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The Shallow-water Tanaidacea (Arthropoda: Malacostraca: Peracarida) of the Bass Strait, Victoria, Australia (other than the Tanaidae)

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Abstract

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All of the shallow-water tanaidacean taxa (except for species of the family Tanaidae) from material collected between 1964 and 1999 within the Bass Strait, Victoria, Australia, have been analyzed. The material had been collected predominantly by staff from the Museum Victoria, Melbourne. The species treated here are those occurring at depths <200 m; substrata were predominantly sands. A total of 65 species in 43 genera is discussed, of which 44 species, five genera and one subgenus are described as new, although two of the species are not named owing to inadequacy of the material. Only nine of the species are known from elsewhere in Australia, and none from outside Australia. In addition, after examination of more material of its type- (and only) species, the genus *Annexos* is synonymized with *Apseudes*, as is *Xanthapseudes*; *Apseudes tuski* is moved to *Apseudopsis*; subgenera of *Bunakenia* are rejected; the "tribes" Parapseudini and Pakistanapseudini are raised to Subfamily rank; *Magniaculeus* is synonymized with *Saltipedis*; intraspecific variation in *Kalliapseudes obtusifrons* is discussed; the genera of the Pagurapseudinae are resolved, and *Pagurapseudes abrucei* is transferred to *Macrolabrum*; the first male for the genus *Bathytanais* is described; the validity of the genus *Araphuroides* is discussed, and *A. io* is returned to *Araphura*; *Protanaissus makrotrichos, P. alvesi* and *P. floridensis* are moved to new genera; the family Tanaopsidae is erected to accommodate the genus *Tanaopsis* (at least).

Keywords

Tanaidacea; Apseudomorpha; Tanaidomorpha; Australia; Tasman Sea; Bass Strait

Introduction

The Tanaidacea is a group of generally small, mainly marine, peracarid crustaceans found in benthic habitats from the shore to the deep sea. A comprehensive review of their biology and ecology has been presented by Larsen (2005). As a rule, they are outnumbered in these habitats by the two dominant peracarid groups, the Amphipoda (in shallower waters) and the Isopoda (in deeper waters), although they appear to be a dominant macrofaunal group on abyssal plains where they potentially rival polychaetes in ecological importance (Błażewicz-Paszkowycz *et al.* 2012).

Despite this, the group has been understudied historically. Most species are small in the size-spectrum of macrofauna (commonly only a few mm long, and less than 1 mm wide); they also have a hydrophobic cuticle, which results in their adhering to surface water-films during sample-collection. As a result, they have been undersampled in general macrofaunal collection, and their identification even to genus has posed problems for the non-specialist. Fortunately, an increase in the number of specialists studying the Tanaidacea since the 1980s, coinciding with more rigorous investigations of the smaller taxa in the deep sea, the tropics and the Antarctic, has begun to improve the understanding of, and the availability of identification texts for, the group. Valuable baselines now exist regionally (e.g. Bird & Holdich, 1989; Guţu, 1997; Poore, 2002, 2005; Larsen, 2005; Larsen & Shimomura, 2007b; Bamber, 2008; Edgar, 2008) and globally (e.g. Sieg, 1980b; Sieg, 1983a; Blazewicz-Paszkowycz, 2007; Drumm *et al*., 2008).

In shallow waters (<500 m), the regions where studies on the Tanaidacea have been most comprehensive have been the northeast Atlantic (Europe) and eastern coasts of the USA, simply because of the history of effort in these areas. There has also been a long history of study in the Mediterranean, although over the last century that has concentrated on apseudomorph species (e.g. Guţu, 2002), and more recently in the Antarctic (e.g. Blazewicz-Paszkowycz & Sekulska-Nalewajko, 2004; Jóźwiak & Błażewicz-Paszkowycz, 2007).

As a general rule, the more comprehensive studies have found that in shallow waters tanaidaceans are less diverse,

but the species have denser populations, when compared with deep waters where diversity can be surprisingly high, but species are often represented by only a few (or one) individuals. It was therefore entirely unexpected when Bamber (2005), surveying the shallow-water (0 to 40 m depth) tanaidacean fauna of one bay in southwestern Australia over three weeks, found 26 species in 21 genera; further, that in quantitative sandy-beach samples of an admittedly low-diversity community, the tanaidaceans were the dominant peracarid group, representing 80% of the peracarid fauna numerically.

Most recent studies in Australian waters (Larsen, 2001; Guţu, 2006; Błażewicz-Paszkowycz & Bamber, 2007a, b; Bamber, 2008; Edgar, 2008) have found an extraordinary shallow-water diversity and dominance of the Tanaidacea when compared with other parts of the world. For example, Holdich & Jones (1983), listed 28 species in 16 genera for the long-studied British waters, this total having risen only to 33 as a result of subsequent publications (Bird & Holdich, 1989; Bird, 2002, 2004; Bamber, 2011); Larsen (2005) listed a total of 58 shallow-water (undefined) species from the Gulf of Mexico/ western Caribbean Sea. Furthermore, the large majority of the taxa found in Australian waters was new to science, and showed both high local diversity and high regional distinctness. Bamber (2005) listed 28 species in 21 genera recorded from Australian waters previously to that study (although two species were missed from that list); a short time later, Bamber (2008) listed a new total of 113 species in 61 genera from Australian waters. Of this impressive number, only six species have also been recorded outside Australia (and four of those are recorded as "cf." in Australian waters, and may yet prove to be distinct). Seventeen genera are currently endemic to Australia. One entire family, the Whiteleggiidae Guţu, 1972, is also endemic [Błażewicz-Paszkowycz & Bamber (2007b) showed that the only other record, of *Whiteleggia multicarinata* (Whitelegge, 1901) off South Africa, was in fact a *lapsus calami*]. At the regional level, Bamber (2008) found that, of 29 species discovered in Moreton Bay, Queensland, only six species also occurred elsewhere in Australia.

The present paper brings together the results of four decades of sampling in the Bass Strait, southeastern Australia. This region lies between the Great Australian Bight to the west and the Tasman Sea to the east, and between Victoria in the north and Tasmania in the south, extending for some 400 km east-to-west and 250 to 300 km north to south (Fig. 1). It is the widest area of continental shelf of temperate Australia (Wilson & Poore, 1987), and forms part of the Southeast Australia Large Marine Ecosystem (LME), considered notable for its biodiversity (e.g. Morgan, 1989). The prevailing strong current runs from east to west. Most of the Strait is around 50 m depth, and the substrata are predominantly sands.

This work describes all the shallow-water tanaidacean taxa analysed from material collected between 1964 and 1999 within the Bass Strait (see Poore, 1986; Wilson and Poore, 1987), except for taxa in the Family Tanaidae Dana, 1849, which are being treated elsewhere. Species analyzed are those occurring at depths <200 m (although some of these extend to greater depths). Species occurring in adjacent waters exclusively below 200 m will also be treated elsewhere.

From the foregoing, it is perhaps now no surprise that analysis of the hundreds of samples collected over that period revealed a total of 65 species in 43 genera, of which 57 species and eight genera were new to science. Some of this material has already been described (Błażewicz-Paszkowycz & Bamber, 2007a, b). The following description of all taxa from the Bass Strait describes 44 new species, five new genera, one new subgenus and designates one new family. The material is held in the collections of Museum Victoria, Melbourne.

Methods

A map of the Bass Strait region, showing principal sampling areas mentioned in the text, is given as Figure 1.

Sampling techniques, including trawls, dredges, epibenthic sled and Smith-McIntyre grab, are listed in Poore (1986) and Wilson & Poore (1987); these papers also give sample-station details, including sediments where known. Techniques for more recent samples are not known, but none are treated herein as quantitative.

The type material and other studied materials are deposited at Museum Victoria (Melbourne, Australia). In the case of very numerous species, not all the material is listed below even when studied for confirmation of identification; in these cases, primary types are only those specimens designated as such herein. In addition, some previously described material held at the Museum was re-examined to resolve issues of identity, and in one case to designate new type material (neotype).

Dissected material was stained with chlorazol black and mounted in glycerine for microscopic examination. Drawings were done with the aid of a *camera lucida*. Measurements are made axially, dorsally on the body and antennae, laterally on pereopods. Body-proportions are based on length (from anterior of rostrum to tip of telson) versus width of pereonite 2. Morphological terminology is as in Błażewicz-Paszkowycz and Bamber (2007b).

Systematics

Order **Tanaidacea** Dana, 1849

Suborder **Apseudomorpha** Sieg, 1980

Superfamily **Apseudoidea** Leach, 1814

Family **Apseudidae** Leach, 1814

Subfamily **Apseudinae** Leach, 1814

Genus ***Apseudes*** Leach, 1814

Xanthapseudes Guţu, 2008, new synonymy.

Apseudes abditospina (Błażewicz-Paszkowycz & Bamber, 2007) comb. nov.

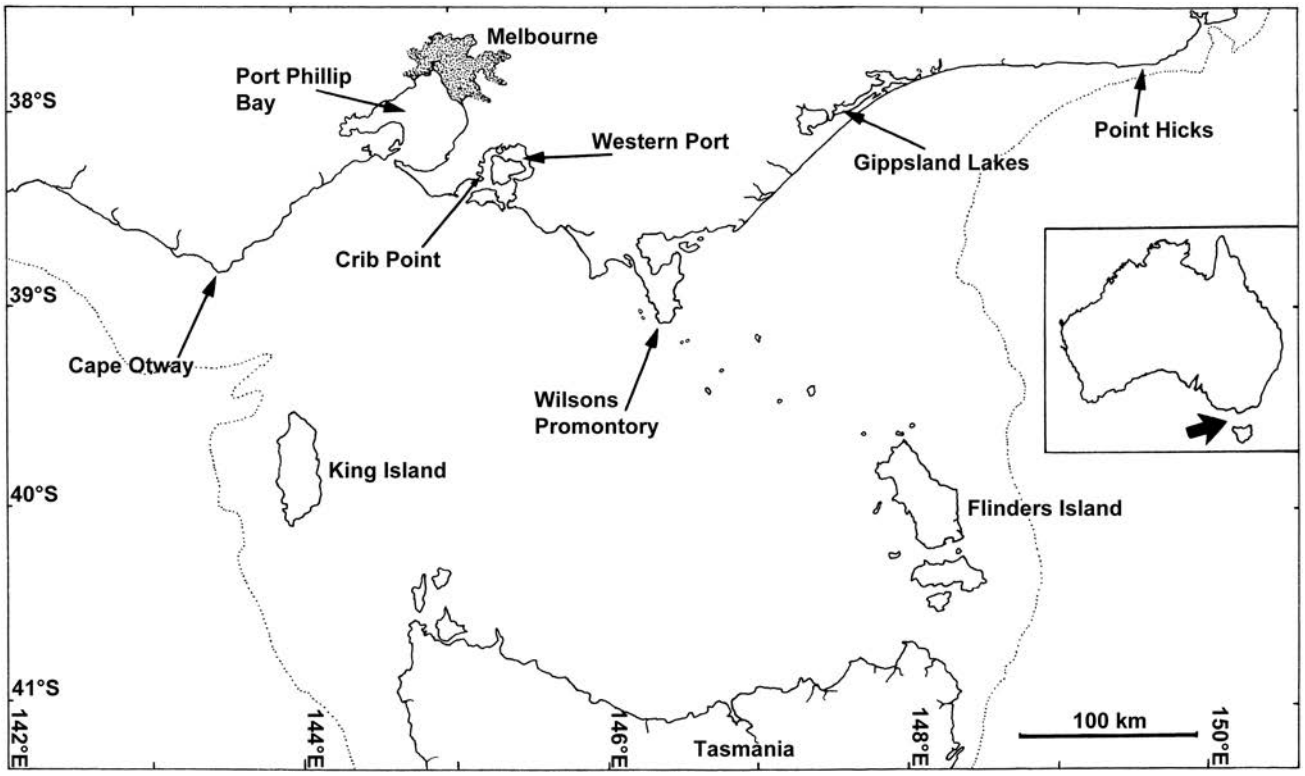

Fig. 1. Map of the Bass Strait, showing main place names mentioned in the text and 100 m depth contour (dotted line) (partly redrawn after Wilson & Poore, 1987).

Figure 2

Annexos abditospina Błażewicz-Paszkowycz & Bamber, 2007b, 111–116, figs 1–3.

Remarks. On its original description, *Annexos abditospina* was attributed to a new genus of the Apseudinae owing to its not having exopodites on the cheliped nor on pereopod 1. Re-examination of paratypes of this species has found that it does indeed have exopodites on both of these appendages (Fig. 2), although they readily break off. Both are of three articles, that on the cheliped has seven marginal plumose setae on the distal article, while the exopodite on pereopod 1 has five.

The species is therefore transferred to the genus *Apseudes*, of which *Annexos* becomes a junior synonym. *A. abditospina* was compared with, and distinguished from, other Australian species of *Apseudes* during its original description (Błażewicz-Paszkowycz & Bamber, 2007b). With the discovery of exopodites on the cheliped and pereopod 1, *A. abditospina* sits comfortably with that group of typical *Apseudes* which includes the generotype, *A. talpa* (Montagu, 1808).

There are distinct proximal hook-like apophyses on the bases of the first three pereopods of this species, a feature known elsewhere only in *A. atuini* (Bamber 2005), from Western Australia, although in that species they are also present on the posterior pereopods. Like *Apseudes poorei* (Błażewicz-Paszkowycz & Bamber, 2007) (see below), this species has distinct articulated inner-distal spines on the first and second maxilliped palp articles. For discussion of the relevance of this feature to Guţu's (2008a) suggested genus *Xanthapseudes* see under remarks for *A. poorei* below.

This species was found throughout the Bass Strait, between 38°43' and 40°22'S and 144°18' and 148°24'E, and from 22 to 79 m depth on sandy to coarse shell substrata.

Apseudes poorei Błażewicz-Paszkowycz & Bamber, 2007

A. poorei Błażewicz-Paszkowycz & Bamber, 2007b, 120–125, figs 7–9.

Xanthapseudes poorei Guţu, 2008a, 39.

Remarks. Apseudes poorei is very similar to *A. bucospinosus* Guţu, 2006, a species from Heron Island on the Great Barrier Reef (depth not recorded), although the pereopods of the latter species are not fully described. An unusual distinguishing feature of *A. poorei* is the presence of plumose setae on the bases of pereopods 2 and 4; the two species are distinguished further on the setation of the mouthparts and the morphology of the cheliped, *inter alia*. *A. bucospinosus* has strong inner-distal "spiniform processes" rather than spines on the first and second maxilliped palp articles. Guţu (2008a) assigned these

Fig. 2. *Apseudes abditospina* comb. nov. A, cheliped; B, pereopod 1. Scale = 0.1 mm.

two species to a new genus, *Xanthapseudes*, on the basis of an assumed similarity in the character of spines or spine-like apophyses on the proximal maxilliped palp articles. In fact, in this character, *A. poorei* is much closer to *A. abditospina,* yet quite distinct on a number of other characters (for example, the anterolateral spiniform apophyses on the pereonites and the hook-like apophyses on the anterior pereopod bases of the latter species). It is therefore evident that this character of one article of the maxilliped palp alone is not a sufficient basis on which to distinguish a separate genus.

Apseudes poorei was found throughout the Bass Strait, between 38º00' and 40º23'S and 144º05' and 148º37'E, and from 13 to 82 m depth on sandy substrata.

Apseudes quasimodo sp. nov.

Figures 3–5

Material examined. 1 ♀ with oostegites (Registration no, J58462), holotype, Eastern Bass Strait, Stn MSL-EG 95, 37º51.70'S 148º14.60'E, 37 m depth, February 1991, coarse sand, coll. N. Coleman, Smith-McIntyre grab; 2 ♀♀ with oostegites, 6 subadults, 1 juvenile (J28515), paratypes, same sample as Holotype. 1 ♀ with oostegites and penial tubercle, 3 juveniles (J28513), paratypes, Stn MSL-EG 69, 37º51.70'S 148º14.6'E, 37 m depth, 4 June 1991, coarse sand; 2 ♀♀ with oostegites, 3 brooding ♀♀, 23 juveniles (J28514), paratypes, Stn MSL-EG 77, 37º49.89'S 148º30.13'E, 27 m depth, 4 June 1991, coarse sand; 3 subadults (J28512), paratypes, Stn MSL-EG 44, 37º53.18'S 148º28.96'E, 45 m depth, 26 September 1990, sand and shell; 1 brooding ♀, 8 subadults

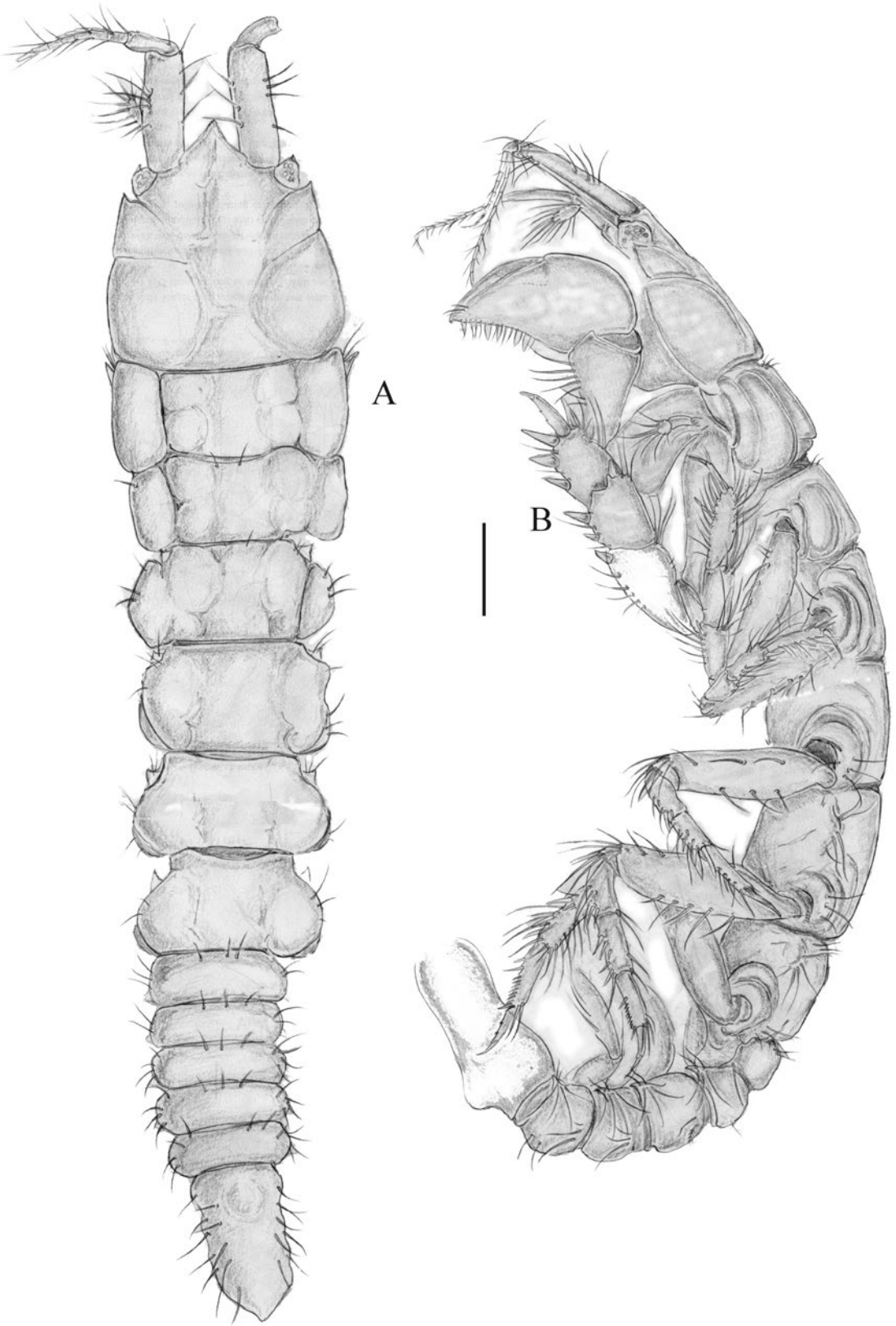

Fig. 3. *Apseudes quasimodo* sp. nov., holotype female. A, dorsal view; B, lateral view. Scale = 1 mm.

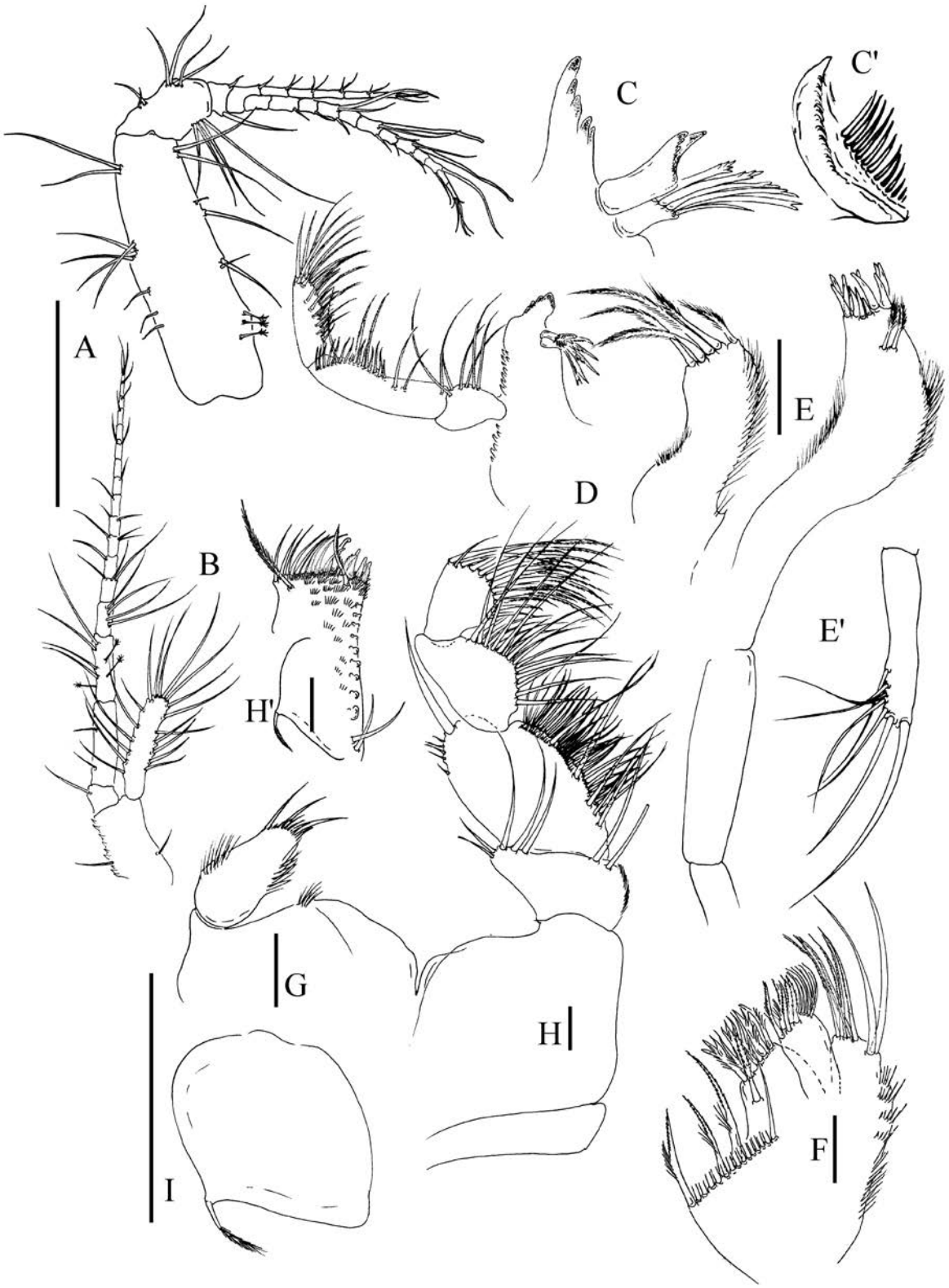

Fig. 4. *Apseudes quasimodo* sp. nov., female paratype (J56389). A, antennule; B, antenna; C, left mandible; C', mandible molar; D, right mandible; E, maxillule; E', maxillule palp; F, maxilla; G, labium; H, maxilliped; H', maxilliped endite; I, epignath. Scale: A = 0.6 mm; B, I = 1 mm; C-H = 0.1 mm.

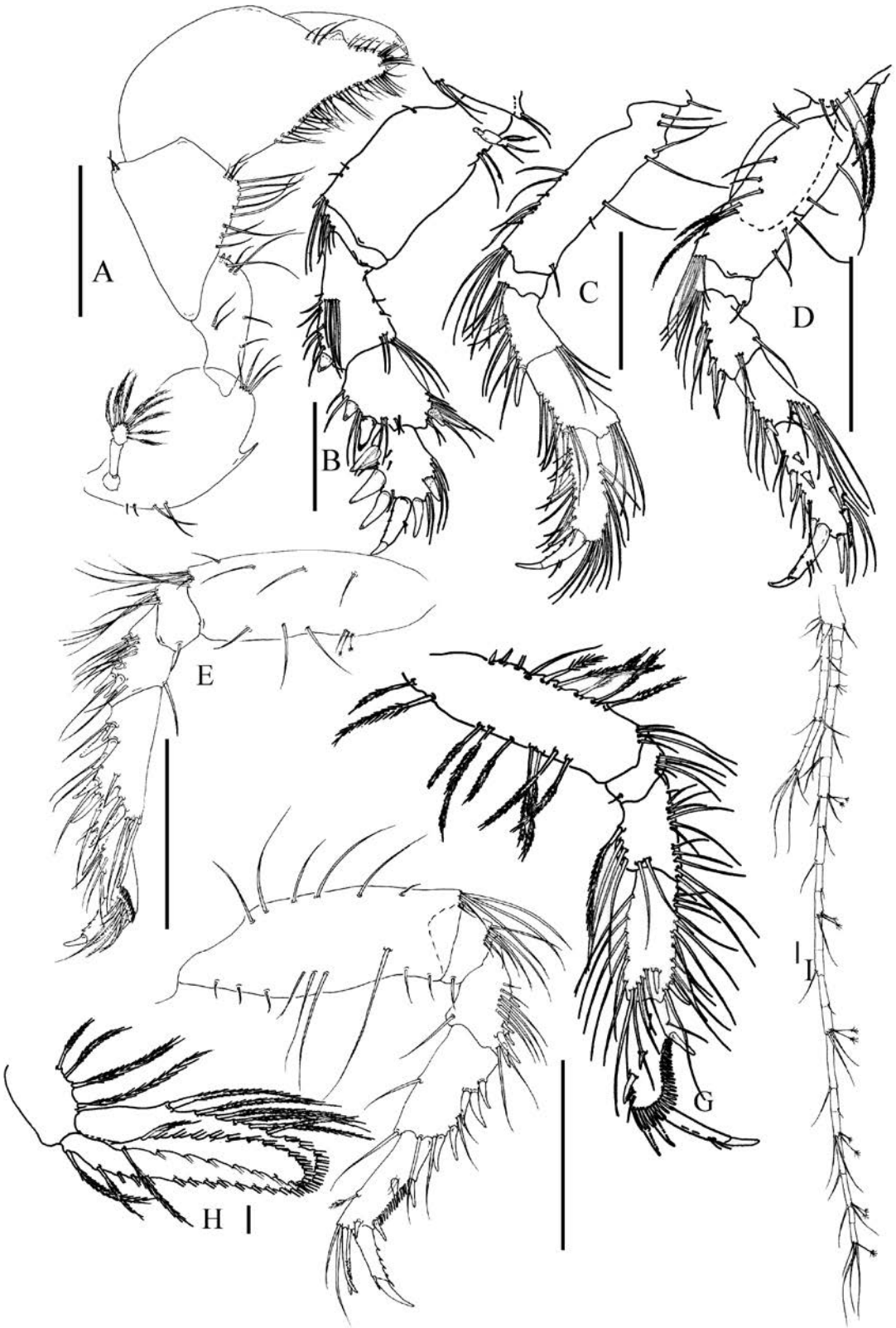

Fig. 5. *Apseudes quasimodo* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

(J28516), paratypes, Stn MSL-EG 96, 37°51.70'S 148°14.60'E, 37 m depth, February 1991, coarse sand; 6 ♀♀ with oostegites, 8 subadults, 7 juveniles (J28517), paratypes, Stn MSL-EG 99, 37°53.39'S 148°15.40'E, 43 m depth, February 1991, coarse sand; 1 subadult (J28518), paratypes, Stn MSL-EG 103, 37°49.89'S 148°30.13'E, 27 m depth, February 1991, coarse sand; 1 subadult (J28519), paratypes, Stn MSL-EG 104, 37°49.89'S 148°30.13'E, 27 m depth, February 1991, coarse sand; 2 ♀♀ with oostegites (J28520), paratypes, Stn MSL-EG 30, 37°51.77'S 148°13.63'E, 40 m depth, 25 September 1990, sand with shell; 1 ♀ with oostegites (J28521), paratypes, Stn MSL-EG 44, 37°53.18'S 148°28.96'E, 45 m depth, 26 September 1990, sand with shell; 1 ♀ with oostegites (J28522), paratypes, Stn MSL-EG 55, 37°50.63'S 148°43.47'E, 49 m depth, 28 September 1990, sand with shell; 1 ♀ with oostegites (J51300), paratypes, Stn MSL-EG VC-41-C3, 37°32.95'S 148°03.78'E, 40 m depth, May 1998; all Eastern Bass Strait, coll. N. Coleman, Smith-McIntyre grab. 1 ♀ with oostegites (J56335), paratypes, steel wharf Stn MSL ref C27 grab nr4, 12 m depth, 5 March 1997; 1 ♀ with oostegites (J57555), paratypes, Western Bass Strait, Stn CR 89-K-5 Stn 52, 38°57'S 143°27'E, 49 m depth, 08 October 1980, coarse sand, Smith-McIntyre grab. 2 juveniles (J57644), 1 ♀ with oostegites, 1 juvenile (J57665), 1 ♀ with oostegites (J57671), paratypes, Stn CPBS 23N, 38°20.29'S 145°14.18'E, 10 m depth, 10 March 1965, sandy gravel; 3 ♀♀, 2 subadults (J57668), paratypes, Stn CPBS 33S, 38°22.06'S 145°14.10'E, 13 m depth, 5 March 1965, reef, sponge; 2 ♀♀ with oostegites (J57680), paratypes, CPBS 23S/1 1973, ca 38°21'S 145°14'E, 10 m depth; all Crib Point Benthic Survey, Western Port, Smith-McIntyre grab.

