure 19. *Paranthura lobelia*. Holotype female.

numerous terminal long setae and dorsal submarginal short setae on distal two-thirds.

Male. Pereon and pleon of similar proportions to female; telson a little longer and dorsally setose. Antenna 1 with 8 aesthetasc-bearing articles. Pereopod 1 palm with about 50 mesial setae. Pereopod 2 article 6 more elongate. Pereopod 7 not modified. Uropodal rami of similar shape to female, exopod mesially setose. Pleopod 2 with a simple lanceolate appendix masculina, only just exceeding endopod.

*Colour*: Diffuse brown pigment dorsally.

*Distribution*: NSW (Port Stephens), subtidal.

*Remarks*: *Paranthura lobelia* is similar to *P. acacia* in the form of pereopod 1 but differs in having a shorter uropodal endopod, broader exopod, broader sixth articles on pereopods 4-7, and a more tapering telson. The species shares with *P. microtis* a distinctly tapering telson.

### ***Paranthura microtis* sp. nov.**

Figures 20, 21

*Paranthura punctata*.—Barnard, 1925: 154 (part from South Australia).—Nierstrasz, 1941: 252 (part). [Not *Paranthura punctata* (Stimpson)—South Africa].

*Material examined*: 2 females, 3 males, 1 juvenile; 9.4-16.9 mm:

Holotype: female, 16.9 mm, SAM C3904. SA, St Vincent Gulf, 31 Jan. 1895.

Paratypes: SA, type-locality, SAM C3905 (1 male). Port Adelaide, Feb. 1907, NMV J1652(2) [labelled *Paranthura punctata* (Stimpson) = 'nigropunctata' of Australian zoologists sed non Lucas, determ. K. H. Barnard]. Sellicks Beach, "underside of smooth hard boulders on reef", H. M. Hale, 27 Jan. 1936, SAM C3909(2).

*Description*: Female. Head as wide as long. Pleon  $2.0\times$  as long as pereonite 7, pleonites 1-6 free. Antenna 1 flagellum of 10 articles. Antenna 2 flagellum  $0.9\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 elongate,  $1.6\times$  as long as wide; palm axial ( $10^\circ$ ); proximal thumb broad, separated from the straight cutting edge

by a shallow obtuse angle; setal formula 16, 15, 60. Pereopod 2 article 6 shorter than that of pereopod 1,  $1.8\times$  as long as broad, palm with 11 spines. Pereopod 4 articles 5 and 6 with 5 and 6 spines respectively; dactyl stout,  $0.8\times$  length of article 6. Pereopod 7 articles 5 and 6 with 5 and 6 fine spines respectively; article 6  $4\times$  as long as wide; dactyl stout,  $0.7\times$  length of article 6.

Pleopod 1 endopod bearing 40 setae; exopod widest in proximal half and tapering distally, bearing about 55 setae. Pleopod 2 endopod  $2.8\times$  as long as broad, with about 30 setae distally; exopod with partial suture laterally, with 4 setae proximal to suture and 16 setae distally.

Uropodal endopod reaching beyond end of telson,  $1.1\times$  as long as wide, lateral margin weakly convex; exopod  $2.3\times$  as long as wide, proximal lobe narrowly rounded, distal lobe rounded. Telson  $1.5\times$  as long as pleon,  $2.4\times$  as long as wide, widest in proximal half and tapering sharply to an evenly rounded apex; with numerous terminal long setae and dorsal submarginal short setae on distal half.

Male. Pereon of similar proportions to female. Pleon little shorter ( $1.6\times$  pereonite 7), telson shorter ( $1.3\times$  pleon) than in female. Antenna 1 with 6 aesthetasc-bearing articles. Pereopod 1 with about 40 mesial setae. Pereopod 2 article 6 more elongate. Pereopod 7 more elongate than female. Uropodal rami narrower, not especially setose. Pleopod 2 with a simple appendix masculina reaching well beyond endopod.

*Colour*: Very dark brown dorsally on pereon of some individuals, in distinct large chromatophores on telson and uropods.

*Distribution*: South Australia.

*Remarks*: *Paranthura microtis* is very close to *P. acacia* from Victoria. The pereopods of the two species are virtually indistinguishable. However, the rich colour of this species, the more broadly rounded uropodal endopod and the more sharply tapering telson serve to separate the two. Males of *P. acacia* and *P. microtis* differ in modification of pereopods and uropodal rami.

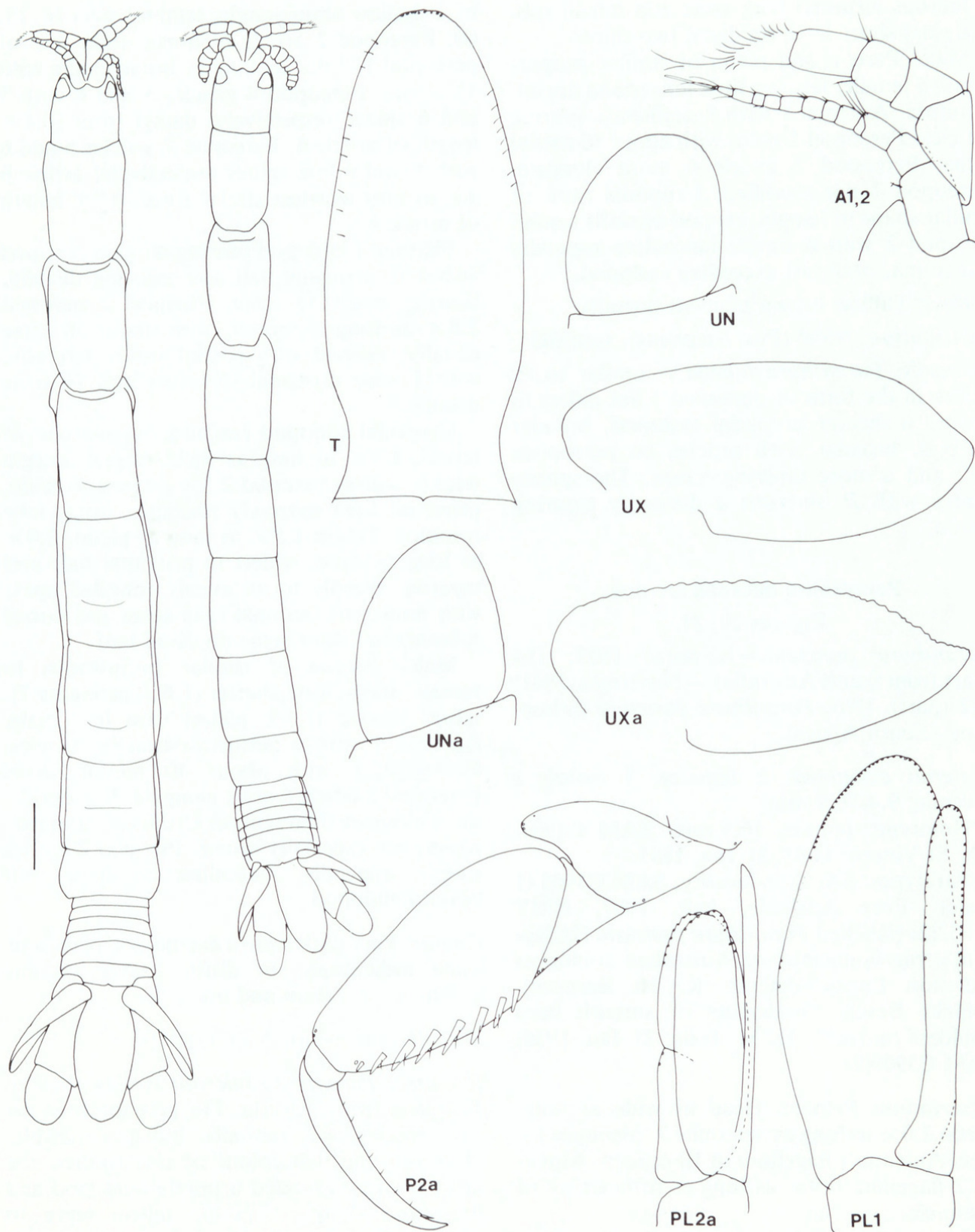


Figure 20. *Paranthura microtis*. Holotype female; a, male, 13.6 mm, SAM C3905.