Description of female/hermaphrodite. Body (Fig. 3), dorsoventrally flattened, holotype 12.7 mm long, 5.6 times as long as wide, narrower posteriorly. Cephalothorax subrectangular, as long as wide, anterior margin with conspicuous pointed rostrum with "shoulders" at base. Eyes present, eyelobes with small spine-like apophyses directed anteriorly; lateral spiniform apophyses at anterior margin of branchial chambers. Pereonites 1, 3, 5 and 6 subequal, about 0.4 times as long as cephalothorax, pereonite 2 just shorter, pereonite 4 longest, half length of cephalothorax; lateral margins of pereonites 1 and 2 uniformly convex, pereonites 3 to 6 with small anterolateral spine-like apophyses and expanded posterolaterally at attachment of coxae (all pereonites respectively 2.6, 2.8, 2.1, 1.6, 2.0 and 1.9 times as wide as long); ventral pointed, forwardly-curved hyposphenia on pereonites 2, 4 and 5, but variable - rarely also on pereonite 1, sometimes absent on pereonites 2 and 4; penial tubercle mid-ventrally on pereonite 6. Pleon just longer than last three pereonites together, with five free subequal pleonites bearing pleopods; pleonites dorsally convex, over three times as wide as long, not bearing lateral spiniform apophyses. Pleotelson less than half-length of whole pleon, twice as long as wide, with conspicuous lateral setae, and with pronounced mid-dorsal boss towards anterior margin.

Antennule (Fig. 4A). Peduncle proximal article three times as long as wide, inner margin without rugosity, with three shorter setae in proximal half and mid-length and subdistal tufts of four and two simple setae, outer margin with three proximal penicillate setae and three pairs of simple setae as figured; second article slightly longer than wide, 0.25 times as long as article 1, with four outer distal setae, four inner distal setae and two inner proximal setae; third article about half as long as wide, 0.25 times as long as second, with single inner and outer distal setae; fourth article as long as third, with single inner distal seta. Main flagellum of 12 segments, segments 6, 8, 10 and 12 each bearing 1 aesthetasc; accessory flagellum of five segments.

Antenna (Fig. 4B). Proximal peduncle article simple; article 2 with inner rugosity, single outer and inner setae at mid-length, and bearing elongate squama with 18 simple marginal setae; peduncle article 3 as long as wide, with one seta; article 4 0.8 times as long as article 2, with two inner setae; article 5 0.8 times as long as article 4, with three penicillate setae and four longer outer simple setae. Flagellum of 13 segments.

Labrum (not figured) rounded, distally finely setulose; sharp epistome present. Left mandible (Fig. 4C) outer margin rugose, bearing strong, denticulate pars incisiva, robust, denticulate lacinia mobilis, setiferous lobe with two trifurcate, three bifurcate and one simple setae, pars molaris (Fig. 4C') robust, distally concave, with fine marginal spinules. Right mandible (Fig. 4D) as left but without lacinia mobilis; mandibular palp of three articles, proximal article longer than wide with five inner setae, article 2 twice as long as article 1 with three longer proximal setae, two longer distal setae, and row of about 14 shorter setae in distal half; article 3 two-thirds length of article 2, densely setose along inner margin and distally. Labium (Fig. 4G) with small mid-distal tuft of setules, palp with fine lateral setules and three simple distal setae. Maxillule (Fig. 4E, E') inner endite with finely setose outer margin and five finely setulate distal setae; outer endite with eleven distal spines and two subdistal setae, outer and inner margins finely setose; palp of two articles, distally with six setae increasing in length towards tip of article. Maxilla (Fig. 4F) with smooth outer margin; outer lobe of moveable endite with two finely plumose subdistal setae and six distally-denticulate distal setae; inner lobe of moveable endite with three distally-denticulate setae, four simple setae and two subdistal setulose setae; outer lobe of inner endite with three stout trifurcate distal spines, and three distal and one subdistal setulose setae; inner lobe of fixed endite with rostral row of over 40 setae guarding seven longer finely denticulate setae. Maxilliped (Fig. 4H) basis naked; palp article 1 with two inner distal setae and five setae on slight outer-distal apophysis; palp article 2 longer than wide, with dense rows of numerous filtering setae on inner margin, outer margin with one slender distal spine and adjacent subdistal short, simple setae; palp article 3 longer than wide, with six shorter and thirteen longer simple setae in two rows along expanded inner margin; palp article 4 with twelve distal setae. Endite (Fig. 4H') with simple inner caudodistal seta, plumose outer subdistal seta, outer fine distal setae and inner rod-like distal spines. Epignath (Fig. 4I) large, cup-shaped, with distally-plumose distal seta.

Cheliped (Fig. 5A) robust. Basis 1.8 times as long as wide, dorsally naked, ventrally with two smaller and two longer proximal seta, mid-ventral spine-like apophysis and tuft of four distal setae; exopodite present, 3-articled, second article naked, elongate, distal article with nine plumose setae. Merus narrowing proximally, with three longer simple setae and paired short spines on ventrodistal "shoulder". Carpus subtriangular, widest distally (here 0.7 times as wide as carpus length), with row of simple setae along entire free

ventral margin, dorsodistal and ventrodistal shorter setae. Chela stout, propodus 1.3 times as long as wide, fixed finger; dense row of setae along majority of ventral margin; cutting edge of fixed finger with row of fine setules and proximal tooth-like apophysis; dactylus with fine setae but no apophyses on cutting edge, distal claw pointed, meeting claw of fixed finger.

Pereopod 1 (Fig. 5B) with coxal spine-like apophysis pronounced. Basis stout, 1.9 times as long as wide, with two proximal dorsal setae, sparse small ventral setae, small ventrodistal spine and adjacent setae; exopodite present, 3-articled, article 3 with four distal plumose setae. Ischium with dense tuft of ventrodistal setae. Merus widening distally, 0.56 times as long as basis, with row of longer mesial setae, ventral marginal setae in distal half, stout ventrodistal spine, five dorsodistal simple setae but no dorsodistal spine. Carpus three-quarters as long as merus, with dorsodistal stout spine surrounded by tuft of setae, two ventral stout spines. Propodus just shorter than carpus and articulating slightly ventral of carpus midline, with three ventral stout spines, two dorsal stout spines surrounded by setae. Dactylus stout, with mid-dorsal fine seta and fine inner denticulation, unguis short, both together 0.85 times as long as propodus.

Pereopod 2 (Fig. 5C) more slender. Coxa without apophysis. Basis 4.1 times as long as wide with longer dorsal setae in the proximal half and tufts of ventral setae. Merus 0.7 times as long as carpus, with ventrodistal slender spine. Carpus elongate, with ventrodistal slender spine. Propodus articulating subdistally on ventrodistal corner of carpus, just longer than carpus, densely setose on both margins, with mid-ventral and ventrodistal spines. Dactylus with paired mid-dorsal setae and fine ventral denticulation, unguis short, the two together 0.63 times as long as propodus. Pereopod 3 (Fig. 5D) similar to pereopod 2, but propodus with outer mesial and subdistal dorsal spines.

Pereopod 4 (Fig. 5E) similar to pereopod 2 but basis with plumose sensory setae, merus only half length of carpus and with two ventral spines, carpus with four ventral, two distal and one slender dorsodistal spines; propodus as long as carpus, with dorsodistal tuft of four short and two long finely denticulate setae, and adjacent spinulation; dactylus plus claw 0.6 times as long as propodus and shorter than longest dorsodistal propodal setae. Pereopod 5 (Fig. 5F) similar to but larger than pereopod 4, carpus without dorsodistal spine, propodus with two long, lender and one short dorsodistal spines, and with ventral row of 12 short spinules bounded proximally, distally and mesially by small spines; dactylus ventrally denticulate, together with claw almost as long as propodus. Pereopod 6 (Fig. 5G) basis with both dorsal and ventral marginal plumose setae, merus with one plumose and three simple setae all longer than article. carpus densely setose on all margins, with subdistal and ventrodistal spines, propodus with tapering row of fine spines along most of ventral margin and around distal margin; dactylus together with claw almost as long as propodus.

Pleopods (Fig. 5H) all alike. Basis elongate, with four inner but no outer plumose setae. Endopod and exopod subequal, linguiform, each with about 30 plumose setae.

Uropod (Fig. 5I) biramous, both rami filiform, multi-segmented. Basis with five setae distally; exopod one-quarter as long as endopod, with five segments; endopod elongate, with about 22 segments.

Description of younger stages. Juveniles with slender cheliped, exopodite with only 5 setae; hyposphenia sparse, one on pereonite 6; subadults with robust cheliped similar to that of adult, fewer hyposphenia than adult, one on pereonite 6; no oostegites.

Etymology. Named after Quasimodo, a central character from French author Victor Hugo's 1831 novel *Notre Dame de Paris,* who also had a distinctive dorsal hump.

Remarks. Apseudes quasimodo sp. nov. is unique amongst the Apseudidae in having a pronounced mid-dorsal boss towards the anterior margin of the pleotelson, as well as the anaxial articulation of the propodus on the anterior pereopods. In the presence of a row of small spinules on the ventral margin of the propodus of pereopod 5 (as well as of pereopod 6), it resembles only *Apseudes sensu stricto* and *Paradoxapseudes* (see below) in the Apseudidae, but in the conformation of the cheliped, the pereonites, and with spine-like apophyses at the anterior margin of branchial chambers, *inter alia*, shows similarities with *Spinosapseudes* and *Tuberapseudes*, as well as such taxa as *Apseudes grossimanus* (which also has suggestions of an anaxial articulation of the pereopod propodus) and *A. tenuimanus.*

Apseudes quasimodo was found in Western Port at 10–13 m depth, and in the Eastern Bass Strait off the Metung to Marlo coast (to the east of Gippsland Lakes) from 27 to 49 m depth on coarse sandy substrata.

Genus ***Apseudopsis*** Norman, 1899

Apseudopsis tuski (Błażewicz-Paszkowycz & Bamber, 2007) comb. nov.

Apseudes tuski Błażewicz-Paszkowycz & Bamber, 2007b, 116–120, figs 4–6.

Remarks. This species lacks anterolateral spiniform apophyses on the pereonites, a comb of spinules on the pereopod 5 propodus, and a dorsodistal spine on the merus of pereopod 1, so is clearly a member of *Apseudopsis* Norman 1899 *sensu* Guţu (2006), indeed close in overall morphology to *A. latreilli* (Milne-Edwards, 1828). *Apseudopsis tuski* also has unusual spination on the maxilliped palp, as is the case for two of the species of *Apseudes* discussed above, but in this case there are three spines on the outer margin of the second article, the most distal of which is large and robust.

This species was found throughout the Bass Strait, between 37°50' and 40°07'S and 143°14' and 148°30'E, and from 18 to 84 m depth on sandy to coarse shell substrata.

Genus ***Spinosapseudes*** Guţu, 1996

Spinosapseudes colobus Błażewicz-Paszkowycz & Bamber, 2007

S. colobus Błażewicz-Paszkowycz & Bamber, 2007b, 126–127, figs 10–13.

Remarks. Spinosapseudes colobus was the second species of the genus to be described after *S. setosus* (Lang, 1968), recorded from the other side of the Tasman Sea off New Zealand at 610 m

depth. *S. colobus* is a species more compact in its pereopods, and of a shallower distribution. This species was found throughout the Bass Strait, between 38°39' and 40°23'S and 144°18' and 148°40'E, and from 22 to 124 m depth.

Genus ***Bunakenia*** Guţu, 1995

Bunakenia labanticheiros sp. nov.

Figures 6–9

Material examined. 1 brooding ♀ (J50813), holotype, Central Bass Strait Stn VC 31 C2, 39°02.52'S 146°10.47'E, 40 m depth, 14 May 1999, coll. N. Coleman; 1 ♂, 7 ♀♀, 2 juveniles (J50814), paratypes, Eastern Bass Strait Stn VC 31 C1, 38°18.3'S 147°15.25'E, 40 m depth, 10 May 1998, coll. N. Coleman; 115 specimens (J23633), paratypes, East Gippsland Survey Stn MSL-EG 32, 37°54.07'S 148°12.09'E, 42 m depth, 25 September 1990, sand with shell; 27 specimens (J23634), paratypes, East Gippsland Survey Stn MSL-EG 33, 37°53.42'S 148°11.87'E, 43 m depth, 25 September 1990, sand with shell; 20 ♀♀, 5 ♂♂ (J23637), paratypes, East Gippsland Survey Stn MSL-EG55, 37°50.63'S 148°43.47'E, 49 m depth, 28 September 1990, sand with shell; 3 ♀♀, 1 ♂ (J23639), paratypes, East Gippsland Survey Stn MSL-EG57, 37°51.29'S 148°43.73'E, 50 m depth, 28 September 1990, sand with shell; 27 specimens (J29174), paratypes, East Gippsland Survey Stn MSL-EG71, 37°53.39'S 148°15.40'E, 43 m depth, 4 June 1991, coarse sand; 45 specimens (J28619), paratypes, East Gippsland Survey Stn MSL-EG97, 37°53.39'S 148°15.40'E, 43 m depth, February 1991, coarse sand.

Description of female. Body (Fig. 6) dorsoventrally flattened, slender, holotype 2.4 mm long, 5.6 times as long as wide, tapering towards posterior, glabrous. Cephalothorax subrectangular, as long as wide, with uniform triangular rostrum; eyelobes and eyes present. Six free subequal pereonites, each glabrous and without lateral apophyses; pereonite 1 trapezoidal, wider anteriorly, just less than half as long as cephalothorax; pereonites 2 and 6 subequal, subrectangular, half as long as cephalothorax; pereonites 3 and 5 subequal, subrectangular, two-thirds as long as cephalothorax; pereonite 4 longest, 0.8 times as long as cephalothorax (all pereonites respectively 2.3, 2.0, 1.5, 1.25, 1.5 and 1.8 times as wide as long), lateral margins smooth, without apophyses. Pleon 2.4 times as long as pereonite 6, tapering posteriorly, of five free subequal pleonites bearing pleopods plus pleotelson; each pleonite about five times as wide as long, without dorsolateral rows of plumose setae. Pleotelson subrectangular, 0.7 times as long as all pleonites together, as long as wide.

Antennule (Fig. 7A) proximal peduncle article 3.2 times as long as wide, outer margin with numerous penicillate setae and one subdistal and two distal simple setae, inner margin centrally rugose, one simple proximal seta and five plumose setae; second peduncle article 1.5 times as long as wide, 0.3 times as long as first, with penicillate outer seta and numerous simple inner setae; third article half length of second, 1.5 times as long as wide, distally with inner and outer setae, the former longer than article; fourth peduncle article about half length of third. Main flagellum of 9 segments, single aesthetascs present on fifth, eighth and ninth segments; accessory flagellum of three segments.

Antenna (Fig. 7B), proximal peduncle article without apophysis. Second article with linguiform squama bearing 11 marginal setae, two setae next to base of squama. Third peduncle article twice as long as wide and two-thirds as long as second, fourth article as long as second, fifth article half length of fourth. Flagellum of five segments.

Labrum rounded, simple, distally setose. Right mandible (Fig. 7C) with strong, crenulate pars incisiva, setiferous lobe with six forked setae, outer margin finely spinose. Left mandible (Fig. 7D) similar but with crenulate lacinia mobilis. Pars molaris robust, with posterodistal denticulation; palp of three articles, proximal article with five simple setae, second article longest with two medial simple setae and, distal to these, three rows of two, three and four simple, third article with ten setae in a single row. Labium (Fig. 7G) with denticulate outer margin, palp with fine lateral setules and three simple distal setae. Maxillule (Fig. 7E) inner endite with outer apophysis, finely setose outer margin and five setulose distal setae, outer endite with eleven distal spines and two subdistal setae (not seen on figure), outer and inner margins finely setose, palp of two articles, distally with three setae. Maxilla (Fig. 7F) typical of the genus, with a rostral row of 25 setae, compound setae on the fixed endite and serrate sickle-like setae on the moveable endite inside five compound outer setae on the outer lobe. Maxilliped (Fig. 7H) basis with medial inner seta; first palp article with one very long inner setae and small, naked outer apophysis; second palp article just longer than wide, with one row of inner simple setae, parallel row of shorter setulose setae, and outer distal spine; third palp article wider than long with inner distal group of thirteen simple setae; fourth palp article mounted anaxially, with eight distal setae. Endites (Fig. 7H') with three coupling hooks, distally with four outer setae and numerous inner slender, blunt spines.

Cheliped (Fig. 8A) slender, smaller than pereopod 1, basis twice as long as wide, ventrally with long proximal seta, central sharp spine and distal group of four simple setae; three-articled exopodite present, slender, distal article with three plumose setae. Merus subtriangular, twice as long as wide, ventral margin with eight setae; carpus 4.7 times as long as wide, with longer ventral marginal setae and shorter dorsal marginal setae. Chela slender, fixed finger just shorter than palm with dense distal setation; dactylus and claw slightly overreaching fixed finger, both fingers without apophyses on cutting edge.

Pereopod 1 (Fig. 8B) with conspicuous sharp setose apophysis on coxa; stout basis less than twice as long as wide, dorsal margin bearing only simple setae in proximal half, single ventrodistal spine; exopodite large, three-articled, distal article with six plumose setae. Ischium with simple ventrodistal setae. Merus widening distally, with single dorsodistal and ventrodistal spines and associated simple setae. Carpus compact, wider than long, with fan of dorsodistal setae, one dorsodistal and two ventrodistal blunt spines. Propodus with two dorsodistal spines and four ventral blunt spines interspersed with single fine setae. Dactylus slender, with paired mid-dorsal and ventral fine setae; claw slender, finely denticulate.

Pereopods 2 and 3 (Fig. 8C, D) basis 3.2 times as long as wide with sparse penicillate setae, one (pereopod 2) or two (pereopod 3) ventromedial setae and tuft of longer ventrodistal setae; ischium half as long as wide; merus as long as carpus, widening distally and with long ventral setae and single

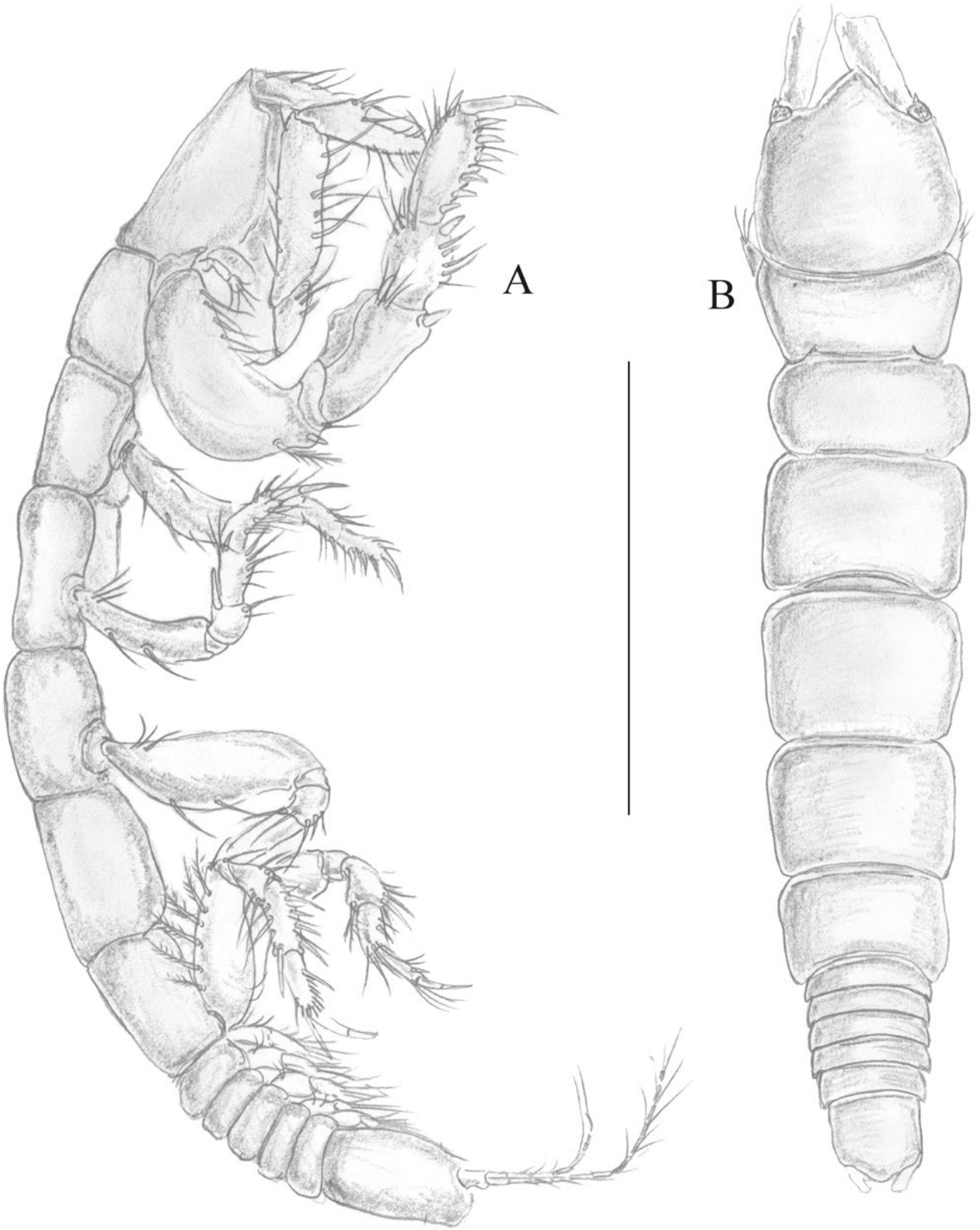

Fig. 6. *Bunakenia labanticheiros* sp. nov., holotype female. A, lateral view; B, dorsal view. Scale = 1 mm.

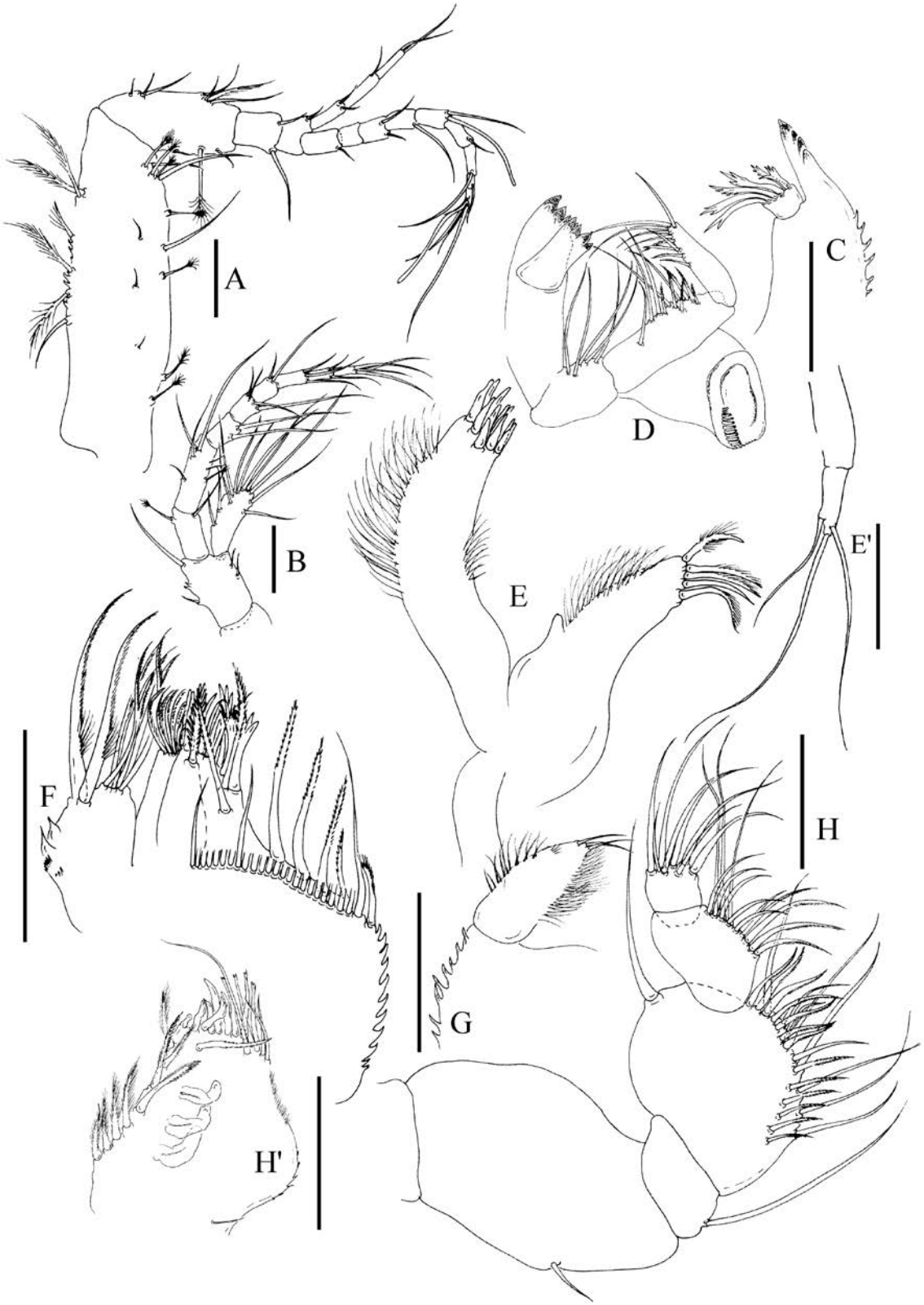

Fig. 7. *Bunakenia labanticheiros* sp. nov., female paratype. A, antennule; B, antenna; C, right mandible; D, left mandible; E, maxillule; E', maxillule palp; F, maxilla; G, labium; H, maxilliped; H', maxilliped endite. Scale: A, B = 0.1 mm; C-H = 0.01 mm.

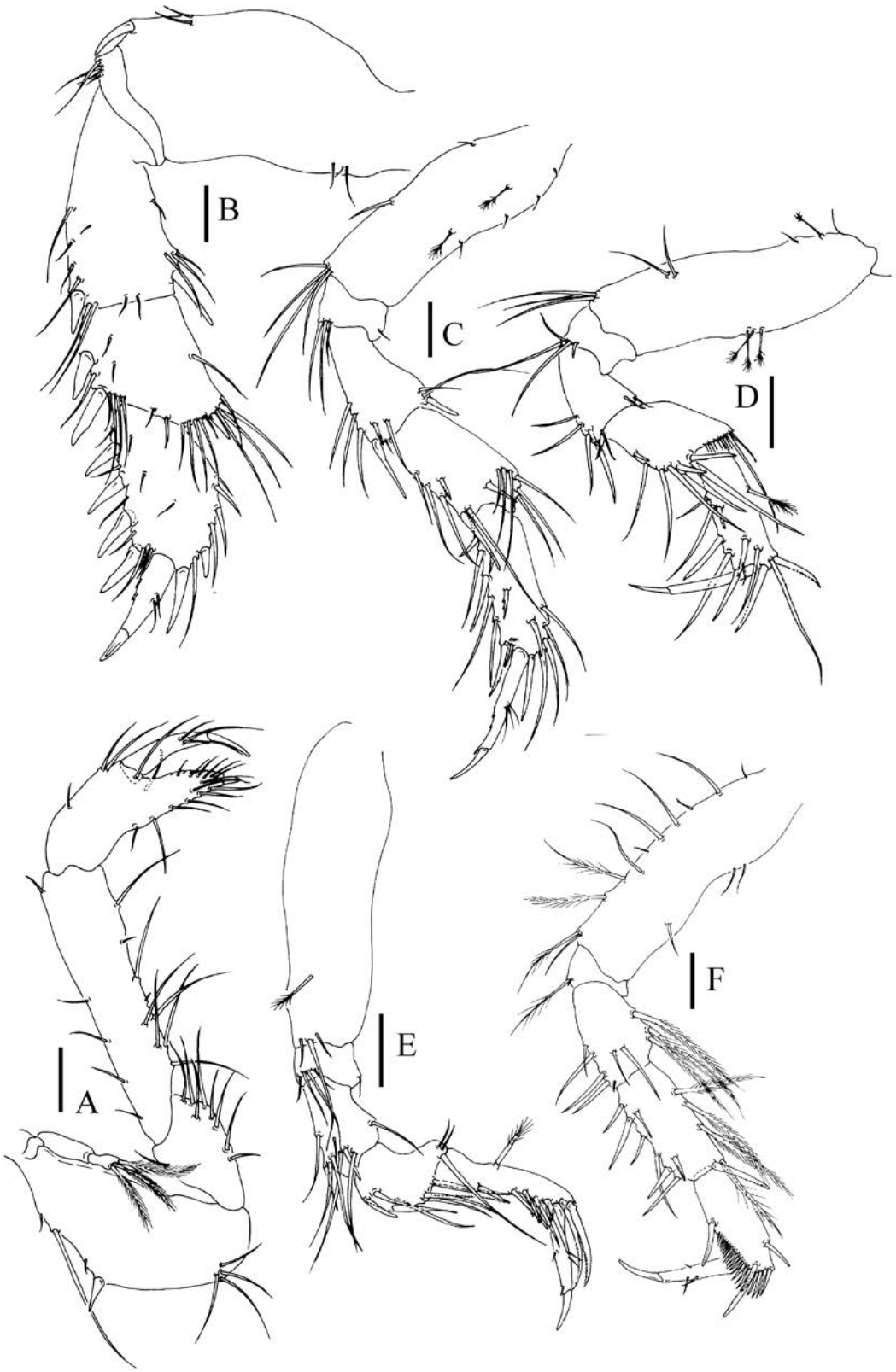

Fig. 8. *Bunakenia labanticheiros* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6. Scale = 0. 1 mm.

Fig. 9. *Bunakenia labanticheiros* sp. nov., male. A, antennule; B, antenna; C, juvenile male cheliped; D, adult male cheliped; E, pereopod 1; F, pereopod 2; G, pleopod; H, uropod. Scale = 0.1mm.

ventrodistal slender spine; carpus with slender ventrodistal spine I tuft of simple setae and crown of dorsodistal simple setae; propodus with two or three ventral and one dorsodistal slender spines; dactylus slender, claw not denticulate.

Pereopods 4 (Fig. 8E) and 5 with slender basis with penicillate seta and fine ventrodistal simple setae; carpus slightly longer than merus; propodus of pereopod 4 with mid-dorsal penicillate seta; dactylus and claw less slender than those of anterior pereopods.

Pereopod 6 (Fig. 8F) proportionately as pereopod 5, but basis with ventral marginal row of five simple and three plumose setae; merus shorter than carpus and with three dorsal plumose setae; carpus with four dorsal plumose setae; propodus with 20 small compound spines ventrally and distally on each side in tapering row; dactylus plus claw slender, simple.

Pleopods as those of male (Fig. 9G) all alike, basis with two inner but no outer plumose setae, endopod and exopod subequal, slender, each with 11 plumose setae.

Uropod (Fig. 9H) biramous, basis with three distal simple and two penicillate setae; exopod just less than three times as long as basis and of six segments; endopod elongate, filiform, multisegmented.

Description of male. generally similar to female. Antennule (Fig. 9A) main flagellum of 11 segments with single aesthetascs on segments 3, 5, 7 and 9, accessory flagellum of 5 segments. Antenna (Fig. 9B) flagellum of eight segments.

Conspicuous dimorphism of cheliped (Fig. 9D): basis 1.5 times as long as wide, ventrally with central spine and paired distal plumose setae; three-articled exopodite present, stout, distal article with four plumose setae. Carpus stouter, widening distally, twice as long as wide. Chela robust, highly modified, fixed finger flexed back along distal margin of propodus (palm), distal tip truncate with rugose cutting edge, tooth-like apophysis in angle between fixed finger and palm; dactylus narrowing rapidly from base, distally truncate, with five spines but no apophysis on cutting edge. Chela of subadult male (Fig. 9C) intermediate between that of mature male and that of female, carpus slender, fixed finger longer than palm, but not reflexed.

Pereopod 1 (Fig. 9E) with stout basis twice as long as wide, dorsal margin bearing nine plumose setae in proximal half. Ischium dorsally wide. Merus dorsal margin with flattened, flange-like apophysis and dorsodistal spine. Pereopods 2 (Fig. 9F) and 3, merus shorter than carpus.

Etymology. From the Greek – *labe* – something for grasping, and *anticheiros* – thumb, in reference to the extra tooth on the fixed finger of the chela of the male.

Remarks. Guţu (1996c) described two subgenera of *Bunakenia*. The nominate *B. (Bunakenia)*, distinguished only by having rows of plumose setae on the basis of pereopod 1, includes three species, *B. (B.) indonesiana* Guţu, (1995a) from Sulawesi, at 4–5 m depth, *B. (B.) tanzaniana* Guţu, 1996(d) from the Indian Ocean coast of Africa at 20 m depth, and *B. (B.) salzella* Bamber, 2005 from the littoral to 30 m depth in southwestern Australia. The subgenus *B. (Extensibasella)*, without plumose setae on the basis of pereopod 1, includes *B. (E.) sudvestatlantica* Guţu, 1996(c) from Brazil at 31 m depth, *B. (E.) aspalieus* Bamber, Bird and Angsupanich, 2003, from Thailand in littoral-infralittoral seagrass beds, *B. (E.) kadazan* Bamber and Sheader, 2005 from Sabah in sand at 23–35 m depth, and *B. (E.) anomala* Guţu, 2006 from Moreton Bay, Australia (depth unspecified).

The present species has plumose setae on the basis of pereopod 1 in the male, but not in the female, and thus falls quite between the two subgenera; Bamber & Sheader (2005) questioned the validity of the subgenera, their species *B. kadazan* showing little affinity to *B. (E.) sudvestatlantica,* and the zoogeography of these two "groups" is inconsistent. We therefore choose to dispense with those subgenera.

In the conformation of the male chela, with extreme reflexion of the fixed finger, *Bunakenia labanticheiros* sp. nov. is similar only to the other Australian species, *B. salzella,* from which it can be distinguished by the presence of the tooth-like apophysis in the angle between the fixed finger and the palm of the male chela (absent in *B. salzella*), the absence of plumose setae on the basis of pereopod 1 in the female (present in *B. salzella*), the mid-ventral spine on the basis of the cheliped (a plumose seta in *B. salzella*), fewer ventral spines on the propodus of pereopod 1, fewer plumose setae on the basis of pereopod 6, and details of the setation of the mouthparts and pleopods, *inter alia*.

Unlike the present species, *B. kadazan* has a thin, pointed rostrum; *B. sudvestatlantica* has a more elaborate cheliped basis in the male, and is without the tooth-like apophysis in angle between fixed finger and palm of the male chela, as also are *B. tanzaniana* and *B. anomala*; *B. aspalieus* (male unknown) has posterolateral hook-like apophyses on the pereonites; all four have plumose setae on both margins of the pleopod; *B. indonesiana* has only one basis seta on the pleopod, but dense rows of plumose setae on the pereopod 1 basis of both genders, and a more pronounced rostrum. All of these species have an inner apophysis on the proximal peduncle article of the antenna, unlike *Bunakenia labanticheiros*.

All specimens were taken from sandy substrata at between 40 and 50 m depth in the Central and Eastern Bass Strait.

Genus ***Paradoxapseudes*** Guţu, 1991

Gollumudes Guţu, 1991

Remarks. in a reanalysis of material from Cuba, the type locality for the then monotypic genus *Paradoxapseudes*, Guţu (2008a) revised the morphology of the type species, *P. cubensis* Guţu 1991, and realised that *Gollumudes* Bamber 2000 is a junior synonym of *Paradoxapseudes*. As a result, he was able to assign 12 species to the genus, which now showed a worldwide distribution. The genus is partly characterized by the row of leaf-like propodal spines on pereopod 5, as well as the row on pereopod 6 found in other apseudomorphs (but see also *Apseudes*). Owing to this new resource of information on the morphological variation within *Paradoxapseudes* (including *Gollumudes*), the Bass-Strait material, including that attributed to "*G.*" *larakia* Edgar (1997) by Błażewicz-Paszkowycz & Bamber (2007b) was re-examined, and found to be of two distinct species, which are described below.

During the analysis of the morphology of all the taxa now included in *Paradoxapseudes*, it also became apparent that the material from Tanzania mentioned by Guţu (2007), and from the Strait of Malacca and the South China Sea mentioned by Guţu (2008a), all attributed to the Japanese species *P. littoralis* (Shiino, 1952), was in fact not of that species (unlike *P. littoralis,* they have serrations on the antennule peduncle article 1, significantly more segments in the main flagellum of the antennule, and plumose, not simple, dorsal setae on the basis of pereopod 1, and the last two have far fewer leaf-like spines on the propodus of pereopod 5, *inter alia*). It is certainly quite unlikely that the material from Tanzania would be conspecific with a species from Japan. This material is considered to represent at least two further taxa, for which more detailed description is required before diagnosis and naming.

Paradoxapseudes paneacis sp. nov.

Figures 10–12

Gollumudes larakia Błażewicz-Paszkowycz & Bamber, 2007b (partim – shallow water specimens), non-*Apseudes larakia* Edgar, 1997.

Material examined. 1 ♀ (J58580), holotype, 1 ♂ (J58581), allotype, 155 further specimens (J57662), paratypes, Crib Point Benthic Survey Stn CPBS 33S/2, Western Port, 38°21.60'S 145°13.67'E, 13 m depth, 12 March 1965, muddy sand, Smith McIntyre Grab. 21 specimens (J57649), Stn CPBS 33S, same data as holotype; 1 ♀ with oostegites (J55880), 3 specimens (J57659), paratypes, Stn CPBS 23N, 38°20.29'S 145°14.18'E, 10 m depth, 10 March 1965, sandy gravel; 7 specimens (J57672), paratypes, Stn CPBS 23S, 38°21.69'S 145°13.51'E, 11 m depth, 9 March 1965, muddy sand; 1 brooding ♀ (J56169), 20 specimens including ♂♂ and brooding ♀♀, 1 brooding ♀ (J57674), paratypes, Stn CPBS 41N, 38°20.81'S 145°13.85'E, 13 m depth, 30 March 1965, gravel and sand; all Western Port, Crib Point Benthic Survey, Smith McIntyre Grab. 1 ♀ (J56292), paratype, Western Port, "sublittoral", 25 November 1971.

Other material (as in Błażewicz-Paszkowycz & Bamber, 2007b). 1 individual (J53143), 50 m south of Twin Reefs, Venus Bay (38°41'S, 145°39'E), 9 m, 07 March 1982, coll. M. McDonald; 1 individual (J55759), 50 m east of Petrel Rock, Venus Bay (38°39'S, 145°42'E), 8 m, 05 March 1982, (CPA 1) coll. M. McDonald and M.F. Gomon; 5 individuals (J55761), 1 km east of Harmers Haven, 500 m offshore (38°34'S, 145°40'E), 11 m, 06 March 1982, (CPA 14), coll. C. Larsen and G. Barber; 1 individual (J55762), 1 km east of Harmers Haven, 300 m offshore (38°34'S, 145°40'E), 6 m, 06 March 1982 (CPA 15), coll. R.S. Wilson and C. Larsen; 1 individual (J55763), east side of Cape Paterson (38°41'S, 145°36'E), 6 m, 05 March 1982, (CPA 12), coll. R.S. Wilson, G. Barber, *et al*.; 1 individual (J55765) Bennison Channel 1.0 km south of Granite Island (38°49'S, 146°23'E), 6.0 m, 23 November 1983, (CIN 28), coll. G.J. Morgan.

Description of female. Body (Fig. 10) dorsoventrally flattened, holotype 2.9 mm long, 5.8 times as long as wide, tapering towards posterior. Cephalothorax subrectangular, 1.4 times as long as wide, with large triangular rostrum; eyelobes and eyes present. Pereonites 1 and 2 subequal in length, 0.28 times as long as cephalothorax, with convex lateral margins, paired anterodorsal setae and posterolateral plumose setae; pereonite 3 longest, 1.5 times as long as pereonite 2, with anterolateral pointed apophysis, midlateral invagination and posterolateral rounded apophysis above pereopod attachment, and with lateral plumose setae and paired anterodorsal setae; pereonites 4 to 6 similar to, but progressively shorter than, pereonite 3, pereonite 6 being 1.26 times as long as pereonite 2 (all pereonites respectively 2.7, 2.5, 1.7, 1.8, 1.9 and 1.9 times as wide as long). Pleon three times as long as pereonite 6, narrower than pereon, with five free subequal pleonites bearing pleopods; each pleonite about three times as wide as long and extended laterally into sharp, triangular apophysis bearing plumose setae. Pleotelson subpentangular, with two rounded apophyses bearing plumose setae on each side, as long as last three pleonites together, just longer than wide.

Antennule (Fig. 11A) proximal peduncle article 3.6 times as long as wide, outer margin with penicillate setae and sparse simple setae in distal half, inner margin with sparse simple setae and proximal serration; second peduncle article wider distally, 1.5 times as long as wide, 0.3 times as long as first, with three penicillate and five simple distal setae; third article 0.7 times length of second, about twice as long as wide; fourth peduncle article slender, half length of third. Main flagellum of 7 segments, aesthetascs present on second, third and fifth segments, seventh segment anaxial on sixth; accessory flagellum of three segments.

Antenna (Fig. 11B), proximal peduncle article with subrectangular inner apophysis bearing two plumose setae. Second peduncle article twice as long as first, twice as long as wide, margins sinuous, with medial and distal simple setae on outer margin, medial and distal tooth-like apophyses on inner margin, the former with an adjacent plumose seta; elongate linguiform squama bearing two longer distal and two shorter subdistal setae. Third peduncle article as long as wide and one-quarter as long as second, with inner-distal spine-like apophysis; fourth and fifth articles 0.7 times as long as second. Flagellum of four segments.

Labrum (not figured) rounded, distally finely setulose. Left mandible (Fig. 11C) with strong, crenulate pars incisiva, robust lacinia mobilis with three distal crenulations, setiferous lobe with two compound and three simple setae; outer margin finely denticulate; pars molaris (Fig. 11C") robust, with radial rows of distal rugosity; palp (Fig. 11C') of three articles, proximal article shortest with five simple setae, second article longest with single row of two longer and eight shorter finely setulose setae along distal half of ventral margin, third article with 11 finely setulose setae, distal setae much longer than more proximal setae; right mandible (Fig. 11D) similar but without lacinia mobilis. Maxillule (Fig. 11E) inner endite with slight outer apophysis, finely setose outer margin and four setulose distal setae, outer endite with eleven distal spines and two subdistal setae, outer margin finely setose, palp (Fig. 11E') of two articles, distally with four setae. Maxilla (Fig. 11F) outer lobe of moveable endite with two subdistal setulose sickle-like setae and five distal setulose setae, inner lobe with eight simple curved setae and five stouter plumose setae; outer lobe of fixed endite with six compound distal spines and subdistal biserrate spine, inner lobe with three stout, proximally setulose setae and rostral row of 26 setae. Labium (Fig. 11G) with setulose outer margin, palp with dense tufts of fine lateral setules and three simple distal seta. Maxilliped (Fig. 11H) basis naked; first palp article with one very long plumose inner seta and adjacent fine simple seta, and

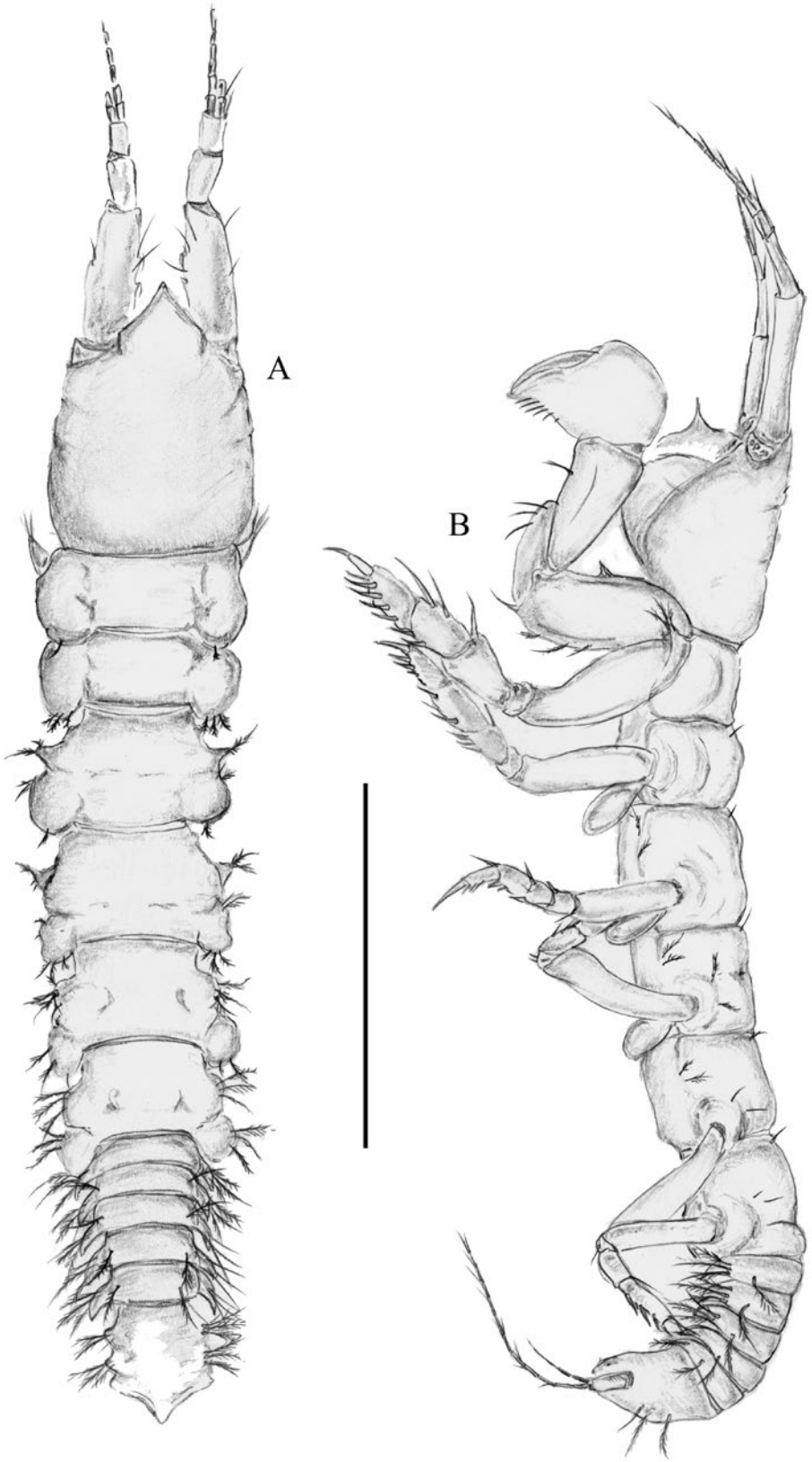

Fig. 10. *Paradoxapseudes paneacis* sp. nov., holotype, adult female. A, dorsal view; B, lateral view. Scale = 0.1 mm.

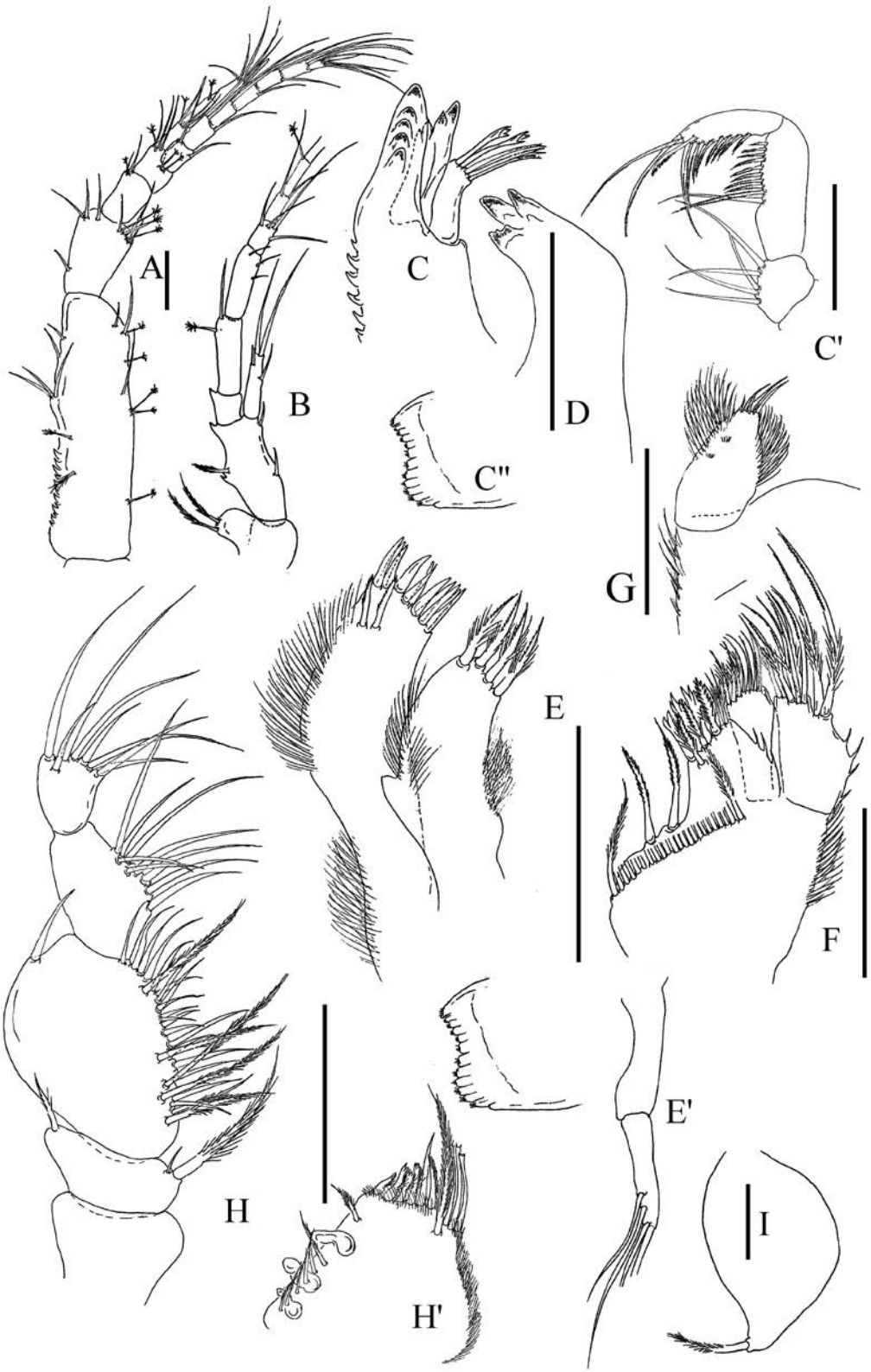

Fig. 11. *Paradoxapseudes paneacis* sp. nov., female paratype. A, antennule; B, antenna; C, left mandible; C', mandible palp; C", mandibular molar; D, right mandible; E, maxillule, with E', detail of palp; F, maxilla; G, labium; H, maxilliped; H', maxilliped endite; I, epignath. Scale: A, B = 0.1 mm; C-I = 0.01 mm.

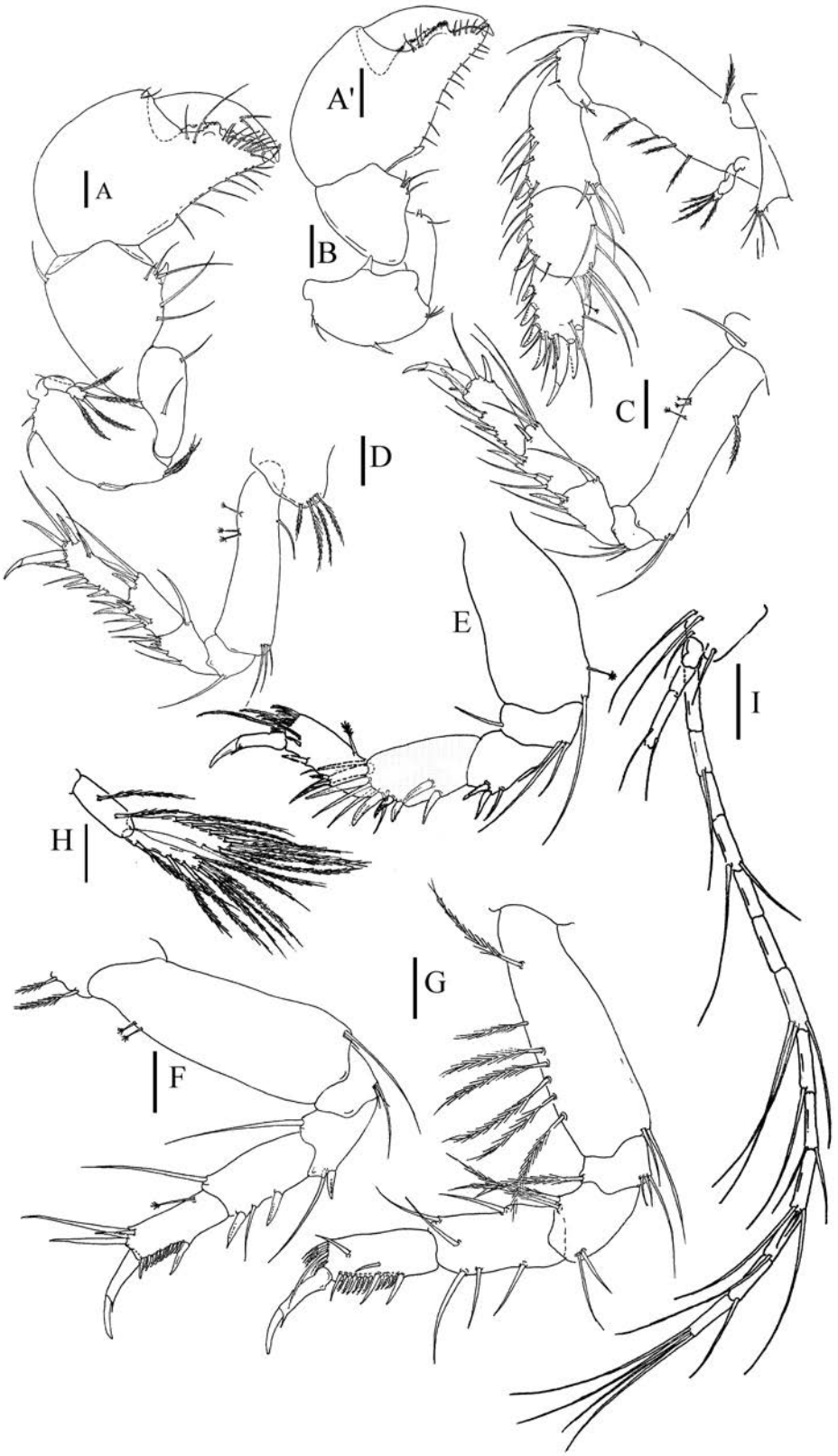

Fig. 12. *Paradoxapseudes paneacis* sp. nov., female paratype. A, cheliped; A', cheliped male; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

small plumose outer seta; second palp article longer than wide, with inner rows of five ventral plumose setae and numerous distally-curved simple; third palp article nearly twice as long as wide, with inner group of nine simple curved setae; fourth palp article with one subdistal and seven distal simple setae. Endites (Fig. 11H') with three coupling hooks, outer margin densely setulose, distally with one simple seta and numerous slender, blunt, bifurcate spines, outer subdistal plumose seta. Epignath (Fig. 11I) oval, with setulose distal spine.

Cheliped (Fig. 12A') basis 1.6 times as long as wide, with two ventroproximal setae on small tubercles, mid-ventral curved spine, two ventrodistal plumose setae; exopodite present, distal article with 4 plumose setae (as on male, Fig. 12A); merus with one longer and two shorter setae on ventrodistal shoulder; carpus widening distally, subpentangular, with stout, curved spine and three simple setae mid-ventrally; chela robust, palm of propodus just longer than wide, fixed finger two-thirds length of palm, ventral margin regularly setose, cutting edge of fixed finger with crenulations and central rugose tooth-like apophysis, numerous submarginal setae; dactylus stout, with crenulated cutting edge.

Pereopod 1 (Fig. 12B) with conspicuous setose apophysis on coxa; basis 2.9 times as long as wide, dorsal margin bearing four plumose setae in proximal half, ventral margin with single proximal plumose seta, single mid-ventral and paired distal simple setae; exopodite three-articled, distal article with four plumose setae. Ischium with three simple ventrodistal setae. Merus widening distally, with ventrodistal row of simple marginal setae, and single long dorsodistal and shorter ventrodistal finely denticulate spines. Carpus just shorter than merus, with setose margins including paired dorsodistal setae longer than propodus, one dorsodistal and two ventrodistal finely denticulate spines. Propodus 0.6 times as long as carpus, with two dorsodistal and four ventral finely denticulate spines interspersed with single fine setae. Dactylus slender, claw short, together longer than propodus.

Pereopods 2 and 3 (Fig. 12C, D) coxa with rounded, setose apophysis, basis four times as long as wide, sparsely setose, ventrodistal seta reaching past half length of merus; ischium half as long as wide, with fine dorsal seta, one short ventral seta and one ventral seta longer than merus; merus shorter than carpus, with two to four ventral setae, pair of ventrodistal spines, one very short, and single strong dorsodistal seta; carpus with ventrodistal spine with adjacent simple setae, smaller submarginal ventral spines, inner distal finely-denticulate spine and long dorsodistal simple setae exceeding tip of propodus; propodus longer than carpus, with three or four finely-denticulate ventral spines, one (P2) or two (P3) dorsodistal finely-denticulate spines, dorsodistal setae exceeding tip of claw; dactylus with ventrodistal seta, dactylus and claw curved, together as long as carpus.

Pereopod 4 (Fig. 12E) basis three times as long as wide, ventrodistal seta reaching past half length of merus; ischium half as long as wide, with fine dorsal seta, two shorter ventral setae and one ventral seta longer than merus; merus 0.6 times as long as carpus, with one ventral seta and pair of ventrodistal finely-denticulate spines; carpus with paired mid-distal spines and ventrodistal row of five finely denticulate spines interspersed with simple setae; propodus 0.8 times as long as carpus, with two finely-denticulate ventral spines and group of numerous finely-setulose dorsodistal setae and single dorsodistal seta exceeding tip of claw; dactylus with ventrodistal seta, dactylus and claw curved, together just shorter than propodus.

Pereopod 5 (Fig. 12F) similar to pereopod 4, but merus with single ventral spine, long dorsodistal and ventrodistal setae reaching or exceeding tip of carpus, carpus with two ventral spines and dorsodistal seta exceeding tip of propodus, propodus with one short and two longer setae, one of which longer than dactylus plus claw, and with ventral comb of 10 leaf-like spines in the distal half.

Pereopod 6 (Fig. 12G) proportionately similar to pereopod 5, basis with seven plumose dorsal setae; ischium with single dorsal plumose seta; merus with two dorsal plumose setae; carpus with dorsal and ventral simple setae; propodus with small leaf-like spines ventrally and distally; dactylus plus claw slender, curved, together as long as propodus

Pleopods typical for genus (Fig. 12H), basis with two inner but no outer plumose setae, endopod with eight plumose marginal setae, exopod shorter with seven plumose marginal setae.

Uropod (Fig. 12I) biramous, basis with four distal simple setae; exopod broken, of at least four segments; endopod elongate, filiform, with about 14 segments.

Description of male. Generally similar to female, but with dimorphic cheliped (Fig. 12A), basis stout, 1.5 times as long as wide, with ventroproximal setae on small tubercles, mid-ventral curved spine, ventrodistal plumose setae; exopodite present, distal article with 4 plumose setae; merus sparsely setose; carpus stouter than that of female, widening distally, almost triangular, with stout, curved ventral spine; chela robust, stouter than that of female, palm of propodus as long as wide, fixed finger almost half length of palm, ventral margin regularly setose, cutting edge of fixed finger with crenulations and sub-proximal rugose tooth-like apophysis, numerous submarginal setae; dactylus stout, with crenulated cutting edge. Setae on most articles longer than those of female.

Etymology. Named after Crib Point, the type locality, contrived from the Greek *pahnee* – a crib, and *akis* – a point.

Remarks. The shallow-water material described as *Gollumudes larakia* in Błażewicz-Paszkowycz & Bamber (2007) is in fact of this species, to which are added numerous further specimens, principally collected during the Crib Point Benthic Survey (see Poore, 1986). *Paradoxapseudes paneacis* sp. nov. is unusual in the genus in having long ventrodistal and dorsodistal setae on merus, carpus, ischium and basis of each pereopod. It is the only Australian species with a spine on the cheliped carpus, a feature also present in *P. littoralis* (from Japan), *P. garthi* (Menzies, 1956) from the Gulf of California, *P. heroae* (Sieg, 1986) from the Subantarctic, and *P. intermedius* (Hansen, 1895) from the Mediterranean. *P. paneacis* is also the only Australian species to have inner proximal serration on the antennule peduncle (like only *P. intermedius* of the four species listed above); as well as the long distal setae on the pereopod article, the present species differs from *P. intermedius*

in having more mandibular palp setae, fewer basis setae on pereopods 1 and 6, and in the conformation of the rostrum, *inter alia*.

All specimens were collected in Western Port on shallow sands at depths between 6 and 13 m.

Paradoxapseudes attenuata sp. nov.

Figures 13–15

Gollumudes larakia Błażewicz-Paszkowycz & Bamber, 2007b (partim – deeper-water specimens), non-*Apseudes larakia* Edgar, 1997.

Material: 1 ♀ (J47130), holotype, Stn BSS109, Central Bass Strait, 40°30.9'S 144°56'E, 27 m depth, 2 November 1980, very coarse sand, coll. M. Gomon & G.C.B. Poore; 2 ♀♀ with oostegites (J55843), paratypes, Stn BSS117, Central Bass Strait, 40°38.0'S 145°23'E, 36 m depth, 4 November 1980, muddy shell and grit, coll. M. Gomon & G.C.B. Poore; 1 ♀ (J58464), paratype, Stn BSS161, Central Bass Strait, 39°48.3'S 147°19.2'E, 60 m depth, 14 November 1981, muddy sand, coll. R. Wilson.