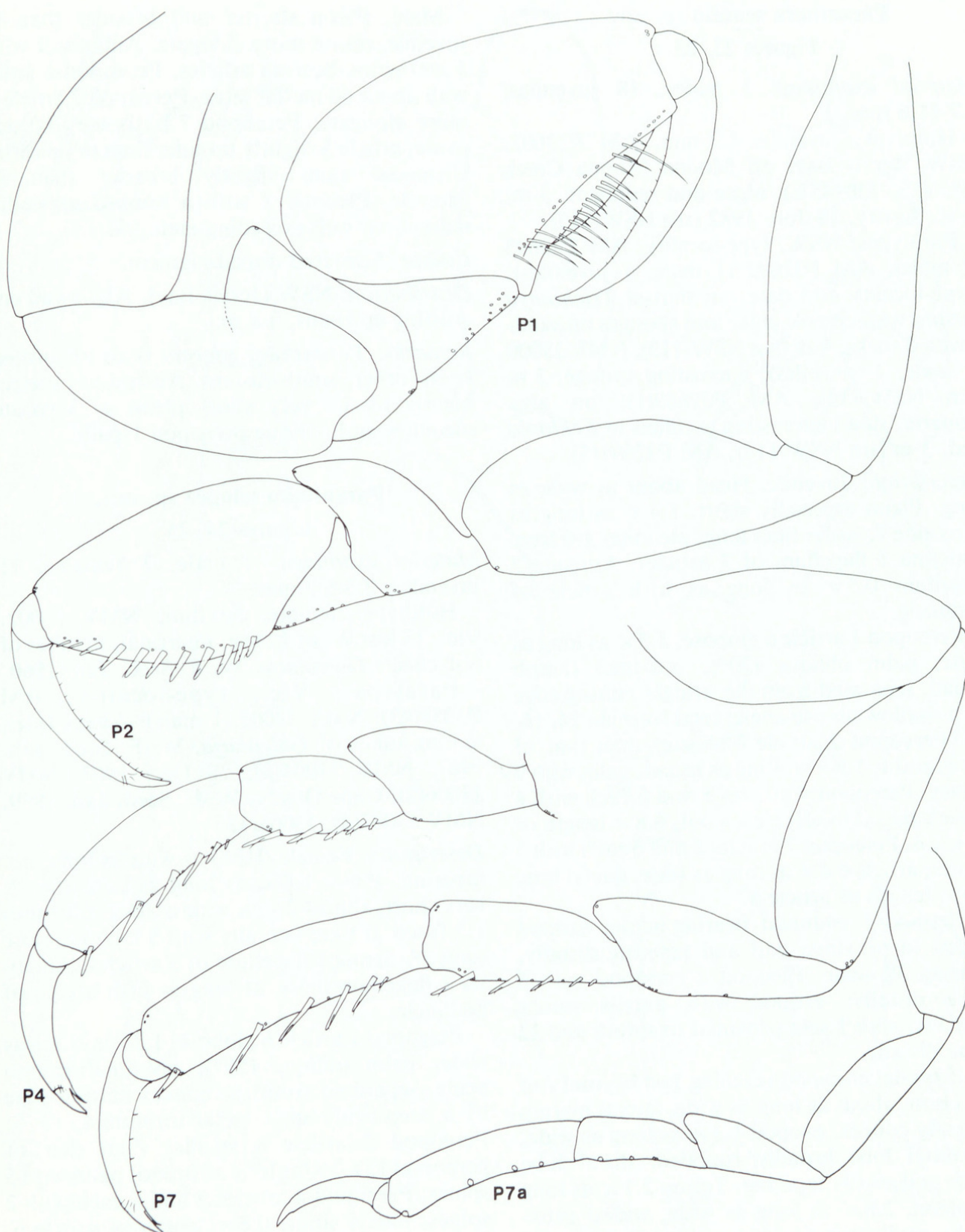


Figure 21. *Paranthura microtis*. Holotype female; a, male, 13.6 mm, SAM C3905.

***Paranthura senecio* sp. nov.**

Figures 22, 23

*Material examined:* 3 males, 18 juveniles; 3.7-11.6 mm:

Holotype: juvenile, 8.7 mm, AM P33602. NSW, Jervis Bay, off Moona Moona Creek (35°00'S, 150°45'E), algae and sediment, 3 m, J. K. Lowry, 19 Jun. 1982 (stn NSW-115).

Paratypes: NSW, type-locality, AM P33603 (1 male), AM P32692 (1 male, 7 juveniles). Type-locality and date, on mussel *Trichomya hirsuta* with epizoic algae and sponges on sand-covered rocks, 8 m (stn NSW-113), NMV J3000 (1 male, 4 juveniles); encrusting sponge, 3 m (stn NSW-112), AM P32689(1); on alga *Zonaria*, small encrusting ascidian in *Ecklonia* bed, 3 m (stn NSW-114), AM P32691(5).

*Description:* Juvenile. Head about as wide as long. Pleon especially short,  $1.4\times$  as long as pereonite 7, wider than long, pleonites 1-6 free. Antenna 1 flagellum of 7 articles. Antenna 2 flagellum  $0.5\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 globose,  $1.5\times$  as long as wide; palm oblique ( $20^\circ$ ); proximal thumb broad, separated from the straight cutting edge by a shallow obtuse angle; setal formula 14, 16, 29. Pereopod 2 article 6 shorter than that of pereopod 1,  $1.8\times$  as long as broad, palm with 9 spines. Pereopod 4 articles 5 and 6 each with 4 spines; dactyl moderately stout,  $0.8\times$  length of article 6. Pereopod 7 articles 5 and 6 each with 3 spines; article 6  $4\times$  as long as wide; dactyl fine,  $0.6\times$  length of article 6.

Pleopod 1 endopod bearing setae; exopod widest in proximal half and tapering distally, bearing 30 setae. Pleopod 2 endopod with 6 setae distally; exopod with partial suture laterally, with 1 seta proximal to suture and 12 setae distally.

Uropodal endopod reaching just beyond end of telson, about as long as wide, lateral margin strongly convex, exopod  $1.3\times$  as long as wide, proximal lobe broadly rounded, distal lobe acute and evenly tapering. Telson  $2.1\times$  as long as pleon,  $2.6\times$  as long as wide, widest proximally and tapering to very broadly rounded apex; with numerous terminal long setae and dorsal submarginal short setae on distal half.

Male. Pleon shorter and broader than in juvenile, telson more elongate. Antenna 1 with 5 aesthetasc-bearing articles. Pereopod 1 palm with about 60 mesial setae. Pereopod 2 article 6 more elongate. Pereopod 7 basis very broad, ovate; article 3 slightly broader than in juvenile. Uropodal rami slightly broader than in juvenile. Pleopod 2 with a hooked appendix masculina, well exceeding endopod.

*Colour:* Scattered dorsal pigment.

*Distribution:* NSW (Jervis Bay). Algae and encrusting epizoans, 3-8 m.

*Remarks:* *Paranthura senecio* is distinguished from other south-eastern Australian species mainly by its very short pleon of separate pleonites and oblique pereopod 1 palm.

***Paranthura telopea* sp. nov.**

Figures 24, 25

*Material examined:* 1 male, 3 females, 15 juveniles, 2.5-6.0 mm:

Holotype: female, 5.0 mm, NMV J3002. Vic., 13 km W. of Lorne, intertidal, in tubes of polychaete *Galeolaria*, W. F. Seed, Jan. 1960.

Paratypes: Vic., type-locality, AM P33580(3); NMV J3003 (1 male). Aireys Inlet, among tubes of *Galeolaria*, W. F. Seed, Jan. 1967, NMV J3004(2); 28 Dec. 1967, NMV J3006(2). Cape Otway, W. F. Seed, Jan. 1959, NMV J3007(8), J3008(1).

*Description:* Female. Head as wide as long, not tapering. Pleon  $1.6\times$  as long as pereonite 7, very short, almost  $2\times$  as wide as long, pleonites 1-5 fused, 6 free; laterally with 5 long plumose setae. Antenna 1 flagellum of 3 articles. Antenna 2 flagellum  $0.3\times$  as long as fifth article of peduncle.

Pereopod 1 article 6 globose,  $1.3\times$  as long as wide; palm oblique ( $50^\circ$ ); proximal thumb acute, separated from the convex cutting edge by a deep acute angle; setal formula 4, 11, 9. Pereopod 2 article 6 smaller than that of pereopod 1,  $1.7\times$  as long as broad, palm with 5 spines. Pereopod 4 articles 5 and 6 each with 2 spines; dactyl stout,  $0.8\times$  length of article 6. Pereopod 7 articles 5 and 6 with 2 and 3 spines respectively; article 6  $2.7\times$  as long as wide; dactyl stout,  $0.8\times$  length of article 6.