Other material: 2 ♀♀ (J55842), Stn BSS119, western Bass Strait, 39°06.7'S 143°28.7'E, 92 m depth, 31 January 1981, fine sand, coll. M. Gomon *et al.*; 1 ♀ (J57559), Stn VC 18 C2, Central Bass Strait, 38°30.2'S 144°15.0'E, 40 m depth, 30 May 1998, coll. N. Coleman, Smith McIntyre grab. *Material in Błażewicz-Paszkowycz & Bamber (2007b)*: 4 individuals (J47131), Australia, Tasmania, eastern Bass Strait, 37 km NNE of Eddystone Point (40°43.48'S, 148°37.12'E), 67 m, 14/11/1981, (BSS 164), coll. R.S. Wilson; 1 individual (J55756), western Bass Strait, 30 km SSW of Warrnambool (38°38.12'S, 142 35.00'E), 59 m, 20/11/1981, (BSS 188), coll. R.S. Wilson; 3 individuals (J55757), western Bass Strait, 15 km S of Port Fairy (38°32.00'S, 142 28.36'E), 52 m, 20/11/1981, (BSS 187), coll. R.S. Wilson; 1 individual (J55760), western Bass Strait, 15 km south of Port Fairy (38°32.00'S, 142 28.36'E), 52 m, 20/11/1981, (BSS 187), coll. R.S. Wilson; 2 individuals (J55766), Victoria, western Bass Strait, 5 km south of Point Reginald (38°48.00'S, 143°14.30'E), 47 m, 20/11/1981, (BSS 185), coll. R.S. Wilson; 1 individual (J55758), western Bass Strait, 5 km southwest of Bluff Point (40°48.06'S, 144°38.00'E), 42 m, 02/02/1981, (BSS 126 G), coll. M.F. Gomon.

Description of female with oostegites. Body (Fig. 13) dorsoventrally flattened, elongate, holotype 2.75 mm long, seven times as long as wide, tapering towards posterior. Cephalothorax subrectangular, 1.5 times as long as wide, with triangular rostrum; eyelobes and eyes present. Pereonite 1 laterally convex, 0.23 times as long as cephalothorax; pereonite 2 1.2 times as long as pereonite 1, with slight anterolateral apophysis bearing plumose seta, smaller posterolateral plumose seta; pereonites 3 to 6 with anterolateral pointed apophyses and posterolateral rounded apophyses, each bearing plumose setae, pereonites 3 and 5 subequal, 1.8 times as long as pereonite 1, pereonite 4 longest, twice as long as pereonite 1, pereonite 6 as long as pereonite 2 (all pereonites respectively 2.9, 2.3, 1.5, 1.2, 1.4 and 1.9 times as wide as long). Pleon narrower than pereon, just longer than cephalothorax, tapering posteriorly, with five free subequal pleonites bearing pleopods; each pleonite about 3.3 times as wide as long and extended laterally into sharp, triangular apophysis bearing plumose setae. Elongate pleotelson subpentangular, with two rounded apophyses bearing plumose setae on each side, as long as last four pleonites together, 1.75 times as long as wide.

Antennule (Fig. 14A) proximal peduncle article 4.2 times as long as wide, outer margin with slight proximal rounded apophysis, three penicillate setae and three simple setae in distal half, inner margin with sparse simple setae, no proximal corrugation; second peduncle article twice as long as wide, 0.4 times as long as first, with two penicillate and five simple distal setae; third article half length of second, about twice as long as wide; fourth peduncle article slender, slightly shorter than third. Main flagellum of 7 segments, single aesthetasc present on sixth segments, seventh segment anaxial on sixth; accessory flagellum of three segments.

Antenna (Fig. 14B), proximal peduncle article with inner apophysis bearing small seta and two teeth. Second peduncle article twice as long as first, twice as long as wide, margins sinuous with mid-inner setae on apophysis, with elongate linguiform squama bearing 6 marginal setae. Third peduncle article as long as wide and one-quarter as long as second, fourth article 0.8 times as long as second, fifth article half length of second. Flagellum of five segments.

Labrum (Fig. 14C) rounded, simple, distally with rows of setules. Left mandible (Fig. 14D) with strong, crenulate pars incisiva, robust lacinia mobilis with five distal crenulations, setiferous lobe with four slender setae; pars molaris robust, with radial rows of distal rugosity; palp (Fig. 14D') of three articles, proximal article shortest with six simple setae, second article longest with four distomedial simple setae, third article with six distal setae. Right mandible (Fig. 14E) similar but without lacinia mobilis. Labium (Fig. 14H) with denticulate outer margin, setulose distal margin, palp with fine lateral setules and one simple distal seta. Maxillule (Fig. 14F) inner endite with slight outer apophysis, finely setose outer margin and four setulose distal setae, outer endite with eleven distal spines and two subdistal setae, outer and inner margins finely setose, palp of two articles, distally with one short and one longer setae. Maxilla (Fig. 14G) outer lobe of moveable endite with two simple subdistal sickle-like setae and five distal setulose setae, inner lobe with eight simple curved setae and five stouter plumose setae; outer lobe of fixed endite with six compound distal spines and subdistal biserrate spine, inner lobe with three stout, serrate and proximally setulose setae and rostral row of 15 setae. Maxilliped (Fig. 14I) basis naked; first palp article with one very long plumose inner seta and small outer seta; second palp article with artefactual suggestion of proximal articulation, longer than wide, with four proximal inner plumose setae and rows of inner curved setae in distal half, mostly plumose; third palp article nearly twice as long as wide, with inner group of six simple curved setae; fourth palp article with one subdistal and seven distal simple setae. Endites (Fig. 14I') with two coupling hooks, outer margin densely setulose, distally with one simple seta and numerous slender, blunt, bifurcate spines. Epignath (Fig. 14J) oval, with setose distal spine.

Cheliped (Fig. 15A) basis twice as long as wide, ventrally with central sharp seta and distal pair of simple setae; three-articled exopodite present, slender, distal article with four plumose setae. Merus with small spine and two simple setae on ventrodistal "shoulder"; carpus 2.4 times as long as wide, with ventral marginal setae and single dorsodistal seta. Chela

stout, fixed finger as long as palm with six ventral setae, cutting edge setose and with proximal tooth-like apophysis; dactylus and claw slightly overreaching fixed finger, with fine setules on cutting edge.

Pereopod 1 (Fig. 15B) with conspicuous setose apophysis on coxa; basis three times as long as wide, dorsal margin bearing four simple setae in proximal half, ventral margin with single proximal, single mid-ventral and paired distal simple setae; exopodite three-articled, distal article with four plumose setae. Ischium with three simple ventrodistal setae. Merus widening distally, with ventroproximal row of simple setae, and single long dorsodistal and shorter ventrodistal finely-denticulate spines and associated simple setae. Carpus shorter than merus, with setose margins including paired dorsodistal setae longer than propodus, one dorsodistal and two ventrodistal finely-denticulate spines. Propodus just shorter than carpus, with two dorsodistal and four ventral finely-denticulate spines interspersed with single fine setae. Dactylus slender, claw short.

Pereopods 2 and 3 (Fig. 15C, D) basis four times as long as wide, sparsely setose, ventrodistal setae reaching to half length of merus; ischium half as long as wide, with fine dorsal seta, one short ventral seta and one ventral seta longer than merus; merus shorter than carpus, with four ventral setae and single dorsodistal seta; carpus with slender ventrodistal spine with adjacent simple setae and long dorsodistal simple setae as long as article; propodus longer than carpus, with two or three slender ventral spines, dorsodistal setae as long as article; dactylus with ventrodistal seta, dactylus and claw slender, curved, together as long as propodus.

Pereopod 4 (Fig. 15E) similar to pereopod 3 but with stouter basis just less than 3 times as long as wide, with penicillate seta and fine ventrodistal simple seta as long as ischium and merus combined; dactylus and claw less curved than those of anterior pereopods, one of dorsodistal setae longer than dactylus and claw combined.

Pereopod 5 (Fig. 15G) similar to pereopod 4, but basis with three penicillate setae and three ventrodistal simple setae, propodus with one longer seta shorter than dactylus plus claw, and with ventral comb of 11 leaf-like spines in the distal half.

Pereopod 6 (Fig. 15F) basis with four plumose dorsal setae; merus shorter than carpus but proportionately longer than on pereopod 5, with two dorsal plumose setae; carpus with one dorsal plumose seta; propodus with small leaf-like spines ventrally and distally; dactylus plus claw slender, curved, together as long as propodus

Pleopods typical for genus (Fig. 15H), basis with two inner but no outer plumose setae, endopod with 12 plumose marginal setae, exopod shorter with eight plumose marginal setae.

Uropod (Fig. 15I) biramous, basis with five distal simple setae; exopod about twice as long as basis and of four segments; endopod elongate, filiform, with about 17 segments.

Male unknown.

Etymology. From the Latin – *attenuatus*: long, drawn out, thin.

Remarks. Paradoxapseudes attenuata sp. nov. is one of only three species of the genus without plumose setae on the basis of pereopod 1 or proximal serration on the antennal peduncle,

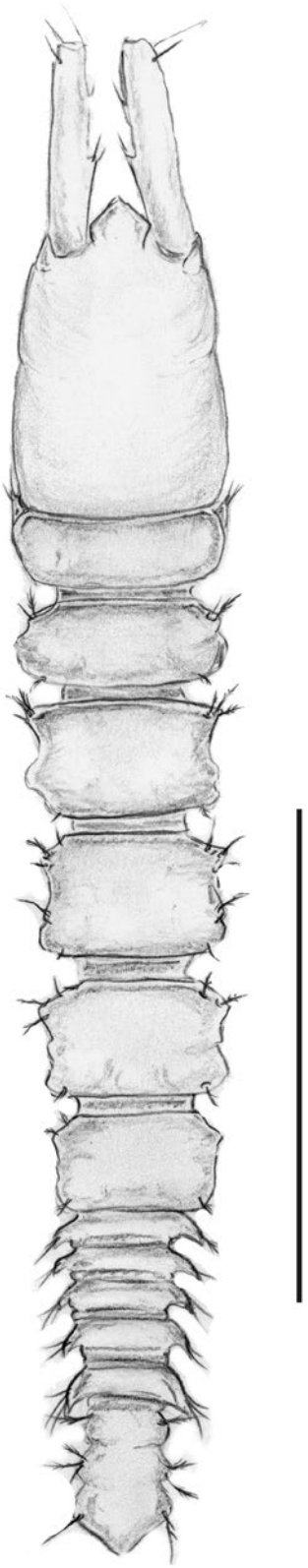

Fig. 13. *Paradoxapseudes attenuata* sp. nov., holotype, adult female, dorsal view. Scale = 1 mm.

Fig. 14. *Paradoxapseudes attenuata* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; D' mandible palp; E, right mandible; F, maxillule; G, maxilla; H, labium; I, maxilliped; I', maxilliped endite; J, epignath Scale: A, B, J = 0.1 mm; C-I = 0.01 mm.

Fig. 15. *Paradoxapseudes attenuata* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

and with only two maxillule palp setae; of the other two, *P. littoralis* is distinct in having only two segments in the accessory flagellum and four in the main flagellum of the antennule (three and seven respectively in the other two), while *P. mortoni* (Bamber, 1997) has one fewer ventral propodus spine on pereopod 1, one fewer setae on the pleopod basis, one more distal seta on the labial palp, fewer setae on the proximal mandibular palp article, and ventral tubercles on the carpus of the female cheliped. The second antennal-peduncle article in the present species is unusual in widening at its midpoint where the setae attach, and in only having four ventral setae on the second article of the mandibular palp, all other species having at least 6. *P. attenuata* is one of the most elongate species in the genus, particularly in the proportions of its cephalothorax.

Paradoxapseudes attenuata was collected throughout the Bass Strait on sandy substrata at depths between 27 and 92 m.

Subfamily **Pugiodactylinae** Guţu, 1995

Genus ***Pugiodactylus*** Guţu, 1995

Pugiodactylus syntomos Błażewicz-Paszkowycz & Bamber, 2007

P. syntomos Błażewicz-Paszkowycz & Bamber, 2007b, 131–132, figs 14–16.

Material examined. 1 brooding ♀ (J57921), Slope Stn. 49, 41°56.50'S 148°37.90'E, coarse bryozoan mud, 200 m depth, 27 July 1986, coll. M. Gomon *et al*., WHOI Epibenthic sled.

Remarks. P. syntomos is distinct from the other four species, which have been described in this genus owing to its rounded rostrum, short cheliped carpus and more compact antenna, *inter alia*. It was distributed sparsely throughout the Bass Strait at between 9 and 200 m depth (the present specimen extending the deeper end of the range marginally), on muddy to coarse sand substrata and once on a predominantly rocky bottom. The genus is found from the Antarctic through Australia (Victoria and Queensland) to Malaysia and the South Pacific, usually in shallow waters.

Family **Whiteleggiidae** Guţu, 1972

Genus ***Whiteleggia*** Lang, 1972

Whiteleggia multicarinata (Whitelegge, 1901)

W. multicarinata, Lang, 1970, 605–615, figs 3–8; – Błażewicz-Paszkowycz & Bamber, 2007, 132 (Bass Strait material).

Additional material examined. 2 specimens, Stn. BSS 206, Eastern Bass Strait, 19 km E of Lake Tyers Entrance, 37°50.5'S, 148°16.0'E, 26 m depth, coarse sand, 30 July 1983, coll. M. Gomon & R. Wilson, FV Silver Gull.

Remarks. This endemic south-east-Australian species occurred across the Bass Strait, on heterogeneous sandy substrata from depths between 26 and 124 m. Previous records were of the type material, off New South Wales, Australia, at 37 to 108 m depth, and further specimens in 1914 on sand and mud in depths of 70 to 100 m off Merimbula, New South Wales (not off South Africa – see Błażewicz-Paszkowycz & Bamber, 2007, p. 132).

Genus ***Pseudowhiteleggia*** Lang, 1970

Pseudowhiteleggia typica Lang, 1970

P. typica, Lang, 1970, 616–626, figs 9–15; – Błażewicz-Paszkowycz & Bamber, 2007, 132–136 (Bass Strait material).

Remarks. Also endemic to southeast Australia, this species occurred in the Central and Western Bass Strait at depths between 39 and 84 m, on coarse to heterogeneous sands, commonly sympatric with *Whiteleggia multicarinata*. The only previous record was of the types at 50 m depth off northern New South Wales, Australia.

Family **Kalliapseudidae** Lang, 1956

Subfamily **Kalliapseudinae** Guţu, 1972

Genus ***Kalliapseudes*** Stebbing, 1910

Kalliapseudes obtusifrons (Haswell, 1882)

Figures 16–21

Apseudes obstusifrons Haswell, 1882; – *Kalliapseudes obtusifrons* Drumm & Heard, 2006, 29–38, figs 1–4 (redescription, literature).

Material examined. A total of 684 individuals were examined from 65 samples, including 361 females (71 with oostegites, 75 with brood pouches), 141 males, 100 juveniles and 82 mancae. Samples were from West of Cape Otway to Port Philip Bay (depths from 9 to 124 m), Port Phillip Bay itself (15 to 20 m), Western Port (2 to 19 m), East of Wilson's Promontory (11 to 40 m), and the Gippsland coast (22 to 29 m), thus ranging from 142.03°E to 148.7°E, and variously between 38.24°S to 40.4°S. Substrata included mud, but mainly fine to coarse sands, to sandy gravel and shell. Numbers per sample ranged from 1 to 141 specimens. A selection of the samples examined is listed in Appendix 1. Numerous further samples held in the collections of Museum Victoria and confirmed as this species were not examined in detail.

Remarks. Kalliapseudes obtusifrons was originally known from Port Jackson, New South Wales (33.85°S 151.27°E), and the species remained somewhat enigmatic until Drumm & Heard (2006) rediscovered a syntype (designating it the lectotype) and valuably redescribed a further specimen – an ovigerous female collected from Cabbage Tree Island, New South Wales (31.95ºS 152.59ºE) (these authors also gave an identification key to the Australian species of *Kalliapseudes*). These had been the only known specimens of this species. It was therefore of some surprise to find *K. obtusifrons* common throughout the Bass Strait.

The large amount of material available has enabled us to confirm the description of the female given by Drumm & Heard (2006) and to supplement that description where their material was damaged, to describe the dimorphism of the male, and to examine intraspecific variation in some meristic characters across the width of the Bass Strait.

Supplementary description of female (Fig. 16). Antennule (Fig. 17A) main flagellum with 7 to 10 segments, accessory flagellum with 3 or 4 segments, both with three distal setae; antenna (Fig. 17B) first article with large apophysis with 4 to 6 plumose setae,

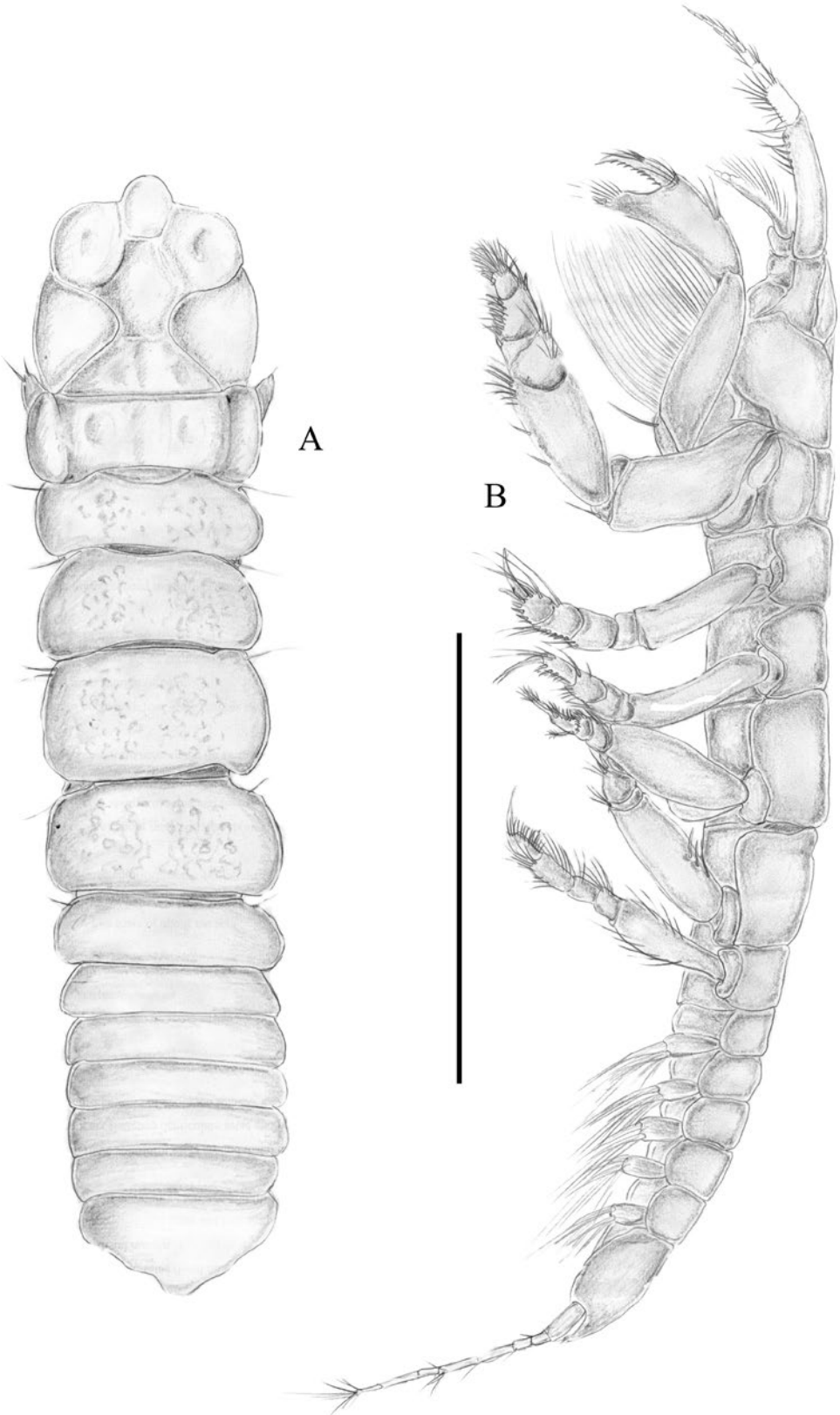

Fig. 16. *Kalliapseudes obtusifrons*, adult female. A, dorsal view; B, lateral view. Scale = 1 mm.

Fig. 17. *Kalliapseudes obtusifrons*, female. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; G, maxilla; H, labium; I, maxilliped; J, maxilliped endite.

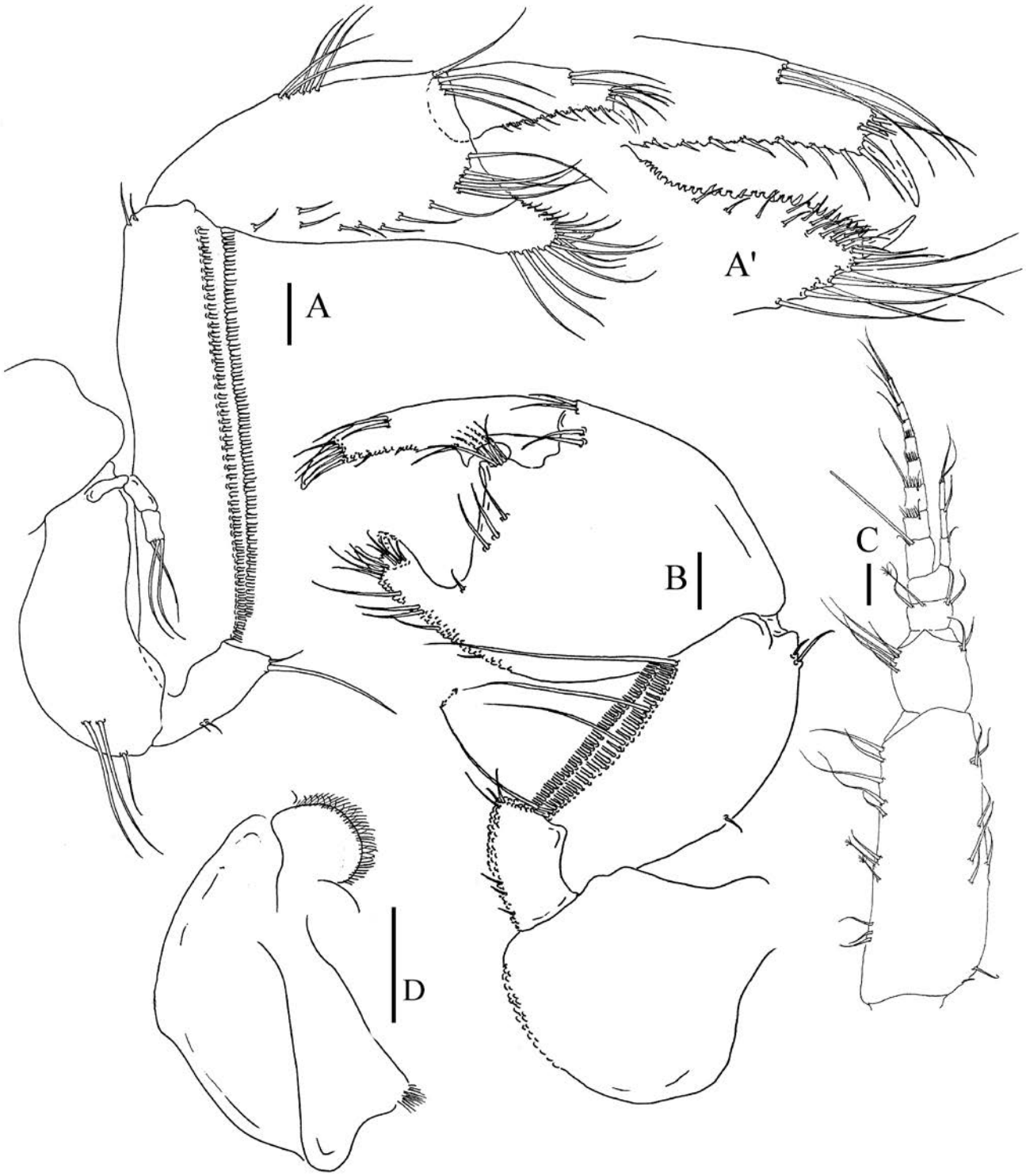

Fig. 18. *Kalliapseudes obtusifrons*. A, female cheliped; A', female cheliped, details; B, male cheliped; C, male antennule; D, epignath. Scale = 0.1 mm.

Fig. 19. *Kalliapseudes obtusifrons*. A, pereopod 1, female; B, details of pereopod 1, female; C, details of pereopod 1, male; D, details of pereopod 1, brooding female; E, details of pereopod 1, manca. Scale: A = 0.2 mm; B-E = 0.1 mm.

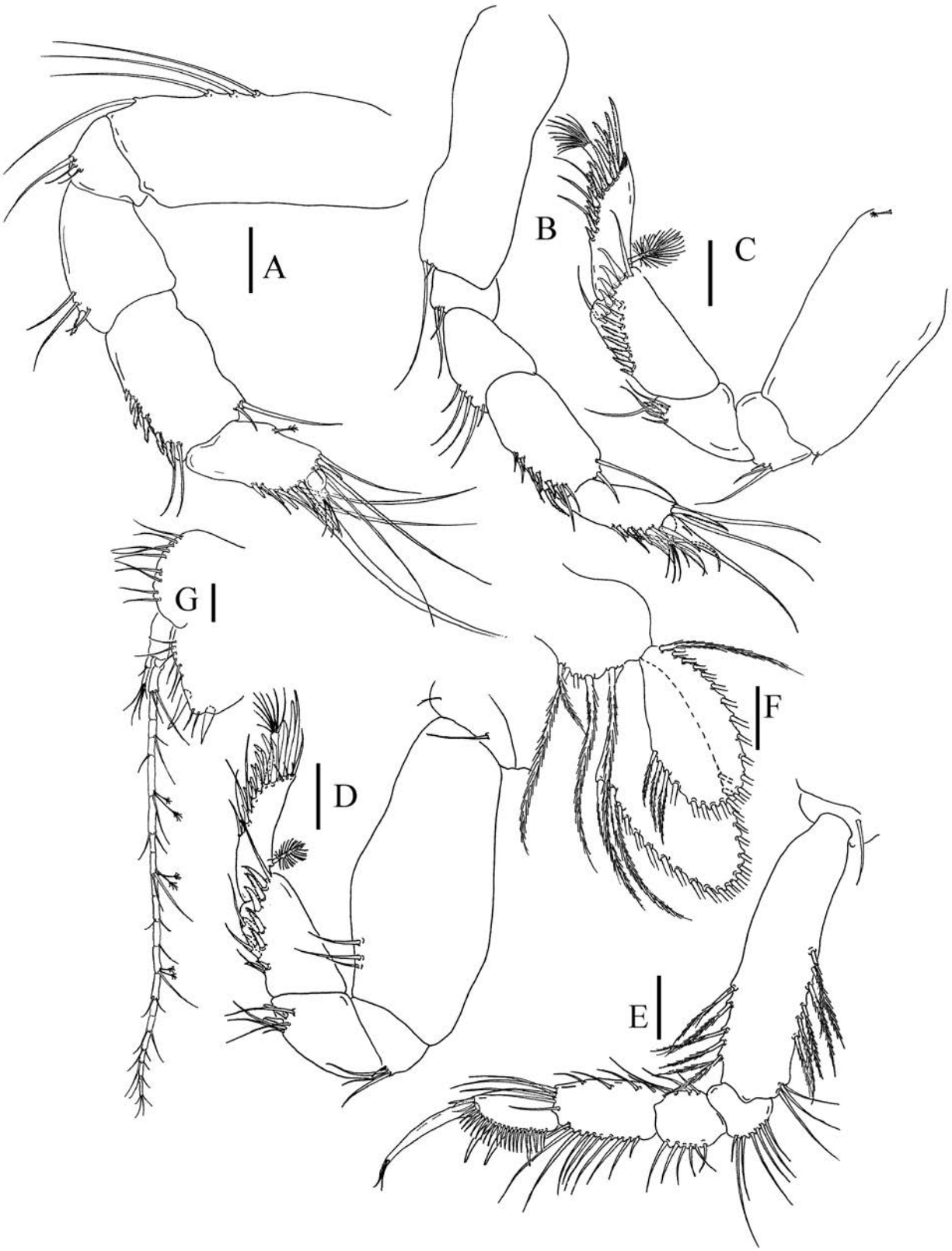

Fig. 20. *Kalliapseudes obtusifrons*, female. A, pereopod 2; B, pereopod 3; C, pereopod 4; D, pereopod 5; E, pereopod 6; F, pleopod; G, uropod. Scale = 0.1 mm.

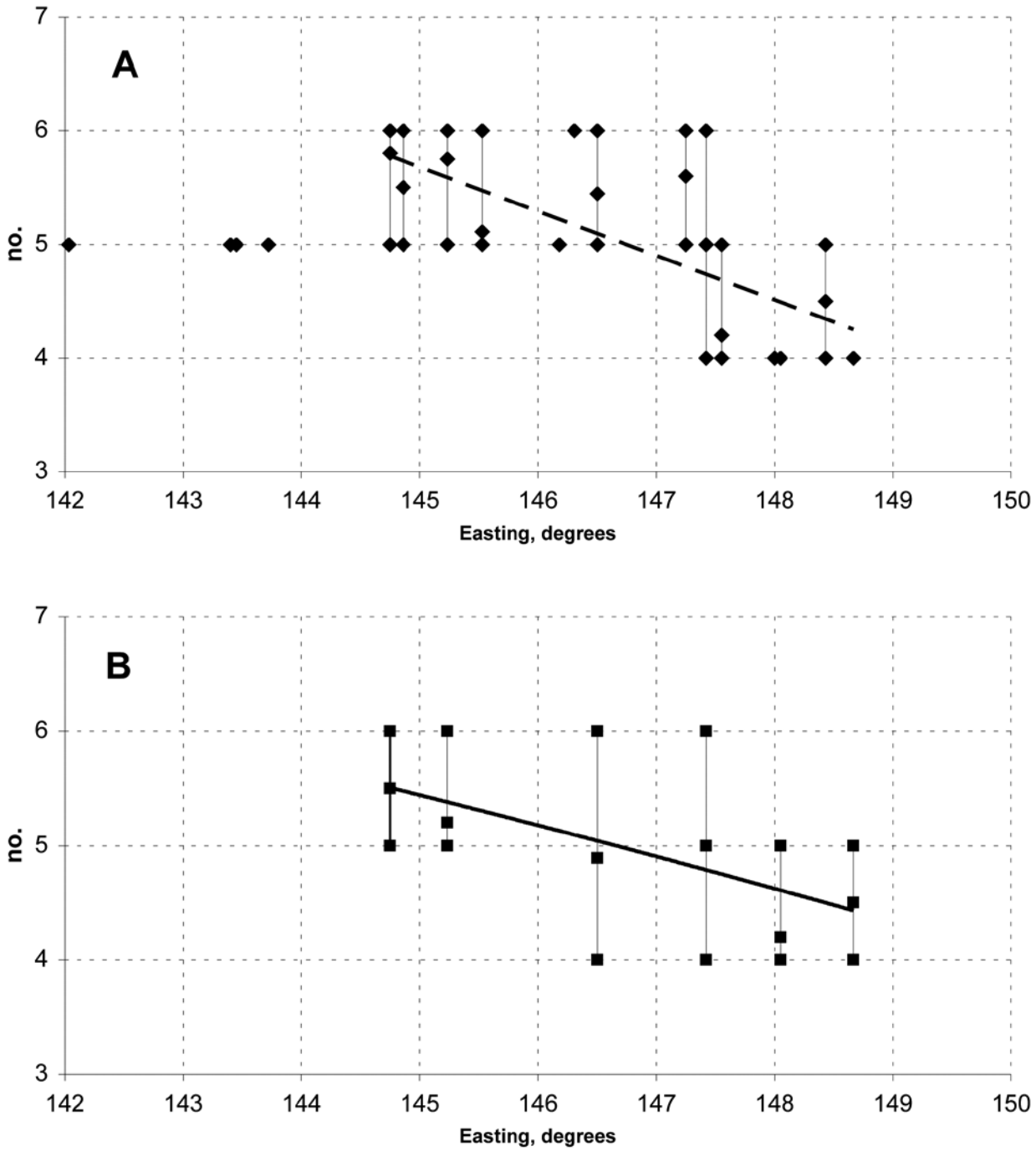

Fig. 21. *Kalliapseudes obtusifrons*: graphs of A, number of ventral spines on the propodus of pereopod 1 and B, number of squama setae, both against longitude across the Bass Strait (means and ranges where available), with linear trend-lines.

squama with 4 to 7 simple setae, third article with two inner plumose setae, fourth article fused to fifth; flagellum of 6 segments, distal segment with four distal setae.