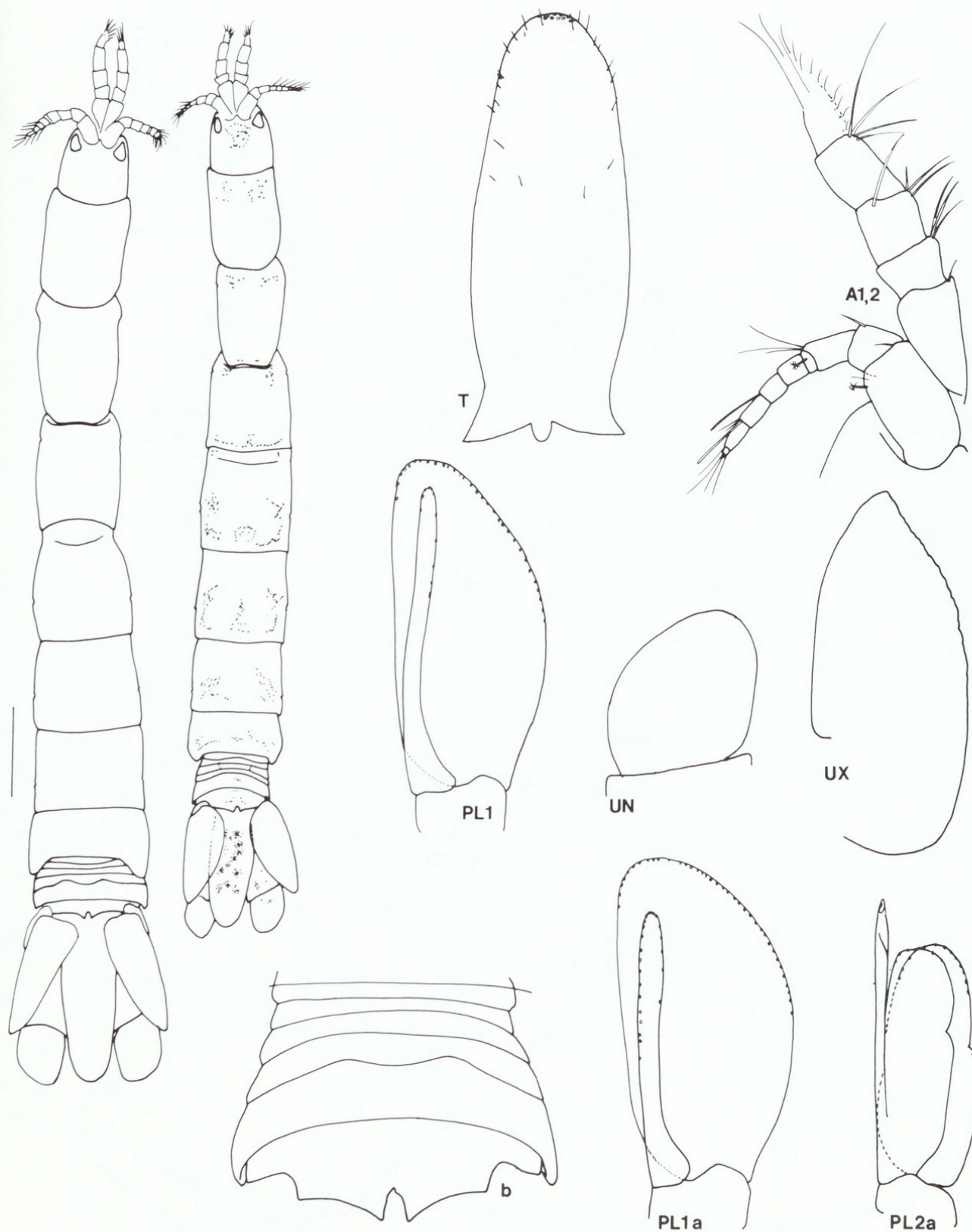


Figure 22. *Paranthura senecio*. Holotype juvenile; a, male, 11.6 mm, AM P33603; b, pleon of juvenile, 8.2 mm, AM P32692.