Cheliped (Fig. 18A) basis with two longer and one shorter ventrodistal setae. Pereopod 1 (Fig. 19) basis with group of ventrodistal simple setae, exopodite with three distal setae; ischium with ventral seta; propodus with 4 to 6 ventral propodal spines. Pereopod 2 (Fig. 20A) with group of long subdistal ventral setae on basis. Pereopod 6 (Fig. 20E) basis with 4 to 6 plumose setae on ventral margin.

Pleopod (Fig. 20F) basis with 3 to 5 plumose seta on outer margin. Uropod endopod filiform, 2.7 times as long as pleotelson, of about 19 segments.

Dimorphism of male. Antennule (Fig. 18C) peduncle article 3 and 4 shorter than wide, main flagellum with 8 segments, segments 2 to 5 each bearing distal row of four or five aesthetascs. Cheliped (Fig. 18B) basis swollen, as long as wide, with corrugated ventrodistal margin; merus with ventral and distal margins corrugated; carpus twice as long as wide, with parallel ventral rows of filtering setae increasing in length distally; propodus robust, ventral margin corrugated in distal two-thirds, palm of chela as long as wide, with row of five plumose filtering setae as long as width of palm. Fixed finger about half length of palm, cutting edge with corrugated triangular distal apophysis and smooth triangular tooth-like proximal apophysis; dactylus cutting edge with proximal triangular tooth-like apophysis, distally corrugated.

Note: Drumm & Heard (2006) describe a "distinct line of fusion" on the cheliped carpus; this would be a stress line in the cuticle related to the internal proximal attachment of the caudal carpus muscle, as seen elsewhere in *Apseudes bruneinigma* Bamber, 1998 (q.v.) and *Pakistanapseudes goofi* Bamber & Sheader, 2003 (Bamber & Sheader, 2003, fig. 4A). It was not observed in any of the Bass Strait *K. obtusifrons* material.

Morphometric variation. As mentioned above, the large amount of material from the Bass Strait has allowed observation of variation in certain meristic characters. Variations were found in the numbers of segments in the antennule flagella (the NSW specimen of Drumm & Heard, 2006, had 10 segments in the main flagellum, 4 in the accessory flagellum; Fig. 17A shows an example of a main flagellum of 7, accessory flagellum of 3), in the number of squama setae (the NSW specimen had 7, the example in Fig. 17B shows 6), in the number of pereopod 1 propodus ventral spines (Fig. 19 shows an adult range of 4 to 6, and a manca with 3), in the number of pereopod 1 exopodite setae (the NSW specimen had 2, most Bass Strait specimens had 3, as in Fig. 19A), and in the number of pleopod basis setae (the NSW specimen had 4, Bass Strait juveniles had 1 to 2, Bass Strait adults had 3 to 4 or once 5, e.g. Fig. 20F).

When those features with sufficient variation are plotted across the east-west range of the Bass Strait material, a distinct trend is revealed: the number of ventral propodal spines in adults (Fig. 21A) and the number of squama setae (Fig. 21B) show either a decline from east to west, or a step somewhere around 147°E (east of Wilson's Promontory). An identical trend is shown in the number of ventral propodal spines in juveniles (not figured). A step change around 147°E may represent a general separation of two populations, possibly partially isolated by hydrographic conditions, as has been shown in other crustaceans with intraspecific meristic variation between populations (e.g. Henderson *et al*., 1990); there would then be no reason why the New South Wales specimens should continue this trend directly, as they would again be a semi-isolated population. Intraspecific ranges in meristics in other species of *Kalliapseudes* were discussed by Bamber *et al*. (2003), who found increases in the number of accessory flagellum segments and the number of squama setae in *Kalliapseudes makrothrix* Stebbing, 1910, *K. gobinae* Bamber, 1999 and *K. tomiokaensis* Shiino, 1966, but in relation to size (larger in larger individuals), and based on much smaller samples. The patterns found here for *K. obtusifrons* are not size-related.

The adult female to male sex ratio of all the material examined was 2.6:1.

Family **Metapseudidae** Lang, 1970

Subfamily **Metapseudinae** Lang, 1970

Genus ***Cyclopoapseudes*** Menzies, 1953

Subgenus ***Exopoapseudes*** subgen. nov.

Diagnosis. Cyclopoapseudes with exopodites on cheliped and pereopod 1.

Type species. Cyclopoapseudes diceneon Gardiner, 1973. Other species *C. (E.) plumosa* sp. nov.

Etymology. Combined from *Exo* – from "exopod", and "*-poapseudes*" from the last part of the name of the genus *Cyclopoapseudes* (female).

Remarks. With the following new species, there are now four species of *Cyclopoapseudes* known. The Pacific species *C. indecorus* Menzies, 1953 (the generotype), from Ecuador, and the Indian Ocean species *C. estafricana* Băcescu, 1975 (Tanzania) are both without exopodites on the cheliped and pereopod 1, while *C. diceneon* Gardiner, 1973 (New Zealand) and the new species described below from the Bass Strait, both from Antipodean waters, have these exopodites. In other apseudomorph taxa, this difference has been considered sufficient to distinguish separate genera (rightly or wrongly); here we distinguish two subgenera, the nominate *Cyclopoapseudes* and the presently Antipodean *Exopoapseudes*, the latter being the more plesiomorphic.

Cyclopoapseudes (Exopoapseudes) plumosa sp. nov.

Figures 22–25

Material examined. 1 ♀ (J60994), holotype, 1 ♂ (3.5 mm long) (J60993), allotype, 2 females with empty brood pouch (3 mm long), 1 brooding ♀ (3 mm long), 7 ♂♂, 8 subadult ♂♂ (1 dissected), 47 other specimens (J57560), paratypes, CPBS 33S, Western Port off Crib Point, 38°22.06'S 145°14.10'E, 13 m depth, reef with sponges, 5 March 1965, coll. A.J. Gilmour.

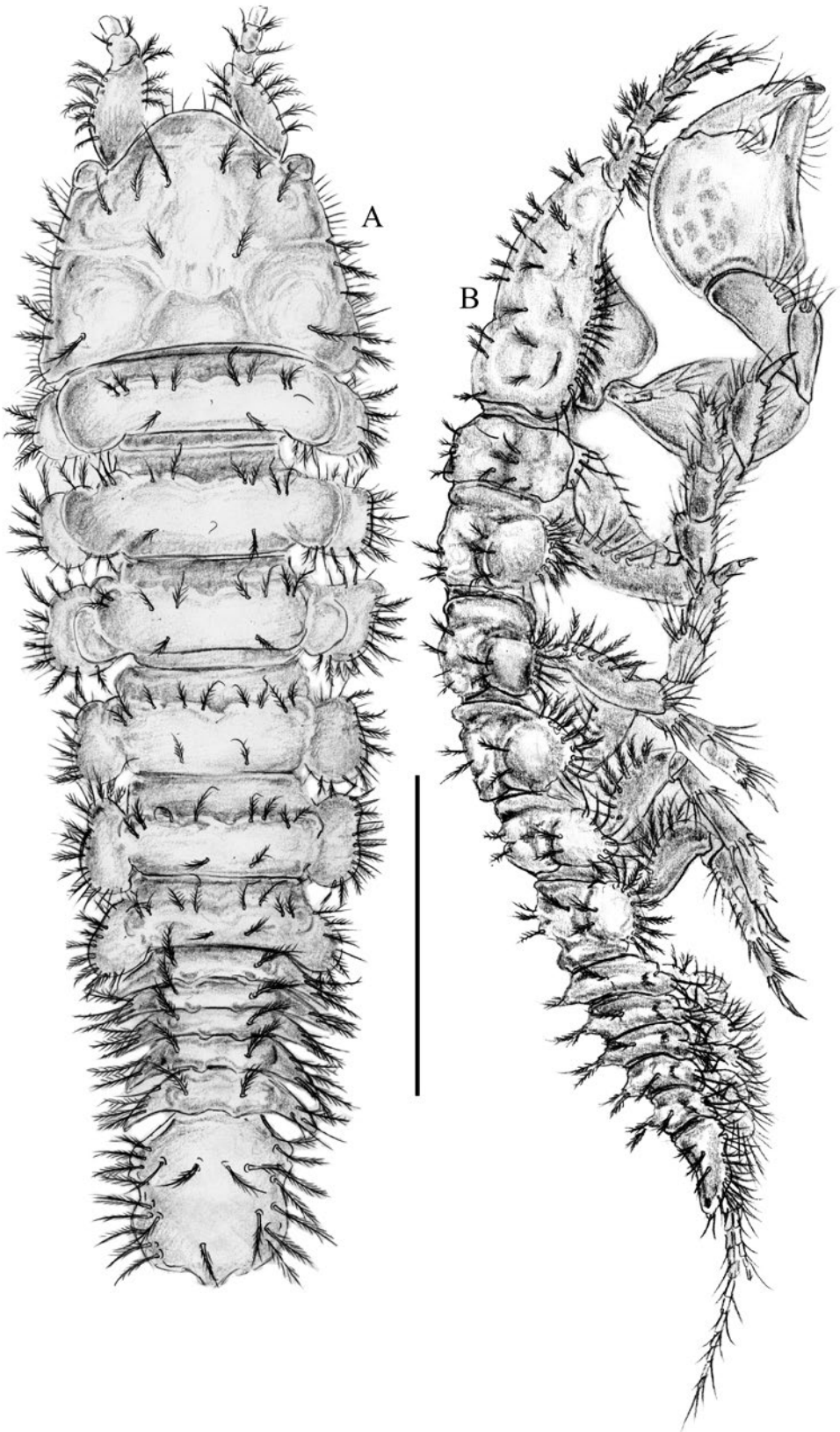

Fig. 22. *Cyclopoapseudes (Exopoapseudes) plumosa* sp. nov. A, holotype female dorsal view; B, male lateral view. Scale = 1 mm.

Fig. 23. *Cyclopoapseudes (Exopoapseudes) plumosa* sp. nov., female paratype. A, antennule; B, antenna; C, left mandible; D, right mandible D', mandibular molar; E, maxillule; F, maxilla; G, labium; H, maxilliped; H', maxilliped endite; I, epignath Scale: A–D, G, I = 0.1 mm; E-F, H = 0.01 mm.

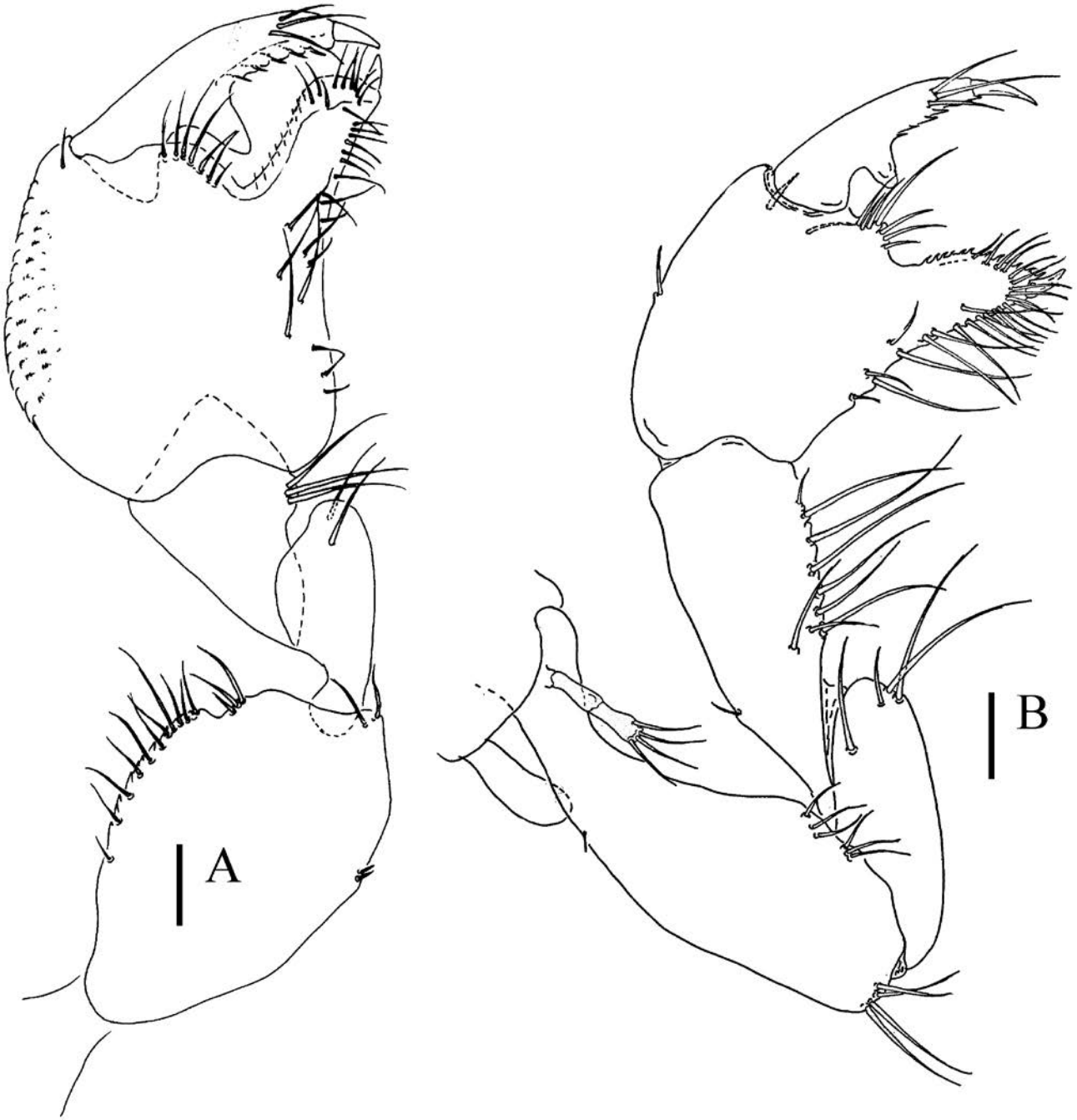

Fig. 24. *Cyclopoapseudes (Exopoapseudes) plumosa* sp. nov. A, cheliped male; B, cheliped female. Scale = 0.1 mm.

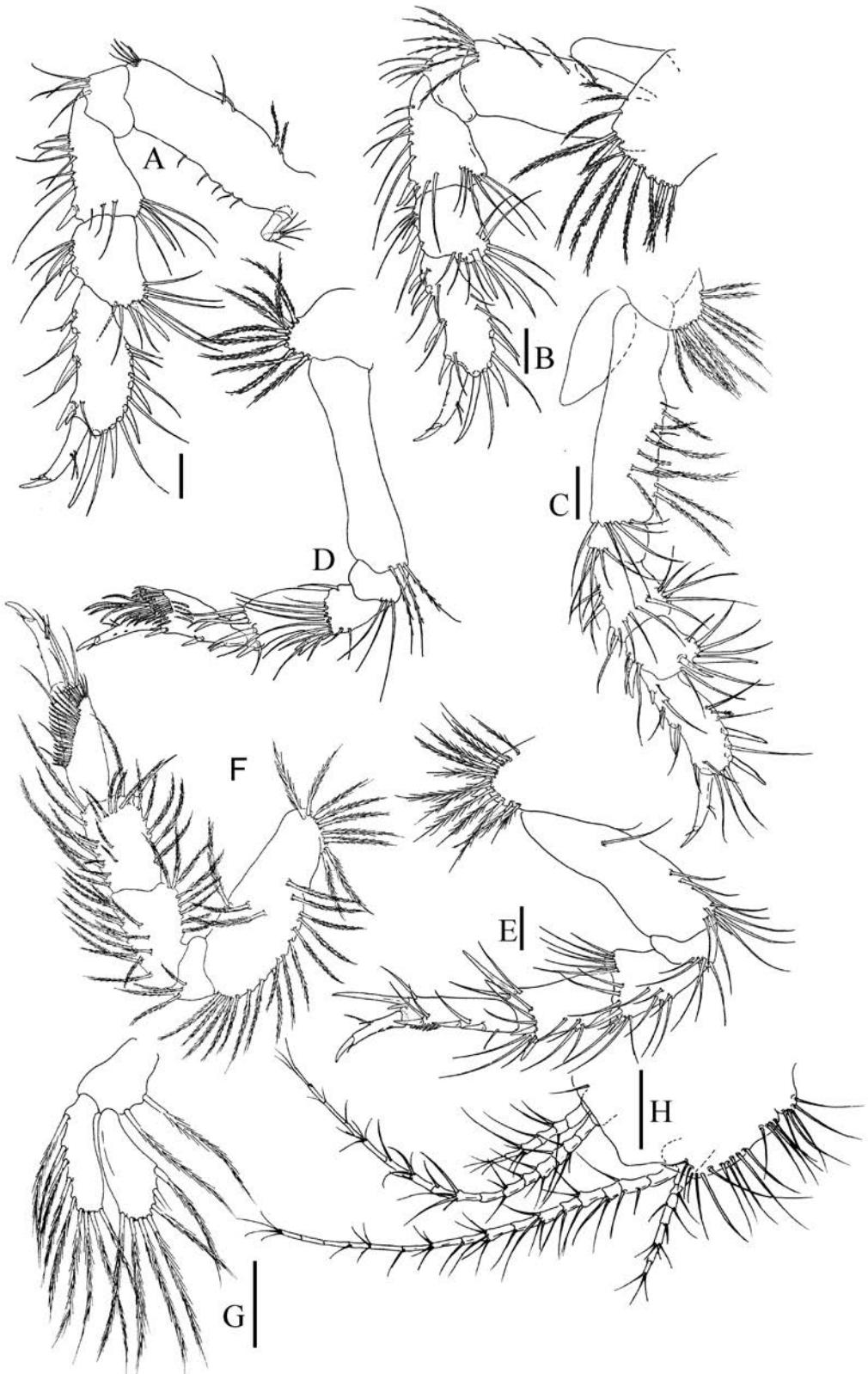

Fig. 25. *Cyclopoapseudes (Exopoapseudes) plumosa* sp. nov., female paratype. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

Description of female with oostegites. Body (Fig. 22A) compact, grossly similar to that of *C. diceneon*, holotype 3.7 mm long (tip of rostrum to posterior of pleotelson), 3.5 times as long as wide, narrower posteriorly. Cephalothorax subrectangular, wider than long (1.5 times as wide as long without rostrum), anterior margin with conspicuous rounded rostrum with smooth anterior margin. Eyes present on robust eyelobes; paired dorsal plumose setae, lateral plumose and simple setae as figured. Pereonites all with lateral margins expanded and uniformly convex, each with anterior row of 6 to 8 plumose setae, posterior pair of plumose setae, and numerous lateral marginal plumose and simple setae; pereonites 1 to 5 subequal in length (pereonite 1 just shortest), about 0.4 times as long as cephalothorax; pereonite 6 shortest, 0.6 times as long as pereonite 2 (all pereonites respectively 3.25, 3.0, 3.0, 2.6, 2.6 and 3.8 times as wide as long). Pleon three times as long as pereonite 2, of five free subequal pleonites bearing pleopods; pleonites dorsally with paired low posterior tubercles, about seven times as wide as long, with paired mid-dorsal plumose setae, laterally expanded by spiniform apophyses each bearing three or four plumose setae. Pleotelson distally with truncated protuberance, slightly longer than wide and half as long as whole pleon, with midlateral indentation; antero-dorsal row of four plumose setae, postero-dorsal triad of plumose setae, laterally with seven marginal plumose setae.

Antennule (Fig. 23A). Peduncle proximal article compact, twice as long as wide, inner margin with paired mesial and three subdistal plumose setae, outer margin with entire row of plumose setae; second article one-third as long as first, with inner and distal groups of plumose setae; third article two-thirds length of second, with outer distal seta and inner marginal plumose setae; fourth just shorter than third, with distal simple setae. Main flagellum of 7 segments, segments 2, 3 and 5 each bearing single aesthetasc; accessory flagellum of 4 segments.

Antenna (Fig. 23B). Proximal peduncle article with inner distal pair of plumose setae; article 2 just longer than article 1, inner margin bearing pair of plumose setae and sub-proximal rounded apophysis, outer margin with three plumose setae and subdistal squama with seven simple marginal setae; peduncle article 3 shorter than wide, one-quarter the length of article 2, with one simple and one plumose inner setae; article 4 twice as long as article 3, with inner distal pairs of simple and penicillate setae; article 5 slightly longer than article 4, with inner and outer distal simple setae and paired inner penicillate setae. Flagellum of seven segments.

Labrum (not figured) rounded, distally finely setulose. Left mandible (Fig. 23D) bearing strong, pointed and crenulated pars incisiva, lacinia mobilis slender with fine denticulations, setiferous lobe with one stout and five finer compound setae, pars molaris (Fig. 23D') robust, blunt, margin with row of rounded tubercles and fine teeth; mandibular palp of three articles, proximal article with single subdistal seta, article 2 more than half as long as whole palp with four simple distal setae, article 3 shorter than article 1 with four subdistal and two distal simple setae. Right mandible (Fig. 23C) as left, but lacinia mobilis with more robust dentition, setiferous lobe with one simple and seven compound setae. Maxillule (Fig. 23E) inner endite with five finely setulate distal setae, inner margin finely setulose; outer endite with nine distal spines and two subdistal setulose setae, outer margin finely setose, inner margin with fine rows of setules. Palp of two articles, distal article with distal row of five simple setae Maxilla (Fig. 23F) with naked outer margin; outer lobe of moveable endite with two simple subdistal setae and eight simple distal setae; inner lobe of moveable endite with four simple and two setulose setae; outer lobe of inner endite with six outer simple setae interspersed with two bidenticulate spines, inner half with two bidenticulate spines and three distally compound spines; inner lobe of fixed endite with rostral row of 19 setae guarding five longer setulose setae. Labium (Fig. 23G) with smooth outer margin, palp with fine lateral setules and two simple distal spines. Maxilliped (Fig. 23H) basis with finely setose outer margin, no distal setae; palp article 1 with outer distal simple seta and inner distal finely setulose seta; palp article 2 longer than wide, inner margin with rows of numerous short setae, and two simple and two setulose longer setae in proximal half, outer margin finely denticulate with slender distal spine reaching tip of third article; palp article 3 with 10 simple setae along inner margin; palp article 4 with eleven setae along broad distal margin. Endite (Fig. 23H') with paired, slender, simple inner caudodistal setae, linguiform inner distal spines and simple outer distal setae, setulose outer margin, two coupling-hooks. Epignath (Fig. 23I) slender, linguiform, with distally setulose distal spine.

Cheliped (Fig. 24B) basis 2.8 times as long as wide, narrow proximally, with short dorsodistal simple setae and four longer ventrodistal setae; exopodite with four plumose setae. Merus subrectangular, with four distal simple setae. Carpus 2.5 times as long as wide, with row of long simple setae along ventral margin. Chela stout, palm just longer than wide and fixed finger 0.6 times as long as palm, ventral margin densely setose; slight setose apophysis between fixed finger and articulation of dactylus; cutting edge of fixed finger serrated, distal claw stout; dactylus with proximal tooth-like apophysis on cutting edge, distal claw pointed.

Pereopod 1 (Fig. 25A) basis three times as long as wide, dorsal margin with five simple setae on a slightly convoluted margin, ventral margin with paired proximal plumose setae, two mid-ventral setae and four ventrodistal setae; exopodite present, 3-articled, article 3 with five distal plumose setae. Ischium with four simple ventrodistal setae. Merus just under half as long as basis, expanded distally, with numerous ventral simple setae, ventrodistal spine, and curved, slender dorsodistal spine with longer adjacent simple setae. Carpus 0.8 times as long as merus, with two ventral spines and intervening simple setae, and single dorsodistal spine amongst tuft of longer setae. Propodus slightly anaxial on carpus, longer than merus, with four ventral spines alternating with simple setae, one ventrodistal spine adjacent to dactylus, and five dorsal spines alternating with simple setae. Dactylus more than half as long as propodus, with mid-dorsal fine setae, ventrodistal seta; unguis mounted subdistally, short.

Pereopod 2 (Fig. 25B) more slender but similar to pereopod 1. Coxa with plumose setae. Basis three times as long as wide with ventral and ventrodistal plumose setae. Merus 1.1 times as long as carpus, with ventrodistal spine but no dorsodistal spine. Propodus with four ventral and three dorsal spines with

interspersed setae. Pereopod 3 (Fig. 25C) similar to pereopod 2, but basis with longer and dorsal plumose seta, merus with two ventral spines, carpus with two dorsodistal spines, propodus with two dorsal spines.

Pereopod 4 (Fig. 25D) basis 5 times as long as wide, naked other than three ventrodistal plumose setae; merus with two ventrodistal spines and inner-distal group of setae as long as carpus; carpus twice as long as merus, distally with slender, curved spines and simple setae; propodus as long as carpus, articulated anaxially on carpus, widening distally to square end, with dense group of finely denticulate shorter and longer setae; dactylus plus unguis as long as propodus. Pereopod 5 (Fig. 25E) similar to pereopod 2, basis with ventral simple setae; merus shorter than carpus, with two ventrodistal spines; carpus with two ventrodistal and one dorsodistal spines; propodus with three ventral and two dorsodistal spines.

Pereopod 6 (Fig. 25F) basis arrayed with proximal, dorsal subdistal, and ventral plumose setae as figured; ischium with four ventrodistal plumose setae; merus and carpus with plumose setae along dorsal and ventral margins, carpus with single dorsodistal spine; propodus with comb of fine leaf-like spines along distal half of ventral margin and around dactylus, dactylus with adjacent slender, curved spine.

Pleopods (Fig. 25G) all alike. Basis with two dorsal plumose setae, ventral margin naked. Endopod shorter than exopod, linguiform, with nine ventral and distal plumose setae; exopod subovate, with seven plumose setae around distal margin.

Uropod (Fig. 25H) biramous, exopod just shorter than pleotelson, of six segments, endopod 3.75 times as long as exopod, of fifteen segments.

Distinctions of male. Sexual dimorphism minimal (Fig. 22B), cheliped (Fig. 24A) more robust, dorsal margin of basis expanded and bearing row of 11 simple setae; merus narrow proximally, with two distal setae; carpus only 1.7 times as long as wide, with three mid-ventral setae; propodus as long as wide, with dorsal marginal rows of microtrichia, chela fingers as those of female but more robust.

Etymology. named for the plumose dorsal setae on the carapace.

Remarks. The morphology of the body of the present species is typical for the genus, as are the conformation of the mandible palp, and of the fourth pereopod, both being unusual features characteristic of the genus. As commented above, *Cyclopoapseudes (Exopoapseudes) plumosa* sp. nov. shares the possession of exopodites on the cheliped and pereopod 1 only with *C. (E.) diceneon*. It is distinguished from that species particularly in the form of the pleotelson, that of the present species being almost square in outline (although with mid-lateral indentation), that of *C. (E.) diceneon* narrowing at half its length to give a T-shape when viewed dorsally, with a conical posterior protuberance bearing long paired distal setae. In addition, *C. (E.) plumosa* has plumose setae dorsally on the carapace (that of *C. (E.) diceneon* being naked), a somewhat more slender and more setose antennule, more setose pereopods, *inter alia*.

Gardiner (1973) distinguished brooding females and subadult males (with a presumed male genital cone "anlage"), and only the latter had a cheliped with a stout propodus and a tooth-like apophysis on the cutting edge of the dactylus. The cheliped of the female figured here (Fig. 24B) is even more robust than that of Gardiner's male, but has an oostegite, contrary to Gardiner's (ibid.) contention that all metapseudids are without an oostegites on the cheliped. The male cheliped of the present species also demonstrates sexual dimorphism. Menzies (1953) based *C. indecorus* on what he referred to as a male (without specifying why), and his relatively incomplete description shows a chela without tooth-like apophysis; with only one specimen, no sexual dimorphism is known for this species. Finally, Băcescu (1975) gave an even less complete description of *C. estafricana,* but based on a brooding female and a juvenile, so again no information is available on dimorphism or hermaphroditism. This genus unfortunately is generally of sparse occurrence.

Genus ***Labraxeudes*** Błażewicz-Paszkowycz & Bamber, 2007

Labraxeudes heliodiscus Błażewicz-Paszkowycz & Bamber, 2007

Figure 26

L. heliodiscus Błażewicz-Paszkowycz & Bamber, 2007b, 136–141, figs 17–19.

Material examined. 6 ♀♀ (3 brooding, 3 with oostegites), 3 juveniles (J55848), Stn WBES 1746, Western Port, 38°29.78'S 145°06.28'E, sand, 24 m depth, 25 November 1974, Smith-McIntyre Grab; 14 ♀♀ (6 with oostegites, 5 brooding), 2 juveniles (J56346), Stn CRUST 21, Whaleback Rock, 0.5 km south of Point Hicks, 37°48.30'S 149°16.48'E, ca 30 m depth; 22 ♀♀ (5 brooding, 15 with oostegites) (J57612), Stn CPBS 33S, Crib Point, Western Port, 38°22.04'S 145°14.06'E, "reef/sponge", 13 m depth, 5 March 1965; 7 ♀♀ (1 brooding, 3 with oostegites) (J57679), Stn CPBS 23N, Crib Point, Western Port, 38°20.17'S 145°14.11'E, sandy gravel, 10 m depth, 10 March 1965.

Remarks. the types (four females) of this species were described from a sample off Phillip Island, at the mouth of Western Port. Examination of the further material listed above has allowed description of some ontogenic variation, and the correction of some misinterpretations of the type material.

Contrary to the type description, all setae on the cephalothorax, pereonites, pleonites and pleotelson are plumose. The pleotelson has a rounded posterior protuberance bearing plumose setae (Fig. 26F).