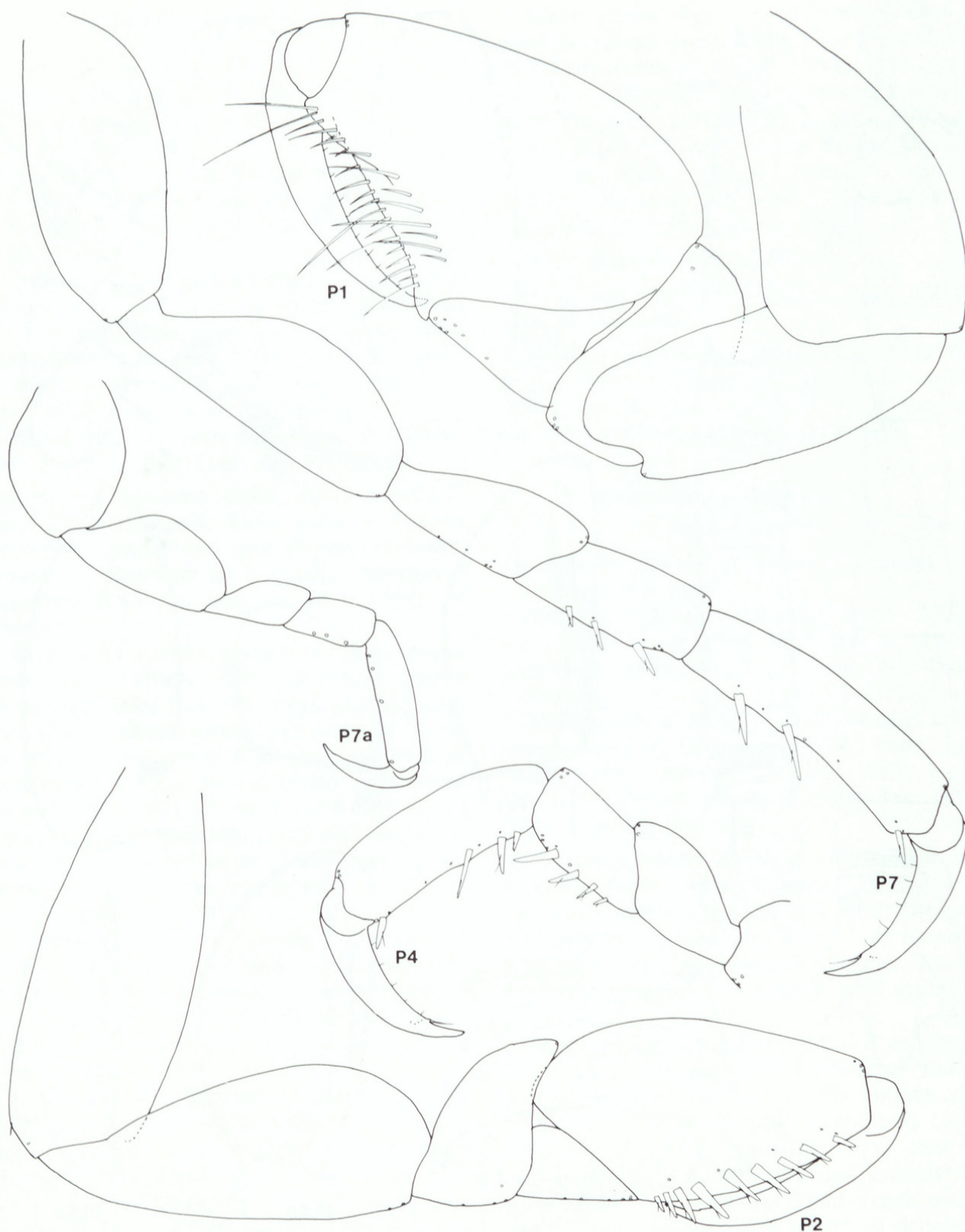


Figure 23. *Paranthura senecio*. Holotype juvenile; a, male, 11.6 mm, AM P33603.