The uropods of the figured type now appear to be from a damaged specimen: large-adult uropods (Fig. 26F) have 7 segments in the endopod and 5 segments in the exopod. The juveniles (post-manca) have shorter uropods (Fig. 26D), but already 7 articles in the endopod and 4 in the exopod, as do brooding females with a simple cheliped (Fig. 26E); the juveniles also have a simpler, semicircular rostrum (Fig. 26C). The chelipeds show progressive development: those of juveniles (Fig. 26A) are simple, smaller versions of those of the smaller brooding females (Fig. 26B): these have a basis twice as long as wide, with one proximal and two distal ventral setae and a mid-ventral spine; exopodite as in the type; merus with mesial and subdistal setae and two ventrodistal spines; carpus 2.25 times as long as wide, with paired proximodorsal

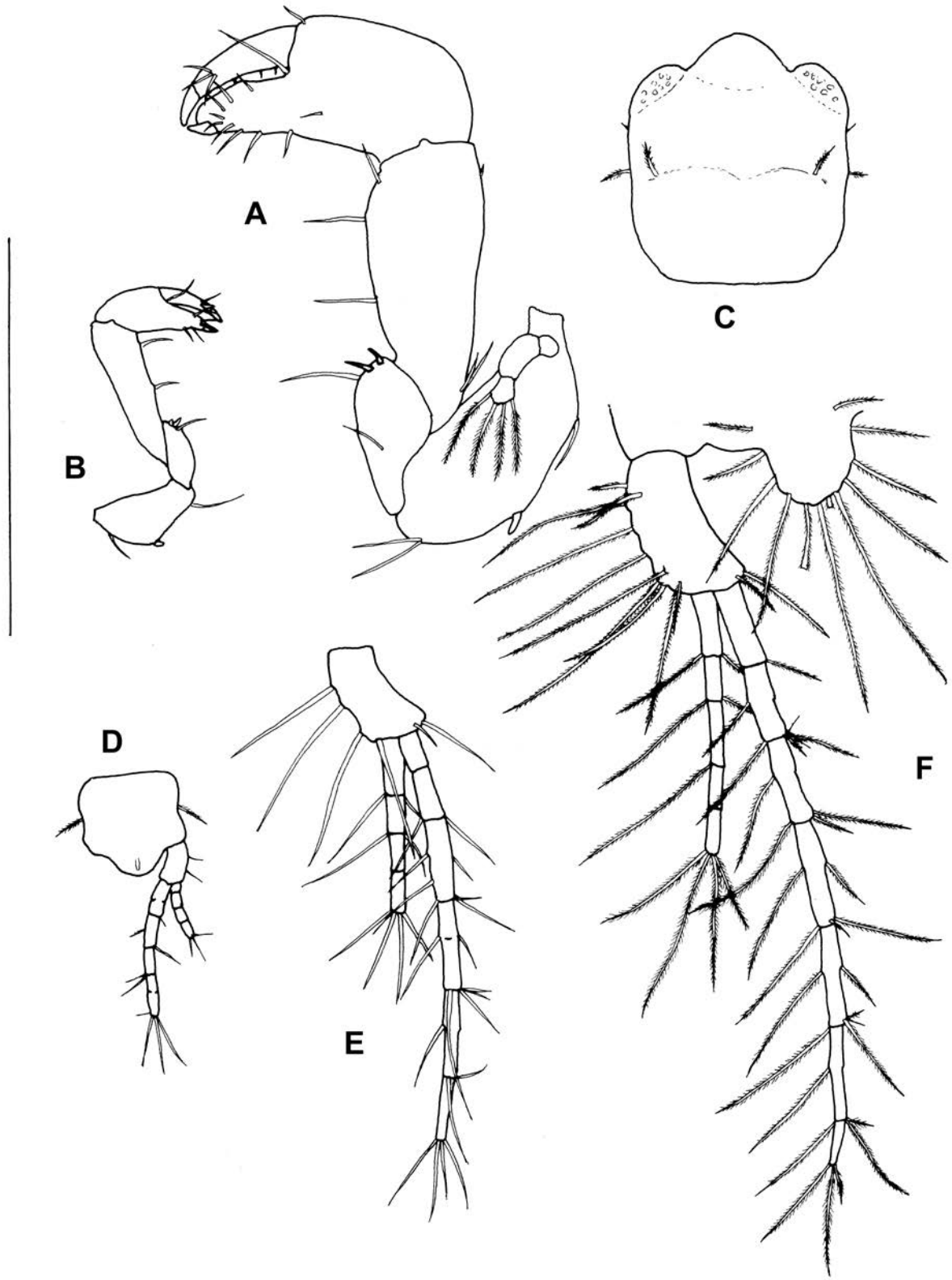

Fig. 26. *Labraxeudes heliodiscus*. A, cheliped of 2.53 mm brooding female; B, cheliped of 1.2 mm juvenile; C, cephalothorax of 1.2 mm juvenile; D, pleotelson and right uropod of 1.2 mm juvenile (plumose nature of uropod setae not shown); E, left uropod of 2.53 mm brooding female (plumose nature of all setae not shown); F, left uropod of 3.74 mm female with oostegites. Scale line = 0.5 mm.

setae and three ventral setae; chela palm 1.4 times as long as wide, fixed finger with three ventral setae, dactylus with no tooth-like apophysis on the cutting edge. The larger specimens have the cheliped as shown for the type (Błażewicz-Paszkowycz & Bamber, 2007b, fig. 19A), showing a dimorphism suggestive of a male, yet these specimens also have oostegites, and no penial tubercle was found on any specimen. This may imply progynous, or later simultaneous, hermaphroditism in this species, but until a specimen with a penial tubercle is discovered, no conclusion can be drawn about this.

All the known material of this species was collected in Western Port except for the specimens from off Point Hicks, at depths from between 10 and 30 m and on a range of substrata.

Genus ***Metapseudes*** Stephensen, 1927

Metapseudes wilsoni Błażewicz-Paszkowycz & Bamber, 2007

M. wilsoni Błażewicz-Paszkowycz & Bamber, 2007b, 141–146, figs 20–23.

Material examined. 1 specimen, Stn. BSS 198, Western Bass Strait, 36 km SSW of Stokes Point, King Island, 40°26.7'S, 143°41.4'E, 85 m depth, medium sand, 22 November 1981, coll. R. Wilson, RV Tangaroa; 1 brooding ♀, Stn. BSS 203, Central Bass Strait, 44 km NE of Cape Wickham, King Island, 39°22.0'S, 144°18.3'E, 60 m depth, coarse sand, 23 November 1981, coll. R. Wilson, RV Tangaroa. 1 ♀ (J57543), Stn SA62, Flinders Island, "The Hotspot" reef, 5 n miles W of N end of Flinders Island, South Australia, 33°40.30'S 132°22.00'E, 17 m depth, tufted bryozoans on rock face, exposed, 19 April 1985, SCUBA, coll. G.C.B. Poore.

Remarks. The large type collection of this species was taken in the Eastern Bass Strait at 32 m depth; the present specimens extend the range through the Bass Strait, as well as to South Australia, and to a depth of 85 m. This, the second species of the genus, is most easily distinguished from the generally similar generotype, *M. aucklandiae* Stephensen, 1927, described from New Zealand in shallow waters (Stephensen, 1927, Gardiner, 1973) (depth range 0–113 m), by the more slender antennules and antennae, and the distinct form of the rostrum, inter alia.

Family **Parapseudidae** Guţu, 1981

Subfamily **Pakistanapseudinae** Guţu, 2008 new rank

Remarks. Guţu (2008b) separated the family Parapseudidae into two groups, separating the species of the *Pakistanapseudes*-group discussed by Błażewicz-Paszkowycz & Bamber (2007a) from the remaining parapseudids. Guţu (ibid.) erected two tribes (Parapseudini and Pakistanapseudini), but it is entirely more appropriate to consider these as subfamilies, so we have given them that new rank herein.

Genus ***Pakistanapseudes*** Băcescu, 1978

Remarks. in describing his new genus, Băcescu (1978) did not designate a type-species. By inference, and as stated by Bamber & Sheader (2003), it should be *Pakistanapseudes leptochelatus* Băcescu 1978, herein so designated (not *Pakistanapseudes leptodactylus* Băcescu 1978 as cited by Guţu, 2008, a *lapsus calami*). It should be noted that members of this genus have a great propensity for autotomizing their appendages on fixation unless relaxed first, so in many species not all of the pereopods, chelipeds, antennules or uropods are known. In both of the new species described below, chelipeds and first pereonites were so rare that no complete exopodite was found.

Pakistanapseudes bassi Błażewicz-Paszkowycz & Bamber, 2007

P. bassi Błażewicz-Paszkowycz & Bamber, 2007a, 14–19, figs 7–9.

Remarks. This species was described originally from numerous specimens collected throughout the Bass Strait, on sandy substrata from depths between 60 and 293 m. Numerous further samples of this species exist in the collections of Museum Victoria, including some from water as shallow as 2 m (Port Phillip Bay), over 100 specimens having been examined in the course of this study in addition to the type-collection, and it appears clearly to be the commonest *Pakistanapseudes* species in the Bass Strait region. It is morphologically similar to *P. perulpa* (rounded rostrum, no bifurcate claws), but unlike that species it has no ventral setae on the pleopod basis, and pereonites 5 and 6 are wide than long (longer than wide in *P. perulpa*).

Pakistanapseudes lucifer sp. nov.

Figures 27–29

Material examined. 1 ovigerous ♀ (J28617), holotype, Stn MSL-EG 117, Eastern Bass Strait, 37°52.65'S 148°42.15'E, 49 m depth, February 1991, coarse sand; 4 ♀♀ (J28627), paratypes, Stn MSL-EG 78, Eastern Bass Strait, 37°43.89'S 148°30.13'E, 27 m depth, 4 June 1991, coarse sand; 1 brooding ♀, 2 ♀♀ with oostegites (J28611), paratypes, Stn MSL-EG 99, Eastern Bass Strait, 37°53.29'S 148°15.40'E, 43 m depth, February 1991, coarse sand; 1 ♂ (J28630), paratype, Stn MSL-EG 108, Eastern Bass Strait, 37°53.14'S 148°28.94'E, 45 m depth, February 1991, medium sand; 1 ♀ (J28627), paratype, Stn MSL-EG 72, Eastern Bass Strait, 37°53.39'S 148°15.40'E, 43 m depth, 4 June 1991, coarse sand; 3 ♂♂, 1 brooding ♀ (J28629), paratypes, Stn MSL-EG 104, Eastern Bass Strait, 37°49.89'S 148°30.13'E, 27 m depth, February 1991, coarse sand; 2 ♀♀ (J57574), paratypes, Stn BSS170, Eastern Bass Strait, 39°51.8'S 148°26.5'E, 130 m depth, 15 November 1981, fine sand, coll. R.S. Wilson; 1 ♂ (J57574), paratype, Stn BSS169, Eastern Bass Strait, 39°02.4'S 148°30.6'E, 120 m depth, 15 November 1981, muddy sand, coll. R.S. Wilson; 1 ♀ (J57574), paratype, Stn BSS188, Western Bass Strait, 38°38.2'S 142°35.0'E, 59 m depth, 20 November 1981, coll. R.S. Wilson; 1 ♀ (J51790), paratype, Stn VC 27 C1, Western Bass Strait, 38°23.92'S 145°18.43'E, 40 m depth, 11 May 1998, fine sand; 2 ♀♀ (J51317), paratypes, Stn VC 18 C3, Western Bass Strait, 38°30.2'S 144°15.00E, 40 m depth, 13 May 1998; 2 brooding ♀♀ (J57655), 1 ♀ with oostegites (J57646), 1 brooding ♀ (J57653), 1 ♂ (J57654), paratypes, Stn CPBS 41N, Western Port, 38°20.81'S 145°13.85'E, 13 m depth, 30March 1965, gravel and sand; 1 ♀ (J55925), 12 March 1965, 1 ♀ (J55902), 20 March 1967, 2 ♂♂ and 4 ♀♀ (1 with oostegites, 2 brooding) (J55885), paratypes, Stn CPBS 32S, Western Port, 38°22.06'S 145°14.10'E, 13 m depth, reef with sponge.

Description of female. Body (Fig. 27A), dorsoventrally flattened, elongate, holotype 3.2 mm long (tip of rostrum to posterior of pleotelson), six times as long as wide, tapering towards posterior. Cephalothorax subrectangular, just longer than wide, with pronounced pointed rostrum curving downward, laterally

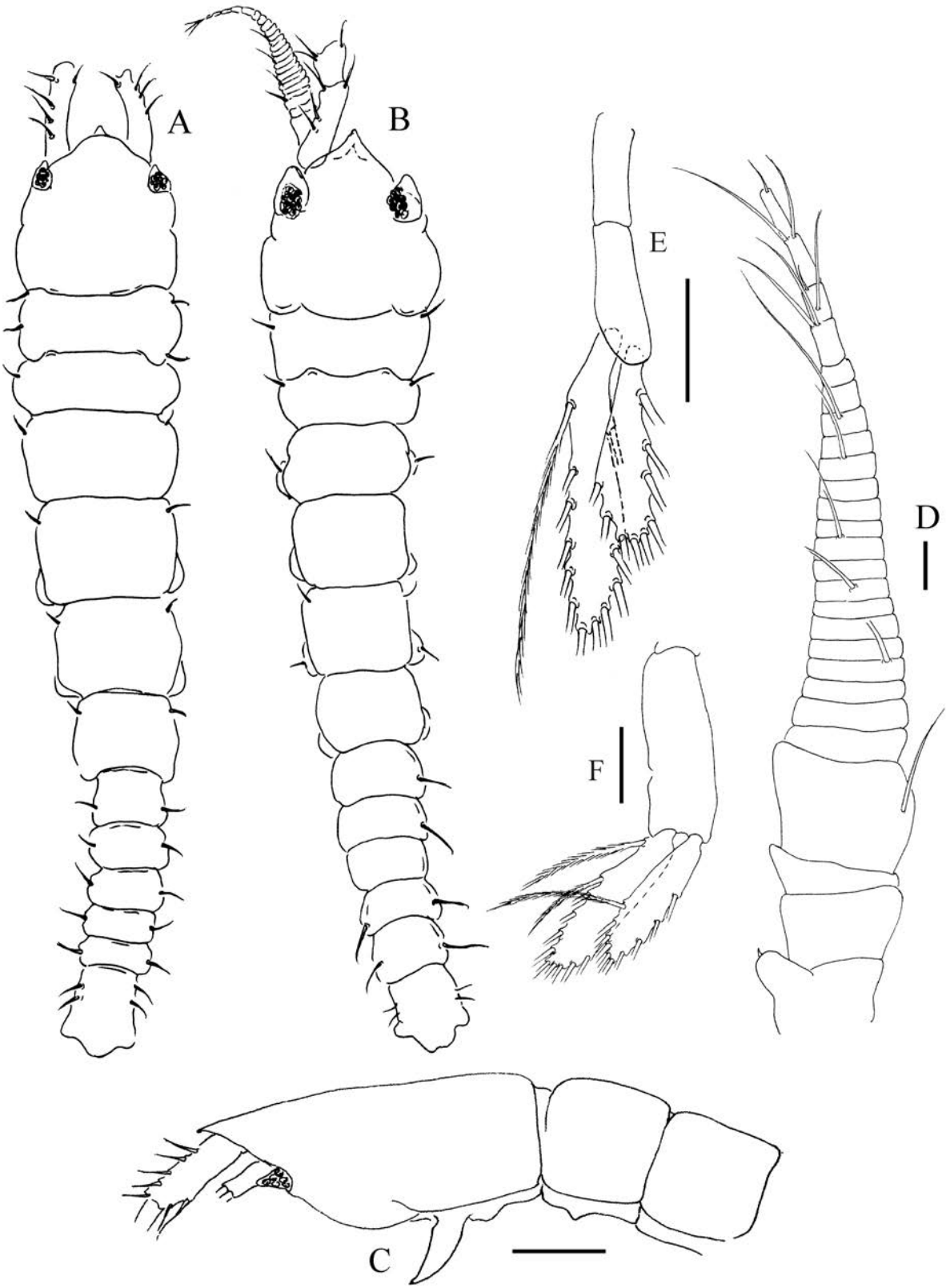

Fig. 27. *Pakistanapseudes lucifer* sp. nov. A, holotype ovigerous female, dorsal. B, male, dorsal; C, cephalothorax of female, lateral; D, male antennule; E, male pleopod; F, female pleopod. Scale = 0.1 mm.

Fig. 28. *Pakistanapseudes lucifer* sp. nov., female paratype. A, antennule; B, antenna; C, left mandible; D, right mandible; E, mandibular molar; E', mandibular palp; F, maxillule;.; F', maxillule palp; G, maxilla; H, labium; I, maxilliped; J, maxilliped endite. Scale A, B = 0.1 mm; C – I = 0.01 mm.

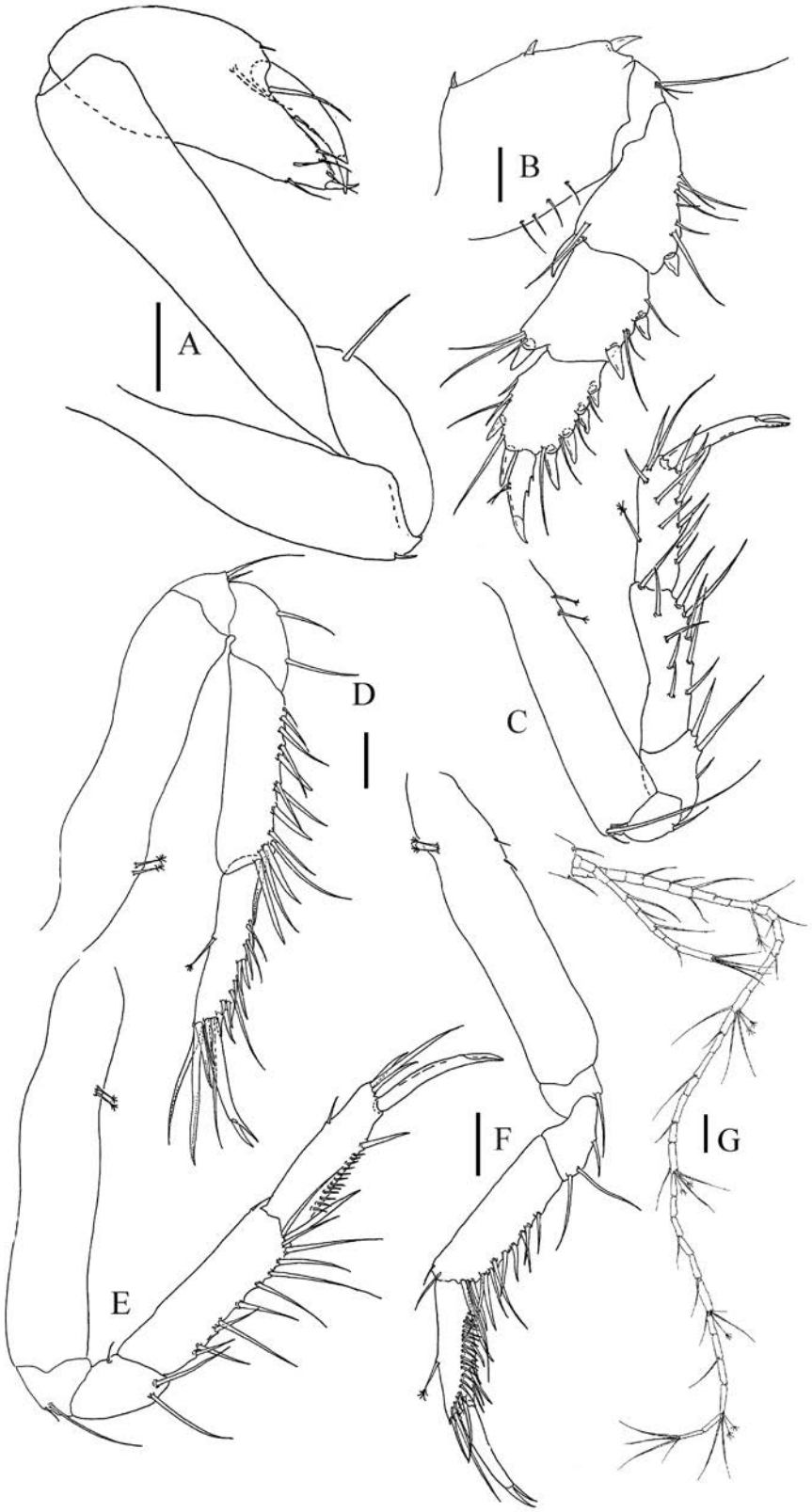

Fig. 29. *Pakistanapseudes lucifer* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, uropod. Scale = 0.1 mm.

indented at anterior of branchial chambers; eyelobes distinct, dark ocelli present. Conspicuous forward-pointing spine-like hyposphenium mid-ventrally between chelipeds (Fig. 27C). Each pereonite laterally convex, with anterolateral seta (posterolateral seta on pereonite 1); pereonites 1 and 2 subequal, shortest, about 0.35 times as long as cephalothorax; pereonite 3 one-and-a-half times length of pereonite 1; pereonite 4 longest, nearly twice as long as pereonite 1, pereonite 5 just shorter than pereonite 4, pereonite 6 just shorter than pereonite 3 and narrowest (all pereonites respectively 2.7, 2.7, 1.8, 1.3, 1.3 and 1.3 times as wide as long). Pleon three times as long as pereonite 5, with five free pleonites bearing pleopods; pleonites with single midlateral seta on each side; pleonite 1- 0.8 times as long as wide, posterior pleonites progressively shorter. Pleotelson rectangular, wider posteriorly, 0.3 times length of pleon, 1.4 times as long as wide, with paired lateral setae.

Antennule (Fig. 28A) proximal peduncle article 2.7 times as long as wide, with inner and outer subdistal tufts of setae and midlateral outer group of three penicillate setae and single simple seta. Article 2 about 1.4 times as long as wide, 0.34 times length of first, with inner and outer distal setae exceeding distal edge of third article, single outer distal penicillate seta. Article 3 just under half-length of article 2, as long as wide. Peduncle article 4 half-length of article 3, wider than long. Main flagellum sparsely setose, of twelve segments, three aesthetascs present on segment 4, four on segment 6, one on each of segments 8 and 10; accessory flagellum of five segments.

Antenna (Fig. 28B) with naked proximal peduncle article (not figured) expanded on inner margin. Article 2 longer than first, with two simple setae adjacent to elongate squama bearing seven inner marginal and distal setae. Peduncle article 3 shorter than wide with inner seta. Article 4 half as long as second with inner penicillate setae; article 5 twice as long as article 4. Flagellum of six segments, first and second segments with setae longer than three flagellar segments.

Labrum rounded, simple, naked; epistome not obvious. Right mandible (Fig. 28D) with five cusps on pars incisiva; setiferous lobe with three trifurcate, two bifurcate and one simple setae, pars molaris (Fig. 28E) stout, blunt with distal rugosity and denticulate margin; palp (Fig. 28E') of three articles, proximal article with one distal seta, second article twice as long as first and naked, third article just longer than second and with two longer stout distal setae and one shorter subdistal seta. Left mandible (Fig. 28C) as right but with dentate lacinia mobilis; outer margin finely denticulate. Labium with outer serrations, distally finely setose, palp (Fig. 28H) with inner and outer fine lateral setules and two longer and two shorter distal spines, and conspicuous rounded inner apophysis. Maxillule (Fig. 28F) inner endite with outer apophysis and finely-setose distal margin, and five plumose distal setae; outer endite with ten distal spines and three distally denticulate subdistal setae, outer margin finely setose; palp of two articles, distally with three setae graduated in length. Maxilla (Fig. 28G) typical of genus, outer margin finely setose; moveable endite outer lobe with two subdistal and five distal finely denticulate setae, inner lobe with six plumose/denticulate setae; fixed endite outer lobe with simple, trifurcate and bilaterally denticulate distal spines, inner lobe with five longer plumose setae and rostral row of 24 setae. Maxilliped (Fig. 28I) with simple setae; first palp article with short outer seta and long inner distal seta; second palp article with inner margin bearing proximal serrations and numerous setae largely in two rows, longest inner seta not reaching distal margin of article, single outer distal setae; third palp article with nine recurved inner setae; fourth palp article with eleven setae around distal margin. Endite (Fig. 28J) distal margin with outer simple setae and inner blunt compound spines, two coupling hooks. Epignath not recovered.

Cheliped (Fig. 29A) slender. Basis four times as long as wide, ventrally without spine but with single ventrodistal seta. Exopodite damaged. Merus with single ventrodistal seta. Carpus slender, four times as long as wide, naked. Chela not slender, palm (propodus) 1.6 times as long as wide with single inner and outer distal setae at base of dactylus and small dorsodistal seta; ventral margin of fixed finger with two setae; cutting edge of fixed finger without apophyses but with three setae. Dactylus shorter than palm, naked, with no apophyses on cutting edge.

Pereopod 1 (Fig. 29B) generally bearing simple (not tapering) longer setae. Basis stout, 1.4 times as long as wide, with small ventroproximal and mid-ventral spine and larger ventrodistal spine, dorsal margin with four simple, fine setae. Exopodite damaged. Ischium with two shorter and one longer ventrodistal setae. Merus more than half length of basis, wider distally, with single dorsodistal seta and curved dorsodistal spine, row of mid-ventral setae, stout ventrodistal spine without adjacent setae. Carpus compact, as long as merus, 1.2 times as long as wide, with two short ventral and one longer dorsodistal blunt spines, sparse ventral and dorsodistal setae as figured. Propodus shorter than carpus, with four ventral blunt spines increasing in length towards distal margin interspersed with single, simple setae, two dorsodistal slender blunt spines and few setae along dorsal margin. Dactylus stout, with two ventral denticulations and two dorsal setae. Unguis distinct, pointed.

Pereopods 2 (Fig. 29C) and 3 similar to each other. Basis four times as long as wide, with two dorsoproximal penicillate setae and two shorter and one elongate ventrodistal setae, longest seta exceeding tip of merus. Ischium as long as wide with one ventrodistal seta; merus short, 0.2 times as long as basis, much shorter than carpus, with three ventral setae, dorsal margin naked. Carpus elongate, three times as long as merus, with inner and ventral rows of setae, single dorsodistal seta. Propodus 0.8 times as long as carpus, with row of elongate, simple ventral setae, paired mesial setae, dorsoproximal penicillate seta and three dorsodistal setae. Dactylus slender, as long as propodus, with subdistal unguis forming bifurcate tip.

Pereopod 4 (Fig. 29D) slender, similar to pereopod 2, basis 4.7 times as long as wide, without ventrodistal setae. Carpus 3.2 times as long as merus. Propodus with dorsodistal group of one short spine, and one longer slender spine and two setae all as long as dactylus; dactylus elongate, 0.8 times as long as propodus, bifurcate as pereopod 2. Pereopod 5 (Fig. 29E) similar to pereopod 4 but propodus with ventral row of fine spinules and three dorsodistal setae; dactylus with subdistal unguis forming bifurcate tip. Pereopod 6 (Fig. 29F) similar to pereopod 5 but

propodus ventral and distal margin with row of some 19 small leaf-like spinules, dorsodistal group of four spines and single seta. Dactylus with subdistal unguis forming bifurcate tip.

Pleopods (Fig. 27F) all alike. Basis naked; rami linguiform. Endopod longer than exopod, respectively with 12 and 10 marginal plumose setae.

Uropod (Fig. 29G) biramous, basis with single inner and outer distal setae; exopod of nine segments; endopod over four times as long as exopod, 0.6 times as long as body length, of about 35 segments.

Description of male. similar to female (figured male 3.7 mm long, Fig. 27B), cephalothorax proportionately slightly larger, rostrum more pronounced. Antennule and antenna (Fig. 27D) with multisegmented flagella bearing dense aesthetascs; squama of antenna fused to second peduncle article, with small distal spinule, fourth peduncle article short, fifth article with two simple distal setae. Cheliped not recovered. Pleopods with more elongate basis, with articulation (Fig. 27E).

Etymology. named after the Devil, owing to its having bifurcated claws ("cloven hooves") on all pereopods other than pereopod 1.

Remarks. bifurcation of the pereopod claws (used in this context to mean the combination of dactylus and unguis, whether fused or not) in *Pakistanapseudes* is a variable feature, ranging from no bifurcation (e.g. *P. leptochelatus, P. bassi*), to a bifurcation resulting from the subdistal attachment of the unguis on the dactylus on pereopods 2 and 3, as, for example, in *P. goofi* Bamber & Sheader, 2003, and finally to a subdistal fusion of the unguis to the dactylus on pereopods 2 and 3 as, for example, in *P. tenuicorporeus* (Shiino, 1963); apart from the present species, the only other species of the Pakistanapseudinae to have bifurcating claws (with an unfused dactylus) on pereopods 5 and 6 as well as 2 and 3 is *Swireapseudes birdi* Guţu & Iliffe, 2008, but in that species the claw of pereopod 4 is not bifurcate, whereas the claw of pereopod 4 in *P. lucifer* sp. nov. is bifurcate, identical to those of the other pereopods.

Other distinctions of *P. lucifer* include the complete absence of setae on the basis of the pleopod: many other species lack outer (ventral) setae, but all appear to have inner (dorsal) setae, although the setation of the basis in *P. leptochelatus* is unclear. In addition, the basis of pereopod 1 is surprisingly short compared with other species, and all other species show some modification of the dactylus and unguis of pereopod 4 (where known), normally a marked reduction in size compared with the other pereopods (although it is larger in *P. perulpa* Błażewicz-Paszkowycz & Bamber, 2007 and *P. ridculli* Bamber, 2005): in the present species, it shows no difference.

In the very sparse setation of the mandibular palp, only *P. brasiliensis* Guţu 1996, from Brazil, approaches *P. lucifer*, but that species has a naked proximal article and eight distal/subdistal setae on the distal article. The sparsity of setation on the cheliped and pereopods is more extreme than any other pakistanapseudid, while the presence of a ventral row of fine spinules on the propodus of pereopod 5 is unique in this group, and the presence of three subdistal setae on the outer endite of the maxillule is unknown in the Apseudomorpha, as far as we are aware, all other species having two when they are present.

With regard to the identification key to Australian *Pakistanapseudes* species given by Błażewicz-Paszkowycz & Bamber (2007), the only other Australian species with a pointed rostrum is *P. australianus* Guţu, 2006, from Queensland, but that species has two setae on the pleopod basis, far more segments in the antennular and antennal flagella, and is without bifurcated claws on pereopods 2, 4, 5 and 6 (pereopod 3 has not been described).

Pakistanapseudes lucifer occurred throughout the Bass Strait, at depths from 13 to 130 m on sandy substrata.

Pakistanapseudes perulpa Błażewicz-Paszkowycz & Bamber, 2007

P. perulpa Błażewicz-Paszkowycz & Bamber, 2007a, 3–8, figs 1–3.

Material examined. 1 ♀ with oostegites, 1 subadult (J30441), La Trobe Valley Ocean Outfall Survey Stn MSL LV 4 T5, Eastern Bass Strait, 1 km off Delray Beach, Victoria, 38°14'S 147°22'E, 15–16 m depth, 24 October 1989; 2 ♀♀ (1 with oostegites) (J30444), La Trobe Valley Ocean Outfall Survey Stn MSL LV 6 T8, Eastern Bass Strait, 1 km off Delray Beach, Victoria, 38°14'S 147°22'E, 15–16 m depth, 29 August 1990; 4 ♀♀ (2 with oostegites) (J30405), La Trobe Valley Ocean Outfall Survey Stn MSL LV 6 S1, Eastern Bass Strait, 1 km off The Honeysuckles, Victoria, 38°22'S 147°12'E, 15–16 m depth, 28 August 1990; 6 ♀♀ (5 with oostegites) (J30409), La Trobe Valley Ocean Outfall Survey Stn MSL LV 6 S4, Eastern Bass Strait, 1 km off The Honeysuckles, Victoria, 38°22'S 147°12'E, 15–16 m depth, 28 August 1990, SCUBA Airlift, coll. EPA & Marine Science Laboratory.

Remarks: this species was described originally from Moreton Bay, Queensland, from clean sandy substrata at depths between 7 and 28 m. The present material is within this depth range, but extends the distribution much further south. It has a rounded rostrum, setae on both margins of the pleopod basis, an overlong dactylus to pereopod 4, and is without bifurcating claws.

Pakistanapseudes taylorae sp. nov.

Figures 30–32

Material examined. 1 ♀ with oostegites (J57588), holotype, Stn BSS76, Western Bass Strait, 39°19'S 143°38'E, 95 m depth, 10 October 1980, coarse sand, carbonate, coll. G C B Poore; 1 juvenile without appendages (J57596), paratype, Stn BSS112, Central Bass Strait, 40°22.2'S 145°17'E, 40 m depth, 3 November 1980, mainly sand, coll. M.F. Gomon and G C B Poore; 3 ♂♂, 3 ♀♀ (J55840), paratypes, Stn BSS180, Central Bass Strait, 39°12.9'S 146°27.3'E, 65 m depth, 18 November 1981, medium sand, coll. R.S. Wilson; 1 brooding ♀ (J55865), paratype, Stn CPBS 32N, Western Port, 38°20.83'S 145°13.49'E, 13 m depth, 21 February 1969, sandy gravel. 1 ♀ (not registered), Stn BSS209, Eastern Bass Strait, 38°18.0'S 147°37.0'E, 55 m depth, 31 July 1983, muddy with fine shell, coll. M. Gomon & R.S. Wilson.

Description of female. Body (Fig. 30A), dorsoventrally flattened, elongate, holotype 4 mm long (tip of rostrum to posterior of pleotelson), 6.5 times as long as wide, tapering towards posterior. Cephalothorax subrectangular, just wider than long, with pronounced apparently rounded rostrum but with small distal point (Fig. 31C), single lateral setae in front of branchial chamber on each side; eyelobes distinct, dark ocelli present. Forward or backward pointing hyposphenium mid-ventrally between chelipeds. Pereonite 1 naked, pereonites 2

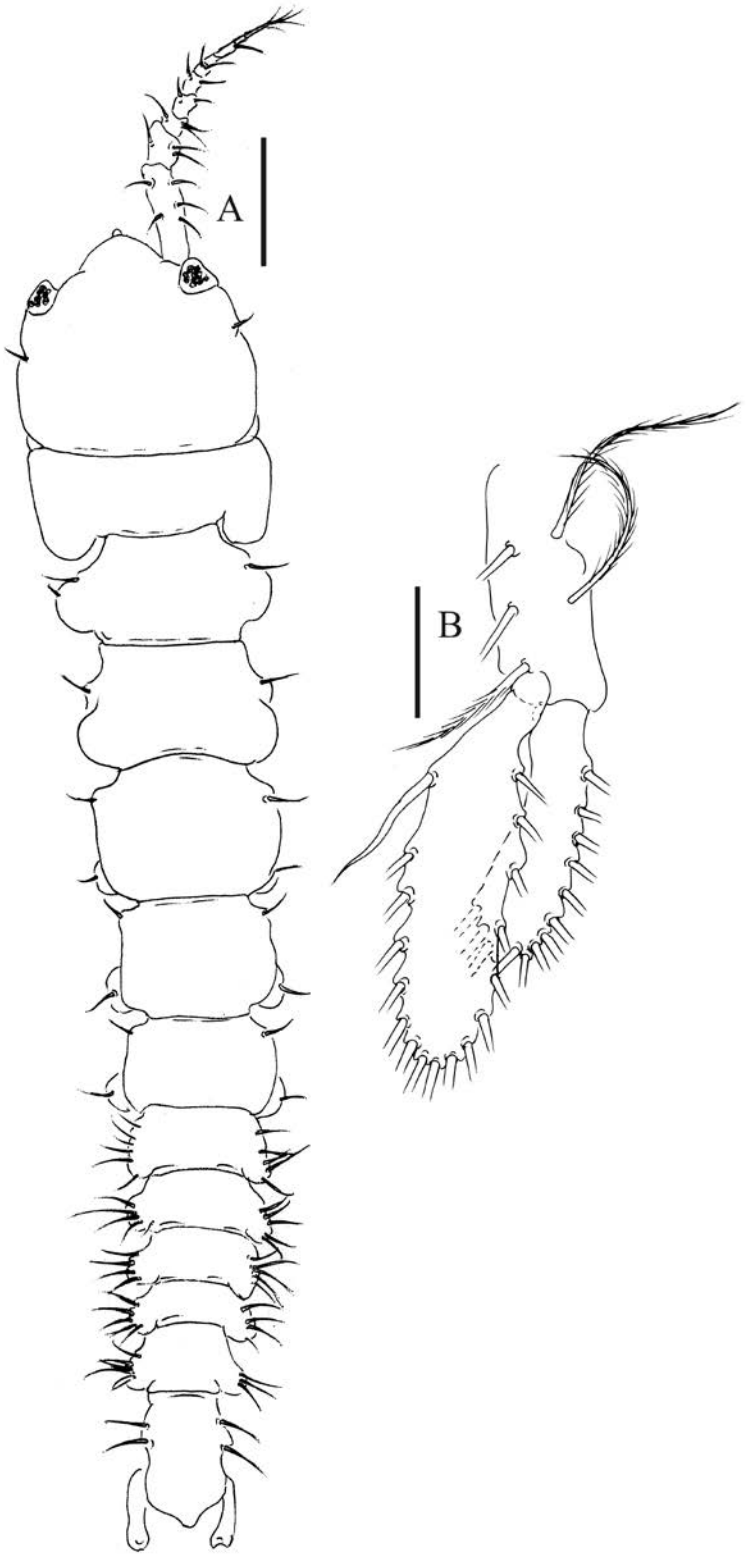

Fig. 30. *Pakistanapseudes taylorae* sp. nov., holotype female. A, dorsal view; B, pleopod. Scale = 0.1 mm.

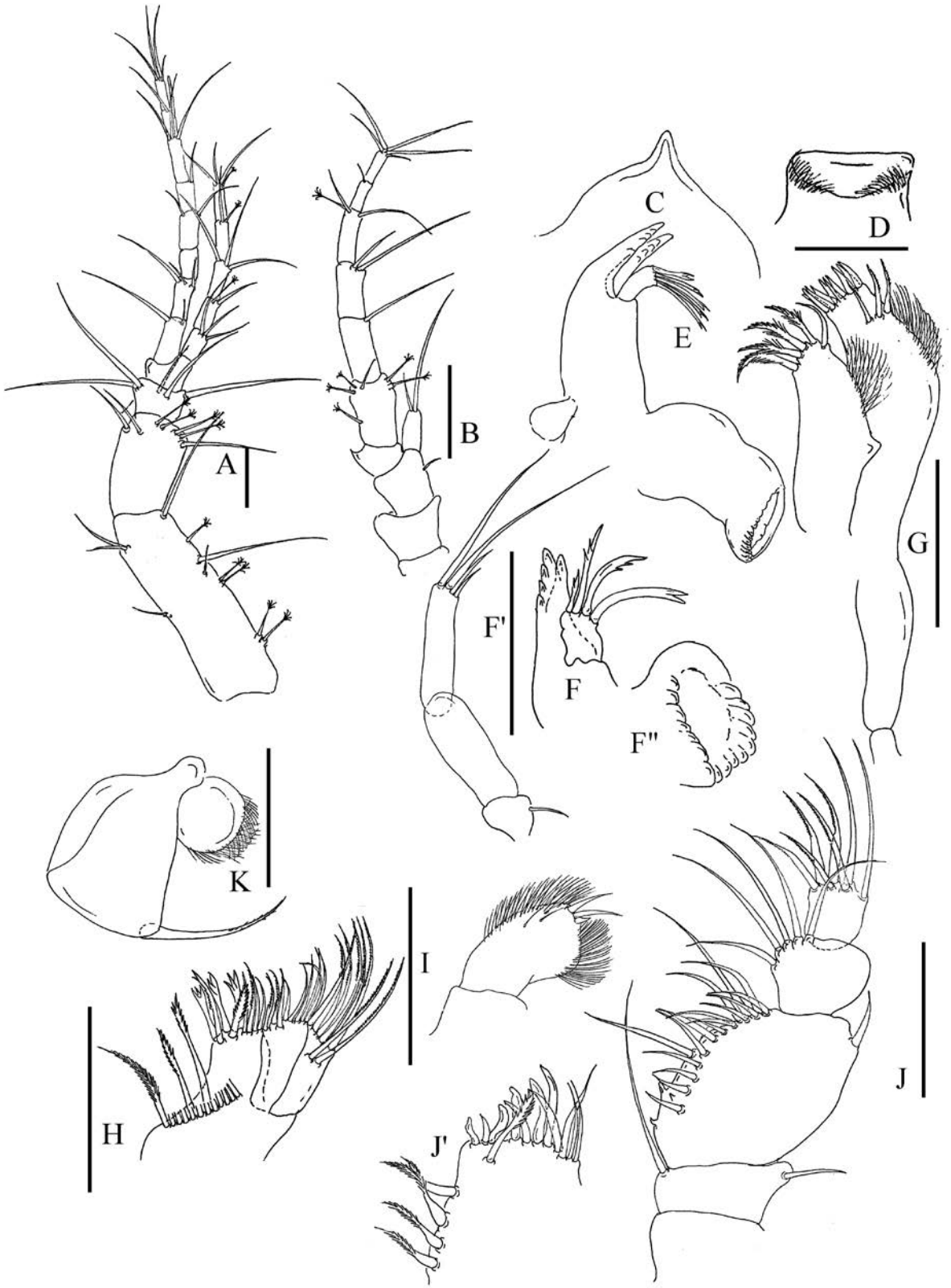

Fig. 31. *Pakistanapseudes taylorae* sp. nov., female paratype. A, antennule; B, antenna; C, rostrum; D, labrum; E, left mandible; F, right mandible; F' mandible palp; G, maxillule; H, maxilla; I, labium; J, maxilliped; J', maxilliped endite; K, epignath. Scale A, B, D = 0.1 mm; C, E-K= 0.01 mm.

Fig. 32. *Pakistanapseudes taylorae* sp. nov. A, antennule, male; B, cheliped (fragment), female; C-H, pereopods 1–6 respectively, female. Scale = 0.1 mm.

and 3 with anterolateral seta, pereonites 4 to 6 with anterolateral seta and posterolateral seta; pereonite 1 shortest, about 0.4 times as long as cephalothorax, pereonites 2 and 3 subequal, half length of cephalothorax; pereonite 4 longest, 1.3 times as long as pereonite 1, pereonite 5 just shorter than pereonite 4, pereonite 6 just longer than pereonite 1 (all pereonites respectively 2.6, 1.8, 1.7, 1.1, 1.2 and 1.7 times as wide as long); pereonites 1 and 2 with or without hyposphenia. Pleon three times as long as pereonite 4, with five free pleonites bearing pleopods; pleonite 1- 0.4 times as long as wide, posterior pleonites progressively shorter, each with four or five lateral setae. Pleotelson rectangular, one-third length of pleon, twice as long as wide, with paired lateral setae.

Antennule (Fig. 31A) proximal peduncle article 3.2 times as long as wide, outer margin with few shorter simple setae, inner margin with numerous penicillate setae and more sparse longer simple setae, longest seta reaching distal edge of second peduncle article. Second article 1.5 times as long as wide, half length of first, with distal crown of simple and penicillate setae. Article 3 about 0.2 times length of article 2, half as long as wide, with long distal setae all round. Peduncle article 4 as long as article 3, wider than long. Main flagellum regularly setose, of eight segments, single aesthetascs present on segments 6 and 8; accessory flagellum of five segments.

Antenna (Fig. 31B) with naked proximal peduncle article expanded on inner margin. Article 2 just longer than first, with one simple seta adjacent to elongate squama bearing two distal setae. Peduncle article 3 shorter than wide with inner spine-like apophysis. Article 4 one-and-a-half times as long as second with crown of penicillate setae; article 5 just longer than article 4, with single distal seta. Flagellum of four segments.

Labrum (Fig. 31D) truncate, simple, marginally setose. Pointed epistome obvious. Right mandible (Fig. 31F) with five rounded "teeth" on pars incisiva; setiferous lobe with one bifurcate and three trifurcate setae, pars molaris (Fig. 31F") stout, blunt with crenulate distal margin; palp (Fig. 31F') of three articles, proximal article with one inner seta; second article nearly three times as long as first, naked; third article as long as second, with two longer and two shorter simple distal setae. Left mandible (Fig. 31E) as right but with dentate lacinia mobilis and five setae on setiferous lobe. Labium (Fig. 31I) without serrations, not setose, palp with inner and outer fine lateral setules and two longer and one minute simple distal setae, and widely rounded inner apophysis. Maxillule (Fig. 31G) inner endite with outer finely-setose margin distal of apophysis, and four plumose and one simple distal setae; outer endite with ten distal spines and three subdistal setae, outer margin finely setose; palp of two articles. Maxilla (Fig. 31H) typical of genus, outer margin naked, outer lobe of moveable endite with two subdistal and seven distal finely denticulate setae, inner lobe with nine plumose/denticulate setae; fixed endite outer lobe with simple, trifurcate, plumose and bilaterally denticulate distal spines, inner lobe with two longer plumose setae and rostral row of 13 setae. Maxilliped (Fig. 31J) mostly with simple setae; first palp article with short outer distal seta and longer inner distal seta almost reaching tip of article 2; second palp article with outer distal spine, inner margin bearing 16 setae largely in two rows, longest inner seta reaching fourth article, inner proximal margin with about three thorn-like apophyses; third palp article with five recurved inner setae; fourth palp article with seven setae around distal margin, inner five with finely denticulate inner margins. Endite (Fig. 31J') distal margin with outer simple setae and gradation of inner blunt spines, caudal seta leaf-like. Epignath (Fig. 31K) large, cup-shaped, with large, setose proximal lobe and distally setulose distal spine.

Cheliped (Fig. 32B) only one available on one specimen, damaged; basis slender, 2.6 times as long as wide, ventrally with small proximal and longer distal setae, without spine. Exopodite damaged. Merus with three ventrodistal setae. Carpus slender, 3.3 times as long as wide, with one mid-ventral and two ventrodistal setae. Chela badly damaged, fixed finger with 3 ventral setae, and tuft of distal curled setae, and row of spatulate setae on cutting edge.

Pereopod 1 (Fig. 32C) basis three times as long as wide, with small ventroproximal and mid-ventral spine and seta between these two, longer, pointed ventrodistal spine with adjacent seta exceeding distal margin of ischium, dorsal margin with two proximal simple setae and two mid-dorsal penicillate setae. Exopodite damaged. Ischium with three ventrodistal setae. Merus half as long as basis, wider distally, with slender dorsodistal spine and long dorsodistal seta as long as carpus, row of five ventral setae and ventrodistal spine. Carpus just shorter than merus, with three ventral spines interspersed with three setae, and one elongate dorsodistal spine with adjacent row of four setae. Propodus with five ventral spines increasing in length towards distal margin interspersed with single simple setae, two dorsodistal slender blunt spines and row of setae along dorsal margin. Dactylus stout, with three ventral denticulations, two small mid-dorsal setae. Unguis distinct, pointed.

Pereopod 2 (Fig. 32D) basis 2.7 times as long as wide, with single mid-ventral spine and three elongate ventrodistal setae. Ischium as long as wide with row of three ventrodistal setae; merus shorter than carpus, with single long, slender dorsodistal and ventrodistal spines. Ventral margin with row of six setae, one ventrodistal seta. Carpus 1.5 times as long as merus, with row of three slender spines interspersed with single setae along ventral margin, and diagonal row across inner face of two spines and six setae, one longer, slender dorsodistal spine; propodus just longer than carpus, ventrodistal margin with four slender spines interspersed with single simple setae, dorsally with three slender spines and five setae in distal half. Dactylus slender, together with distinct unguis 0.8 times as long as propodus, not bifurcate. All spines with fine denticulation in distal half.

Pereopod 3 (Fig. 32E) similar to pereopod 2, but basis more slender, merus with only one ventral spine and without dorsal spine, carpus and propodus with fewer spines and setae, dactylus 1.24 times as long as propodus, very small unguis subdistal, giving bifurcation.

Pereopod 4 (Fig. 32F) basis 4.3 times as long as wide, with ventrodistal and dorsoproximal penicillate setae and single, long ventrodistal simple seta exceeding tip of merus. Ischium with single ventrodistal seta. Merus with three ventral setae. Carpus 1.5 times as long as merus, ventrally with four slender,

blunt, finely denticulate spines interspersed with nine setae. Propodus with distal crown of ten setae, single dorsal penicillate seta in proximal half; dactylus elongate, sinuous, pointed, 1.6 times as long as propodus.

Pereopod 5 (Fig. 32B) similar to pereopod 4 but basis without ventrodistal seta, ventral setae on ischium and merus shorter, unguis attached subdistally, shorter than extension of dactylus, giving bifurcation.

Pereopod 6 (Fig. 32H) basis naked, ischium with two ventrodistal setae and single smaller dorsodistal seta. Carpus with eight setae and five denticulate spines ventrally. Propodus ventral and distal margin with row of some 26 small leaf-like spines, ventrally with slender subdistal spine, dorsodistal group of two setae. Dactylus as long as propodus, unguis attached subdistally, shorter than extension of dactylus, giving bifurcation.

Pleopods (Fig. 30B) all alike. Basis with two outer plumose setae and three inner plumose setae; rami linguiform. Endopod longer than exopod, respectively with 17 and 13 marginal plumose setae.

Uropods missing on all specimens.

Description of male. Generally similar to female, available specimens missing most appendages (cheliped unknown); antennule missing, antenna (Fig. 32A) with multisegmented flagellum with array of aesthetascs over whole surface; squama with three distal setae.

Etymology. named after Dr Joanne Taylor, Collection Manager at Museum Victoria, in gratitude for all her diligent efforts and her tolerance of our interference with her collections.

Remarks. Pakistanapseudes taylorae sp. nov. is the seventh species of this genus recorded from Australian waters (see Błażewicz-Paszkowycz & Bamber, 2007, and above). The only other species to have a pointed rostrum and bifurcate claws is *P. lucifer* (described above); the present species is distinguished from *P. lucifer* by having basal setae on the pleopod, a very short third peduncle article on the antennule, a non-bifurcate claw on pereopods 2 and 4, far more and longer setae and spines on the cheliped and pereopods, fewer segments in the flagellum of the antenna and the main flagellum of the antennule, fewer setae on the distal maxilliped palp article, and the thorn-like apophyses on the second palp article, *inter alia*. Interestingly, both of these species have the unusual attribute of three subdistal setae on the outer endite of the maxillule.

Elsewhere, the only other species of the Pakistanapseudinae with a pointed (if only slightly) rostrum, eyes, and bifurcate pereopod claws is *Swireapseudes birdi* from the Bahamas, but that species has far more segments in the antennular and antennal flagella, far fewer spines on its much more slender pereopod 1, a proportionately longer third peduncle article on the antennule, and distinct setation of its mouthparts.

P. taylorae is particularly unusual in the Pakistanapseudinae in the reduced setation of the antennal squama: only the deep-sea species *Leptolicoa thokozele* (Bamber & Sheader, 2003), very distinct from the present species in a number of features, has as few as two squama setae.

P. taylorae was collected sparsely throughout Bass Strait, on coarse to medium sands, and in depths between 13 and 95 m.

Pakistanapseudes C sp. nov.

Material examined. 1 damaged female (J58891), Stn MSL EG 49, Eastern Bass Strait, 15.1 km WSW OF Pt Ricardo, 37°51.38'S 148°28.14'E, 34 m depth, 26 September 1990, Smith-McIntyre Grab.

Remarks. The body of this taxon is very elongate, much more so than, and thus quite different from, all the other described Australian species of *Pakistanapseudes*. Unfortunately, the single specimen is in very poor condition, with the only appendages being the cheliped and pereopods 1 and 2, and the pleon in particular is substantially damaged, so it does not warrant a proper description, nor naming, despite its being clearly a distinct and new species.

Subfamily **Parapseudinae** Guţu, 1981 new rank

Genus ***Parapseudes*** Sars, 1882

Parapseudes blandowskii sp. nov.

Figures 33–36

Material examined. 1 brooding ♀, holotype (J24152), Stn CRUST 153, Cappers Camp, west end of Nelson Bay, off rock platform, 38°24'S 141°34'E, 5 m depth, 29 February 1992, coll. B.F. Cohen & R.S. Wilson, SCUBA airlift. 4 ♂♂, 22 ♀♀ (10 brooding, 7 with oostegites), 5 subadults (J57615), 1 ♀ (J57795), 1 ♂ (J58574), paratypes, Stn CPBS 41N, Western Port, 38°20.81'S 145°13.85'E, 13 m depth, 30 March 1965, sandy gravel; 2 ♂♂, 8 ♀♀ (6 brooding) (J57634), paratypes, Stn CPBS 23S, Western Port, 38°21.69'S 145°13.51'E, 11 m depth, 9 March 1965, muddy sand; 1 subadult (J57630), paratype, Stn CPBS 23N, Western Port, 38°20.29'S 145°14.18'E, 10 m depth, 10 March 1965, sandy gravel; 33 specimens (including ♂♂ and brooding ♀♀) (J57622), paratypes, Stn CPBS 33S, Western Port, 38°22.06'S 145°14.10'E, 13 m depth, 5 March 1965, reef with sponges; 3 ♀♀ (2 brooding, 1 with oostegites) (J56359), paratypes, Stn CPBS 41N, Western Port, 38°20.81'S 145°13.85'E, 13 m depth, 30 March 1965, sandy gravel; 1 ♀ (J56199), paratype, Stn CPBS 32N, Western Port, 38°19.71'S 145°13.82'E, 14 m depth, 25 Agust 1966, sand; 2 ♂♂, 4 ♀♀ (1 brooding) (J57627), paratypes, Stn CPBS 33S, Western Port, 38°22.06'S 145°14.10'E, 13 m depth, 5 March 1965, reef with sponges; 32 specimens (including ♂♂ and brooding ♀♀) (J57645), paratypes, Stn CPBS 41N, Western Port, 38°20.81'S 145°13.85'E, 13 m depth, 30 March 1965, sandy gravel, coll. A.J. Gilmour; 4 ♀♀ (3 brooding), 1 subadult (J56363), paratypes, Red Rock Point Island, sublittoral, 23 July 1974; 1 ♂, 1 ♀ (J56361), paratypes, Cruise 81-T-1 Stn BSS 185, Western Bass Strait, 38°48.0'S 143°14.5'E, 47 m depth, 20 November 1981, rocky bottom, coll, R. Wilson; 1 ♂, 1 brooding ♀ (J56291), paratypes, Western Port sublittoral, 25 November 1971, coll J E Verse, H F Seed.

Description of female. Body (Fig. 33) typical of the genus, holotype 4.0 mm long (tip of rostrum to posterior of pleotelson), five times as long as wide, narrower posteriorly. Cephalothorax pentangular, as long as wide including rostrum, anterior margin produced into convex, triangular rostrum with smooth anterior margin; lateral indentation anterior to branchial chambers. Eyes present on rounded eyelobes. All pereonites with lateral margins uniformly convex, appearing as posterolateral rounded apophyses on pereonites 3 to 6 owing to anterior (3 and 4) or posterior (5 and 6) lateral indentations, each with two to four conspicuous simple lateral setae; pereonite 1 shortest, about one-quarter as long as cephalothorax; pereonites 2 to 5 progressively

longer, pereonite 6 as long as pereonite 3 (all pereonites respectively 3.5, 2.8, 1.7, 1.6, 1.5 and 1.7 times as wide as long). Pleon twice as long as pereonite 5, of five free subequal pleonites, the first four only bearing pleopods, and rectangular pleotelson; pleonites more than four times as wide as long, laterally expanded by spiniform apophyses each bearing two or three simple setae distally, pleonite 1 with dorsal row of setae. Pleotelson distally extended and rounded, half as long as whole pleon, 1.3 times as wide as long, bearing lateral and dorsal simple setae.

Antennule (Fig. 34A). Peduncle proximal article compact, widest at mid-length, 2.3 times as long as wide, inner margin with row of four simple setae just distal of mid-length and subdistal seta, outer margin with penicillate setae in proximal third and four simple setae in distal two-thirds; second article one-third as long as article 1, 1.5 times as long as wide, with outer and inner subdistal tufts of three simple setae; third article 0.4 times as long as second and wider than long; fourth article just shorter than third, naked. Main flagellum of 10 segments, segments 6 and 8 each bearing single aesthetasc; accessory flagellum of 4 segments.

Antenna (Fig. 34B). Proximal peduncle article with outer rounded apophysis, naked; article 2 0.8 times as long as article 1, outer margin with one simple marginal seta, linguiform squama with six simple setae around distal margin; peduncle article 3 shorter than wide, one-third as long as article 2, with one distal seta; article 4 as long as article 1, with one distal seta; article 5 one-third as long as article 4, with one distal seta. Flagellum of five segments.

Labrum (Fig. 34C) rounded, distally finely setulose. Left mandible (Fig. 34D) bearing strong, crenulated pars incisiva, lacinia mobilis robust with five strong denticulations, setiferous lobe with three trifurcate and one bifurcate setae, pars molaris robust, blunt, margin with anterodistal row of finely denticulate teeth (as shown for right mandible, Fig. 34E); mandibular palp of three articles, proximal article longer than wide with four setae on inner margin, article 2 twice as long as article 1 with two longer and three shorter setae in distal half, article 3 0.8 times as long as article 2 with eight inner finely denticulate setae in distal two-thirds and six longer subdistal to distal curved simple setae. Right mandible (Fig. 34E) as left but without lacinia mobilis. Maxillule (Fig. 34F) inner endite with five setulate distal setae, inner and outer margins setulose; outer endite with ten distal spines and two subdistal setae, outer margin finely setulose; palp of two articles, distally with four setae. Maxilla (Fig. 34G) with sparse fine setae on outer margin; outer lobe of moveable endite with three simple subdistal setae and seven simple distal setae; inner lobe of moveable endite with five simple and seven setulose distal setae, inner margin with three subdistal simple setae; outer lobe of inner endite distally with four outer simple setae, one distally-bilaterally-setulose spine, two mid-distal simple spines, three stout trifurcate spines, and one inner stout spine distally setulose on outer margin, subdistally with one distally-bilaterally-setulose spine; inner lobe of fixed endite with rostral row of 18 setae guarding six longer finely-denticulate setae, inner margin finely denticulate. Labium (Fig. 34I) with microtrichia along outer margin, palp with fine lateral setules and three simple distal spines. Maxilliped (Fig. 34H) basis

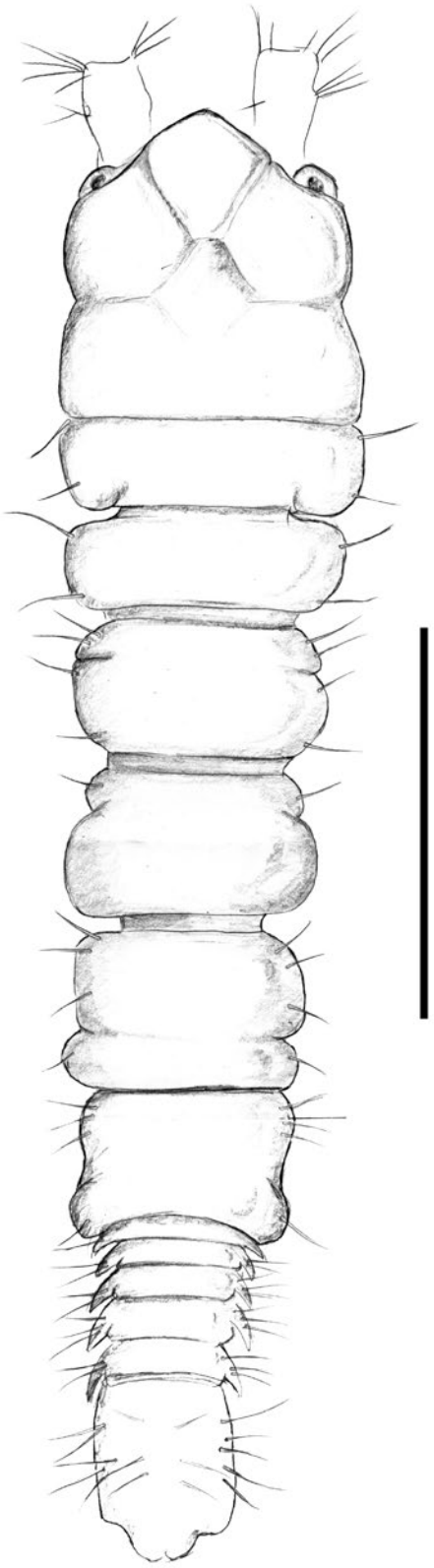

Fig. 33. *Parapseudes blandowskii* sp. nov., holotype female, dorsal view. Scale = 1 mm.

Fig. 34. *Parapseudes blandowskii* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; F', maxillule palp; G, maxilla; H, maxilliped; H', maxilliped endite; I, labium. Scale = 0.1 mm.

Fig. 35. *Parapseudes blandowskii* sp. nov. A, female cheliped; B, male cheliped (exopodite not shown); C, uropod. Scale = 0.1 mm.

naked; palp article 1 with single fine distal spine on outer margin and three fine simple inner proximal setae; palp article 2 longer than wide, with rows of numerous short setae and two longer simple setae along inner margin, outer margin with four distal setae; palp article 3 as long as wide, with 14 simple setae along inner margin, in two rows; palp article 4 with seven distal setae and one subdistal seta. Endite (Fig. 34H') with bilaterally-setulose inner caudodistal seta, distal margin with simple outer setae and inner half bearing slender, distally rugose spines.

Cheliped (Fig. 35A) slender, basis 2.7 times as long as wide, dorsally naked, ventrally with one subdistal and paired distal fine setae; exopodite present, 3-articled, distal article with four plumose setae. Merus lozenge-shaped, with five ventrodistal simple setae. Carpus 2.6 times as long as wide, with two mid-ventral and two ventrodistal setae. Chela palm (propodus) longer than wide, with ventral submarginal group of three setae, dorsal submarginal row of three shorter setae, comb of four longer setae adjacent to dactylus articulation. Chela fingers shorter than palm, ventral margin of fixed finger with five setae; two setae near inner base of fixed finger; cutting edge with fine spinules and row of eight setae but no apophyses, distal claw slender, curved; dactylus with three subdistal setae, row of stout setae along cutting edge, distal claw pointed.

Pereopod 1 (Fig. 36A, B) basis 3.7 times as long as wide, dorsally with two proximal spines and adjacent seta, and one subdistal spine, ventrally with proximal and mid-ventral setae, ventrodistally with small spine and tuft or two shorter and three longer setae; exopodite present, 3-articled, distal article with six plumose setae. Ischium with single dorsodistal and tuft of longer ventrodistal setae. Merus half as long as basis, expanded distally, with entire row of ventral simple setae, submarginal spinules, and ventrodistal spine, dorsally with slender, curved dorsodistal spine and long adjacent simple setae almost as long as carpus.

Fig. 36. *Parapseudes blandowskii* sp. nov. A, pereopod 1; B, pereopod 1 basis details; C, pereopod 2; D, pereopod 3; E, pereopod 4; E', distal articles of pereopod 4; F, pereopod 5; G, pereopod 6. H, pleopod. Scale = 0.1 mm.