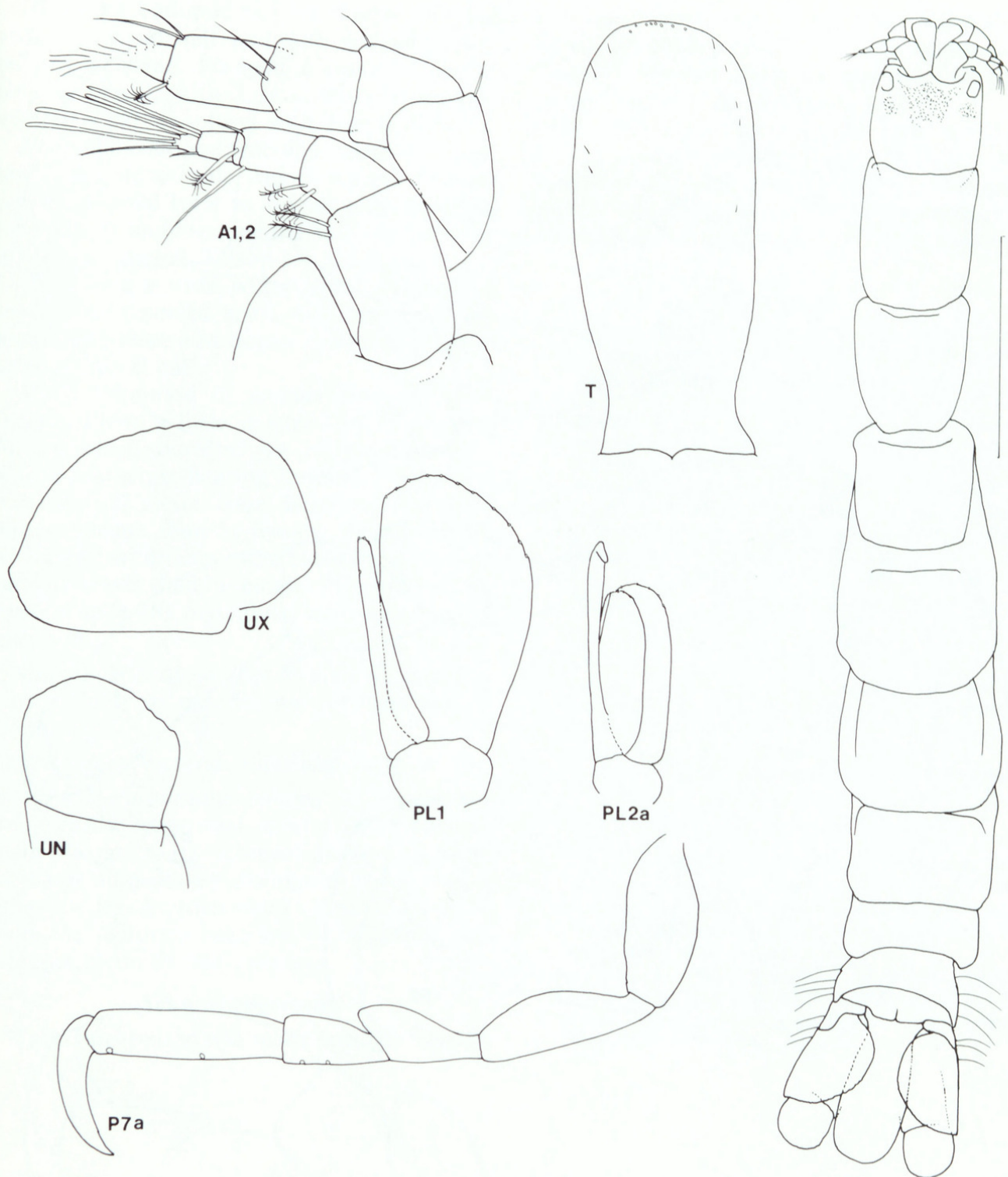


Figure 24. *Paranthura telopea*. Holotype female; a, male, 4.4 mm, NMV J3003.

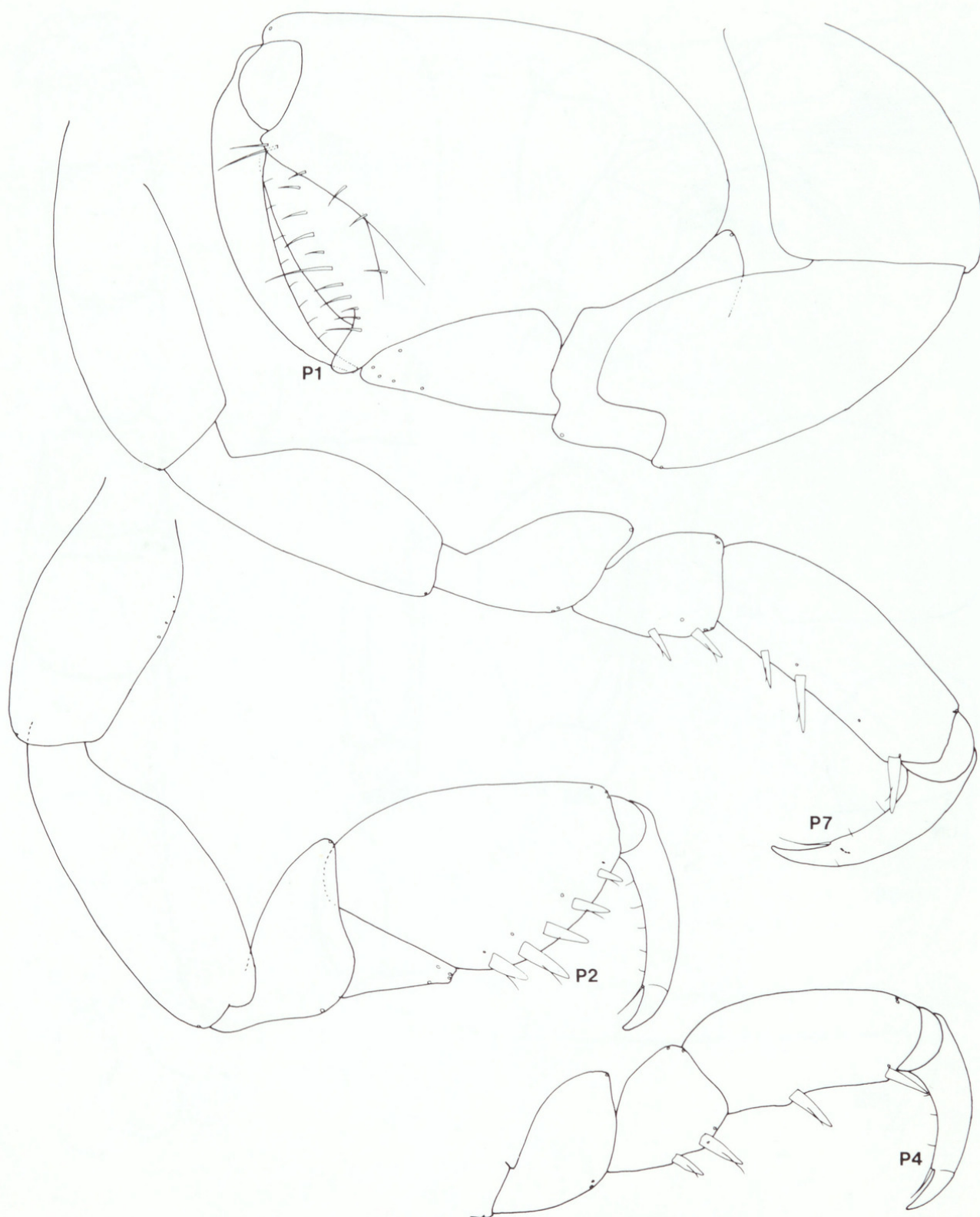


Figure 25. *Paranthura telopea*. Holotype female.

Pleopod 1 endopod bearing 4 setae; exopod widest in distal half and with rounded apex, bearing 11 setae. Pleopod 2 endopod  $3\times$  as long as broad, with 3 setae distally; exopod without a partial suture, with 9 setae distally.

Uropodal endopod reaching to end of telson, about as long as wide, lateral margin strongly convex; exopod  $1.4\times$  as long as wide, proximal lobe very broadly rounded, distal lobe extremely obtusely angled. Telson  $2\times$  as long as pleon,  $2.4\times$  as long as wide, widest distally and with a very broad rounded apex; with numerous terminal long setae and dorsal submarginal short setae on distal half.

Male. Pereopod of similar proportions to female. Pleon a little shorter ( $1.4\times$  pereonite 7), and telson shorter ( $1.4\times$  pleon). Antenna 1 with 4 aesthetasc-bearing articles. Pereopod 1 palm with 22 mesial setae. Pereopod 2 article 6 more elongate than in female. Pereopods 4-7 with terminal articles more elongate. Uropodal rami narrower than in female. Pleopod 2 with a hooked appendix masculina, well exceeding the endopod.

**Colour:** Scattered patches of pigment dorsally, most notably on anterior part of head and on pleon.

**Distribution:** Victoria. Intertidal rocky shore.

**Remarks:** *Paranthura telopea* is one of the more easily recognised species of this genus from the area. Its compact form and fused pleonites immediately distinguish it from most other species. Another small coloured specimen from the Victorian coastline, *P. dryandra*, has a longer pleon of free segments.

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