Carpus as long as merus, with six or seven ventral spines and intervening simple seta, dorsal margin with numerous simple setae and slender, curved dorsodistal spine. Propodus as long as carpus, with nine ventral spines alternating with simple setae, four ventral submarginal spinules, two distal spinules, simple dorsal setae in proximal half and two dorsodistal spines. Dactylus half as long as propodus, with mid-dorsal fine setae; unguis half length of dactylus.

Pereopod 2 (Fig. 36C) more slender. Basis 3.7 times as long as wide with small dorsal spine in distal half and ventrodistal tuft of setae mostly twice as long as ischium. Ischium with ventrodistal tuft of setae as long as merus. Merus 0.7 times as long as carpus, with curved dorsodistal spine, row of ventral simple marginal setae and straight ventrodistal spine. Carpus with five ventral spines interspersed with setae, groups of inner mesial and dorsodistal simple setae, and one shorter straight subdistal spine and one longer curved dorsodistal spine. Propodus articulating anaxially on merus, just longer than merus, with five ventral and two dorsodistal spines with interspersed setae. Dactylus curved, with fine mid-dorsal seta, unguis slender, together 0.8 times as long as propodus. Pereopod 3 (Fig. 36D) similar to pereopod 2, but basis with dorsal seta rather than spine, merus with two ventrodistal spines, carpus with longer marginal and shorter submarginal ventral spines and three dorsodistal spines, propodus with dorsal penicillate seta.

Pereopod 4 (Fig. 36E) similar to pereopod 3 but basis stouter, twice as long as wide; merus with six ventral and one dorsodistal setae; carpus with numerous ventral and distal setae; propodus with dorsoproximal penicillate seta; dactylus with claw (Fig. 36E') half length of adjacent setae, half length of propodus. Pereopod 5 (Fig. 36F) similar to pereopod 4, but basis with fine dorsoproximal setae; carpus with curved dorsodistal spine, ventral margin densely setose and spinose; dactylus plus unguis 0.8 times as long as propodus. Pereopod 6 (Fig. 36G) similar to pereopod 5 but basis with plumose setae along entire dorsal and ventral margins, two ventrodistal setae plumose; merus with single long dorsal plumose seta; carpus with three dorsal plumose setae in proximal half; propodus with ventrodistal submarginal row of 30 spinules, fine distal compound spinules, dactylus plus unguis 0.8 times as long as propodus.

Pleopods (Fig. 36H) in four pairs all alike. Basis elongate, with four dorsal and three ventral plumose setae. Endopod shorter than exopod without proximal articulation; both rami slender, with 12 to 14 marginal plumose setae.

Uropod (Fig. 35C) biramous; basis with distal crown of about 12 simple and two penicillate setae; exopod 2.75 times as long as basis with seven elongate segments; endopod nearly five times as long as exopod, with about 27 segments.

Distinctions of male. Penial tubercle conspicuous. Flagella of antennule and antenna with numerous aesthetascs.

Cheliped (Fig. 35B) robust and highly dimorphic; basis 2.4 times as long as wide, dorsally with conspicuous paired tooth-like apophyses in proximal half, ventrally with mid-ventral spine and two fine distal setae; exopodite present, 3-articled, distal article with four plumose setae. Merus stout with ventrodistal shoulder bearing five setae. Carpus as long as wide, with paired mid-dorsal setae, dorsal subdistal tooth-like apophysis, ventroproximal hooked apophysis with three adjacent setae, ventrodistal corner finely rugose with row of five setae. Chela palm (propodus) as long as wide with mid-distal triangular apophysis with tuft of numerous setae; fixed finger distally squared with conspicuous proximal invagination, ventral margin with five longer setae and distal comb of seven shorter setae; cutting edge with small apophyses; dactylus with two larger apophyses on cutting edge, distal claw overreaching fixed finger.

Basis of pereopod 1 (Fig. 36B) dorsally with two proximal spines and adjacent seta, and one subdistal spine as female.

Etymology. named after Wilhelm Blandowski (1822–1878), a founder of the Geological Society of Victoria, and the first scientist appointed to the then new Victorian Museum, Melbourne, on 1 April 1854.

Remarks: Lang (1965) synonymized all *Parapseudes* material worldwide into *P. latifrons* (Grube, 1864), with a putative distribution from the Yugoslavian Adriatic (type locality), the Mediterranean, the Atlantic Ocean, the Caribbean, Pacific Central and South America through Hawaii to Japan. His decision was based on observing variation in the number of uropod segments, the number of ventral spines on the distal articles of pereopod 1, and the number of segments in the antennule flagella, all characters on which earlier species had been distinguished. From our present knowledge of sibling species in Tanaidacea, such a synonymy is no longer tenable. Both Guţu (1998a), in his preliminary reassessment of the genus, and Larsen & Shimomura (2008) in their sensible discussion of *Parapseudes*, point out that the many described species require detailed re-examination in order to determine their validity, and indeed to understand the world-wide diversity of this genus.

Guţu (1998a; 1998b; 2001) distinguished four species in the genus based, *inter alia*, on the number of dorsal proximal spines on the basis of pereopod 1. To extend this concept, *P. latifrons sensu* Sars (1882) (Mediterranean), *P. algicola* (Shiino, 1952) (Japan) and *P. francispori* (Bācescu, 1980) (Mediterranean) have one proximal spine, *P. latifrons sensu* Guţu (1998b) (Tanzania) and *P. latifrons sensu* Lang (1965) (Japan) (both non *Rhoëa latifrons* Grube, 1864) have two proximal spines, and *P. inermis* (Silva Brum, 1974) (Brazil) and *P. trispinosus* Guţu, 1998(a) (Indonesia) have three; none of these have a subdistal spine. *P. pedispinis* (Boone, 1923) (California) has one proximal spine and one subdistal spine on the pereopod 1 basis. *P. neglectus* Miller, 1940 (Hawaii), *P. similis* Vanhöffen, 1914 (Cape Verde) and *P. spongicola* Brown, 1958 (South Africa) apparently have no such spines, although the original (and only) descriptions of these three species are somewhat wanting. *P. arenamans* Larsen & Shimomura, 2008 (Japan) definitely has no such spines.

These last authors suggested that the appearance of such spines may be an artefact based on setae embedded in mucus: this is not the case for the present material, nor for that of *P. latifrons* agg. *sensu* Bamber (2005) from S.W. Australia (see below). The spination of the pereopod 1 basis in *P. goodei* Richardson, 1905 (Bermuda) and *P. hirsutus* Stebbing, 1910 (Chagos) is not known.

Parapseudes blandowskii sp. nov. has two proximal spines on the basis preceded by a seta and one subdistal spine dorsally on the basis of pereopod 1. This basis spination most closely resembles that of *P. latifrons* agg. of Bamber (2005), from Esperance, southwest Australia, (based only on females) which has three proximal and one subdistal basis spines, and of *P. pedispinis*, redescribed from California by Menzies (1953), although that species has only one proximal spine and is without the adjacent seta. Further, the male cheliped of *P. pedispinis* (as that of all other described males) is without the dorsal and ventral tooth-like apophyses on the carpus shown by *P. blandowskii*. The Esperance species, currently being redescribed elsewhere, has a distinctly different dactylus on pereopod 4.

From species where the spination of the pereopod 1 basis is unknown, *P. blandowskii* differs in the ventral spination of the merus, carpus and propodus of pereopod 1, in the number of segments in the antennule flagella (notwithstanding the variation inferred by Lang, 1965), in the proportions of the pereonites, the plumose setation of pereopod 6, and particularly in the conformation of the male cheliped carpus, *inter alia*.

Both Larsen & Shimomura (2008) and Guţu (1998a; 1998b) found in their species and in *P. francispori* (see Guţu, 2001) that the dactylus of pereopod 4 was reduced to a small tubercle-like structure with the unguis reduced to a seta, and both speculated that this might be the norm in the genus. The present species shows a normal (although reduced in size) dactylus plus unguis on pereopod 4 (Fig. 36E, detail). A normal dactylus and unguis were also shown by Sars (1886) for what must be taken as *P. latifrons sensu stricto*, and by Shiino (1952) in *P. algicola*, while that of *P. latifrons* agg. from Esperance has a reduced but not tubercle-like dactylus and unguis.

Parapseudes blandowskii is only the second *Parapseudes* species presently known from Australasia, and occurred on sandy substrata at depths of 10 to 15 m in Western Port, occasionally deeper outside that embayment. *P. latifrons* agg. of Bamber (2005) was found on sandy substrata with rhodoliths and on the red alga *Osmundaria prolifera* at depths from 18 to 40 m in Esperance Bay, southwest Australia.

Guţu (1998a) gave a revised diagnosis for the genus, but failed to include therein two significant characterizing features, viz the dorsal row of setae on pleonite 1 and the presence of only four pairs of pleopods. This last characteristic is particularly diagnostic for *Parapseudes*.

Genus ***Saltipedis*** Guţu, 1995

Saltipedis nugoris Błażewicz-Paszkowycz & Bamber, 2007

Figure 37

S. nugoris Błażewicz-Paszkowycz & Bamber, 2007a, 26–31, figs 13–15.

Magniaculeus nugoris Guţu, 2008, p. 58.

Description of male cheliped (Fig. 37). Much more robust than that of female. Basis stout, twice as long as wide, with dorsoproximal two-humped apophysis and dorsodistal expansion into which proximal part of merus fits; with mid-ventral spine and ventrodistal seta. Exopodite with three articles, distal article with six marginal plumose setae. Merus almost rectangular, with mid-ventral seta and tuft of eight simple distal setae. Carpus stout, 1.5 times as long as wide, with paired small dorsodistal setae, ventrally with three submarginal and two marginal setae. Chela stout, propodus with tufts of setae dorsodistally and on mid-distal apophysis, fixed finger with array of distal setae as figured, conspicuous tooth-like apophysis on cutting edge; dactylus cutting edge with fine crenulation and setules distally, tooth-like apophysis proximally.

Remarks. This species was described originally from numerous specimens collected throughout the Bass Strait, on muddy- to coarse sandy substrata from depths between 12 and 293 m. Numerous further samples of this species exist in the collections of Museum Victoria, over 100 specimens having been examined in the course of this study in addition to the type-collection, and conforming to the same habitat range as the type collection.

This re-examination of material has enabled us to expand on the original description, to include the dimorphic male cheliped. While this species was originally confused with *Saltipedis forex* Bamber, 2005, until the distinctions from morphological detail were determined, the male cheliped reinforces the differences: that of *S. forex* is without the proximal apophysis on the basis, has a spine rather than a seta mid-ventrally on the basis (as does the female), no mid-ventral seta on the merus, and a truncated fixed finger to the chela (thus without tooth-like apophysis), more reminiscent of the male chela of the unrelated apseudid *Mendamanus ailurostoma* Bamber, 1999.

Saltipedis floccus sp. nov.

Figures 38–40

Material examined. 1 brooding ♀ (J55832), holotype, Stn BSS159, Central Bass Strait, 39º43.5'S 146º18.8'E, 80 m depth, 13 November 1981, muddy shell, coll. R. Wilson; 1 ♀ (J57600), paratype, Stn BSS155, Central Bass Strait, 38º55.5'S 145º17.0'E, 70 m depth, 12 November 1981, fine sand, coll. R. Wilson. 2 ♀♀ (J57731), paratypes, Stn BSS117, Central Bass Strait, 40º38.0'S 145º23'E, 36 m depth, 4 November 1980, muddy shell with grit, coll. M. Gomon & G C B Poore. 1 ♀ (J57721), paratype, Stn BSS68, Western Bass Strait, 39º27'S 142º55'E, 180 m depth, 10 October 1980, coarse sand, carbonate, coll. G C B Poore. 1 ♂, 6 subadults (J57718), paratypes, Stn BSS 133T, Central Bass Strait, 30 km N of Wynyard, Tasmania, 40º33.07'S 145º44.68'E to 40º36.22'S 145º48.68'E, 68 m depth, mud, 04 February 1981, coll. M.F. Gomon *et al*., 20 m otter trawl. 3 ♀♀ (J57737), paratypes, Stn BSS 158, Central Bass Strait, 66 km S of Rodondo Island, Victoria, 39º48.36'S 146º18.48'E, 82 m depth, sand with silt and mud, 13 November 1981, coll. R.S. Wilson. 1 ♀ (J57725), paratype, Stn BSS158, Central Bass Strait, 39º49.5'S 146º18.5'E, 82 m depth, 13 November 1981, sand-silt-mud, coll. R. Wilson. 1 ♀ (J57725), paratype, Stn BSS158, Central Bass Strait, 39º49.5'S 146º18.5'E, 82 m depth, 13 November 1981, sand-silt-mud, coll. R. Wilson. 1 ♂ without cephalothorax (J55850), paratype, Stn WBES 1746, Western Port, 38º29.47'S 145º06.17'E, 79 m depth, 25 November 1974, Smith-McIntyre grab, coll. N. Coleman. 1 ♀ (J55864), paratype, Stn HP BES 1747/2, Western Port, Victoria, 38º27.32'S 145º08.35'E, 18 m depth, 25 November 1974, Smith-McIntyre grab, coll. N. Coleman. 1 ♀ (J55900), paratype, Stn CPBS 100, Western Port, 38º21.15'S 145º13.23'E, 4 m depth, 24 March 1965, mud and *Zostera*; 2 ♀♀ (J57663), paratype, Stn CPBS 01S, Western Port, 38º21.73'S 145º13.23'E, 3 m depth, 1 April 1965. 1 ♀ (J17162),1 ♀ (J46538), paratypes, Stn MSL EG6, Eastern Bass Strait, 19 km S of Lakes Entrance, Victoria, 38º04'S 148º00'E, 92 m depth, 12 August 1989, Smith-McIntyre grab, coll. G.D. Parry.

Fig. 37. *Saltipedis nugoris*, male cheliped. Scale = 0.1 mm.

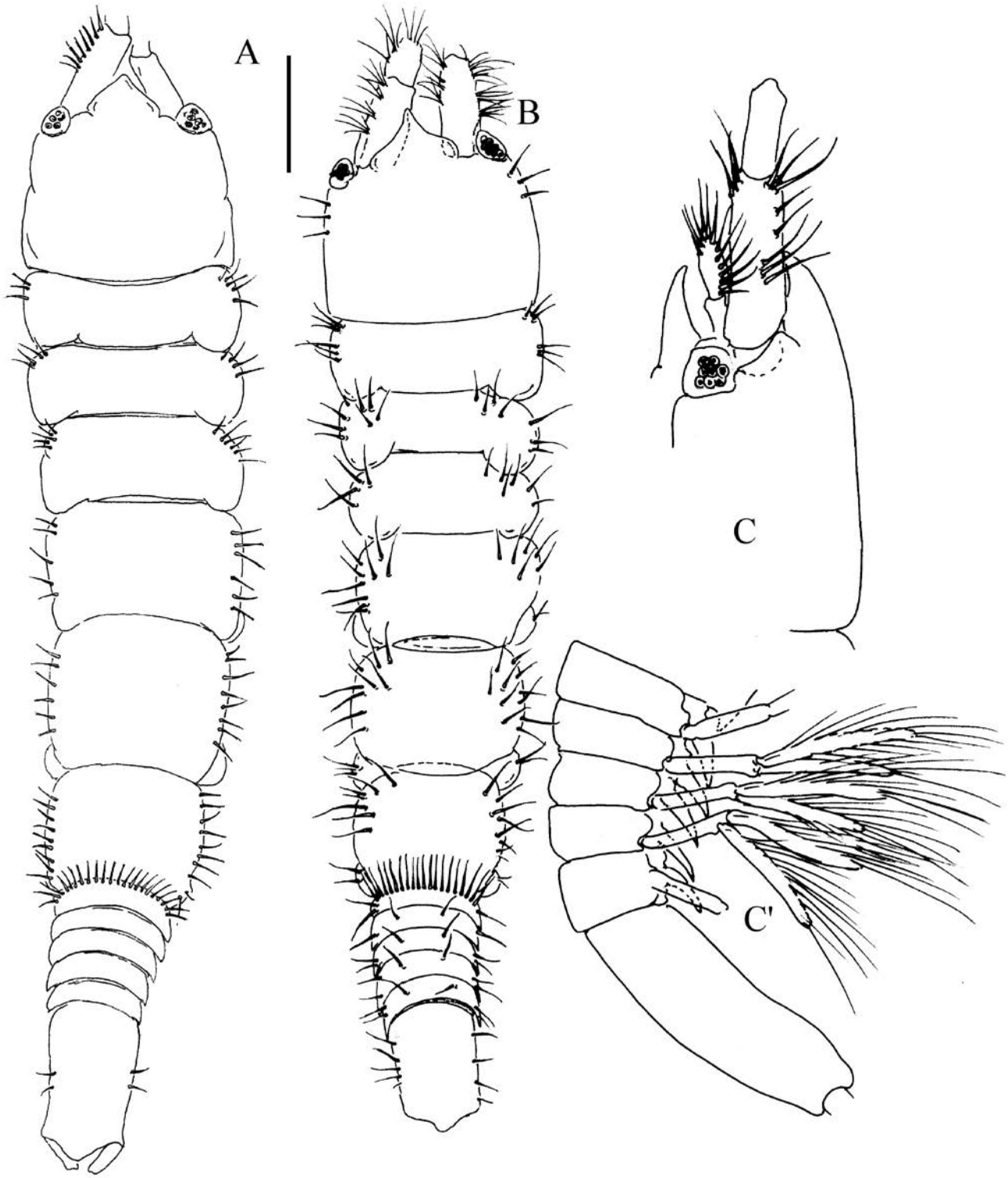

Fig. 38. *Saltipedis floccus* sp. nov. A, holotype female, dorsal; B, male, dorsal; C, cephalothorax, lateral; C', pleon, lateral. Scale = 1.0 mm.

Fig. 39. *Saltipedis floccus* sp. nov., female. A, proximal articles of antennular peduncle; B, antenna; C, right mandible incisor; D, left mandible incisor; D', mandible molar; D", mandible palp; E, maxillule; F, maxilla; G, labium; H, maxilliped; H', maxilliped endite; I, epignath. Scale A, B = 0.1 mm; C–I = 0.01 mm.

Fig. 40. *Saltipedis floccus* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = A-F= 0.1 mm.

Description of female. Body (Fig. 38A) dorsoventrally flattened, holotype 9.2 mm long (tip of rostrum to posterior of pleotelson), five times as long as wide, tapering towards posterior. Cephalothorax subrectangular, as long as wide, with pronounced triangular rostrum; eyelobes distinct, dark ocelli present. Spine-like hyposphenium present mid-ventrally between chelipeds, but no hyposphenium on pereonite 2. Pereonites 1 to 3 with tufts of four to six anterolateral setae, pereonites 4 to 6 with setae dispersed along lateral margins; pereonites 1 and 2 subequal, shortest, about one-third as long as cephalothorax, pereonite 3 1.2 times as long as pereonite 2; pereonites 4 and 6 subequal, 1.7 times length of pereonite 2; pereonite 5 longest, 2.3 times as long as pereonite 2 (all pereonites respectively 3.3, 3.2, 2.6, 1.8, 1.2 and 1.4 times as wide as long). Pleon one-quarter as long as whole body, with five free, pleonites bearing pleopods and backwardly-directed hyposphenia (Fig. 38C'); pleonite 1 with row of setae around anterior margin, posterior pleonites naked; pleonites 4.7 times as wide as long. Pleotelson (Fig. 1B) rectangular, more than half-length of pleon, twice as long as wide, with sparse lateral setae.

Antennule: only basal peduncle articles present on any specimen (Fig. 39A); proximal peduncle article 1.7 times as long as wide, inner margin with row of five setae at mid-length and distal tuft of 7 or 8 setae, outer margin with four groups of setae, a proximal row of penicillate setae, a subproximal tuft of simple and penicillate setae, a subdistal row of simple setae and a distal tuft of six simple setae. Second article 1.5 times as long as wide, 0.5 times length of first, with simple inner distal setae, simple outer proximal setae and an outer distal tuft of simple and penicillate setae.

Antenna (Fig. 39B) with proximal peduncle article expanded on inner margin as a rounded apophysis with three spinules. Article 2 as long as first, with four simple setae adjacent to elongate squama bearing seventeen marginal setae. Peduncle article 3 shorter than wide with inner seta. Fourth article just longer than third, as long as wide, with two inner setae; fifth article twice as long as third, with long inner seta. Flagellum of thirteen segments, mostly with setae longer than two flagellar segments.

Epistome conspicuous (Fig. 38C). Labrum rounded, distally setulose. Right mandible (Fig. 39C) with three rounded "teeth" on pars incisiva; setiferous lobe with four trifurcate and one simple setae; left mandible (Fig. 39D) as right but with dentate lacinia mobilis, and six trifurcate setae on setiferous lobe; pars molaris (Fig. 39D') stout, blunt with distal rugosity; palp (Fig. 39D") of three articles, proximal article with field of twelve inner setae; second article twice as long as first with three shorter and one longer simple inner setae at mid-length; third article as long as first, with eleven shorter inner subdistal setae, two longer distal setae and three shorter submarginal dorsal setae. Labium (Fig. 39G) with outer rows of microtrichia, inner distal margin finely setose, palp with inner fine lateral setules, three simple distal setae, outer proximal microtrichia and small, rounded, setose inner apophysis. Maxillule (Fig. 39E) inner endite with outer apophysis, and four compound distal setae; outer endite with twelve distal spines and two subdistal setae, inner and outer margins finely setose; palp of two articles, distally with six graduated setae. Maxilla (Fig. 39F) typical of genus, outer margin denticulate, moveable endite outer lobe with two subdistal and five distal finely denticulate setae, inner lobe with twelve plumose/denticulate setae; fixed endite outer lobe with simple, trifurcate, plumose and bilaterally denticulate distal spines, inner lobe with nine longer plumose setae and rostral row of 37 setae. Maxilliped (Fig. 39H) with simple setae; basis with inner and outer simple setae and outer distal spine-like apophysis; first palp article with paired inner and outer setae and outer distal spine-like apophysis; second palp article with inner margin bearing numerous setae largely in two rows, longest two inner setae exceeding fourth article, and tuft of nine outer distal setae; third palp article with about 13 recurved inner setae; fourth palp article with seven setae around distal margin and one outer subdistal seta. Endite (Fig. 39H') distal margin with outer simple setae, central rod-pike setae and inner blunt spines, inner margin with plumose setae and four coupling hooks. Epignath (Fig. 39I) large, cup-shaped, with setose outer margin and finely plumose distal spine.

Cheliped (Fig. 40A) slender. Basis 2.7 times as long as wide, with mid-ventral spine and two subdistal penicillate setae; dorsally naked. Exopodite 3-articled; article naked, article 3 with four plumose setae. Merus subrectangular, with ventroproximal, mesial and ventrodistal groups of setae. Carpus very slender, four times as long as wide, two simple setae along ventral margin, five setae along inner midline, and tufts of shorter dorsodistal and ventrodistal setae. Chela slender, palm (propodus) 1.2 times as long as wide with numerous setae on inner face; ventral margin setose along fixed finger; cutting edge of fixed finger without apophyses but with small curved setae. Dactylus longer than palm, with no apophyses on cutting edge.

Pereopod 1 (Fig. 40B) basis 2.35 times as long as wide, with small ventral spinules, ventrodistal spine and long ventrodistal setae exceeding distal margin of ischium, dorsal margin with four setae in proximal half. Exopodite conspicuous, 3-articled, article 2 with one seta, article 3 with five plumose setae. Ischium with three ventrodistal setae. Merus wider distally, with slender dorsodistal spine and shorter, stouter ventrodistal spine, tufts of simple setae ventrally, mesially and dorsodistally. Carpus compact, as long as merus, with two elongate dorsodistal spines, two shorter ventrodistal spines, setae along entire dorsal margin, dorsodistal, ventral and ventrodistal tufts of setae. Propodus as long as carpus, with six ventral spines increasing in length towards distal margin interspersed with setae, two dorsodistal slender spines and row of setae along dorsal margin, mesial field of sparse setules. Dactylus stout, with two ventral denticulations and dorsal seta, unguis distinct, pointed, both together 0.8 times as long as propodus.

Pereopod 2 (Fig. 40C) basis 1.6 times as long as wide, with three ventral spinules, and tuft of long ventrodistal setae exceeding distal margin of ischium. Ischium shorter than wide with tuft of seven ventrodistal setae; merus shorter than carpus, with dense field of ventral setae, two ventrodistal slender spines, dorsal margin naked. Carpus with diagonal row of setae along inner face, two dorsodistal slender spines, ventral margin with five fine spines interspersed with setae;

propodus just longer than carpus, ventrodistal margin with five fine spines interspersed with setae, dorsally with three fine spines interspersed with setae. Dactylus compact, unguis shorter, distinct, both together 0.6 times as long as propodus.

Pereopod 3 (Fig. 40D) similar to pereopod 2, but basis armed only with one mid-ventral and three dorsoproximal penicillate setae.

Pereopod 4 (Fig. 40E) basis slender, with sparse ventral spinules and tuft of ventrodistal setae. Ischium with ventrodistal row of six setae. Merus with numerous ventral setae and one ventrodistal slender spine. Carpus 1.3 times as long as merus, ventrally with five fine spines interspersed with long setae, diagonal row of setae along inner face distally including five fine spines. Propodus just longer than carpus, with dorsoproximal penicillate seta, ventrally with five fine spines interspersed with long setae, diagonal row of setae along inner face distally including two fine spines; dactylus and claw elongate, 0.75 times as long as propodus.

Pereopod 5 (Fig. 40F) basis stouter with single ventrodistal seta, ischium with slender dorsodistal spine, spines on merus, carpus and propodus longer than those on pereopod 4, distal propodal spines finely denticulate.

Pereopod 6 (Fig. 40G) similar to pereopod 5 but basis without complete dorsal marginal row of plumose setae, five ventral plumose setae in distal half; ischium with two dorsodistal spines; propodus ventral and distal margin with row of some 26 small leaf-like spines.

Pleopods (Fig. 40H) all alike. Basis with five ventral (inner) plumose setae and six dorsal (outer) plumose setae; rami linguiform. Endopod longer than exopod, respectively with 24 and 22 marginal plumose setae.

Uropod (Fig. 40I) biramous. Basis with two tufts each of four distal setae. Exopod five times as long as basis and of about ten poorly-distinguished segments; endopod damaged on all specimens, but at least twice as long as exopod.

Description of male. Only one male found (Fig. 38B), with damaged antennae and antennules, without chelipeds. Body similar to that of female, but pereonites 4 and 5 proportionately shorter; cephalothorax with three lateral setae posterior to each eyelobe; all pereonites and pleonites with more dorsal setae.

Etymology. From the Latin, *floccus*, a tuft or lock of hair, with reference to the distinctive tufts of setae on the lateral margins of the pereonites.

Remarks. *Saltipedis floccus* sp. nov. is the fourth species of the genus to be described from Australian waters after *S. forex, S. incognita* Bamber, 2005 (both from southwestern Australia), and *S. nugoris* from the Bass Strait (see above). All four are generally similar in their habitus (as are all species of the genus other than *S. achondroplasia* Bamber, Bird & Angsupanich, 2003), and they share the unusual feature, not found in any other species of the genus, of outer spine-like apophyses on the maxilliped basis and palp-article-1. They are, however, readily distinguished: *S, nugoris* and *S. forex* are without an epistome, and have a triangular or blunt rostrum respectively, while *S. floccus* and *S. incognita* have a conspicuous epistome and a pointed rostrum, but no hyposphenia on pereonites 1 or 2 (present in *S, nugoris*); *S. forex* is the only one of these species without a cephalothoracic hyposphenium between the chelipeds, or a dorsodistal spine on the merus of pereopod 1.

S. forex is notably different from the other Australian species owing to the tufts of setae on the lateral margins of its pereonites; the mouthparts are also much more densely setose (notably the mandibular and maxilliped palps), and the present species is the only one to have ventral (as well as dorsal) plumose setae on the basis of pereopod 6.

Despite all of these differences, the four Australian species do broadly seem to be closely related. Guţu (2008b) moved the previously-described three species into a separate genus, *Magniaculeus*, simply on the feature of the spine-like maxilliped apophyses, ignoring the numerous features by which they differ. In fact, the present species disagrees with a number of the diagnostic characters of *Magniaculeus* (many of which were vague or not distinct to the newly-described genus), e.g. the labial palp is not ovate, and the propodus of pereopod 1 is not longer than the carpus. Both features are in fact more like that of another genus – *Brachylicoa* – which Guţu (2006) also somewhat tenuously separated from *Saltipedis*. Equally, the fine spines on the basis of pereopod 1 in *S, nugoris* and *S. forex* are diagnostic features of another of Guţu's (2006) new genera derived from *Saltipedis, Podictenius*. Until a more comprehensive and rational analysis of the genus *Saltipedis* (including *Brachylicoa, Magniaculeus* and *Podictenius)* is undertaken, separating these four species into a separate genus is premature.

Saltipedis floccus was collected throughout the Bass Strait, at depths between 3 and 180 m, normally on heterogeneous substrata, and it was often sympatric with *S, nugoris*.

Genus ***Remexudes*** Błażewicz-Paszkowycz & Bamber, 2007

Remexudes toompani Błażewicz-Paszkowycz & Bamber, 2007

R. toompani Błażewicz-Paszkowycz & Bamber, 2007a, 19–25, figs 10–12.

Remarks. The presently monotypic genus *Remexudes* shows affinities to both *Saltipedis* and *Pakistanapseudes*, but is quite distinct owing to the elongate pereopod 1 propodus and the flattened distal articles of pereopod 2 which are of the fossorial form more typical of first pereopods in the Apseudomorpha. With a dorsal row of plumose setae on pleonite 1, it accords with the Parapseudinae. The outer spine-like apophysis on the basis of the maxilliped is also found in Australian species of *Saltipedis*, although they also have a similar apophysis on the first palp article.

Remexudes toompani occured throughout the Bass Strait, on sandy substrata from depths of 11 to 630 m.

Family **Pagurapseudidae** Lang, 1970

Subfamily **Hodometricinae** Guţu, 1981

Genus ***Indoapseudes*** Băcescu, 1976

Indopaseudes macabre Bamber, 2005

I. macabre Bamber, 2005, 650–654, figs 17–18.

Material examined. 1 ♀ with oostegites, 1 brooding ♀ (J46401), Cruise 81-T-1 Stn 196 DP, Western Bass Strait, 6km W of Currie, King Island, 38°54.7'S 143°43.4'E, 49 m depth, coarse sand, 21 November 1981, coll. R.S. Wilson, Smith McIntyre grab, RV *Tangaroa.*

Remarks. Of the three described species of *Indoapseudes, I. macabre* is the only species found in Australia (so far). The type (and only other) material was of 11 specimens collected in Esperance, southwestern Australia, in association with macroalgae, from 18 to 26 m depth: the present specimens extend the distribution to southeastern Australia, and the lower end of the depth range to 49 m.

Genus ***Similipedia*** Guţu, 1989

Similipedia diarris Błażewicz-Paszkowycz & Bamber, 2007

S. diarris Błażewicz-Paszkowycz & Bamber, 2007b, 146–147, figs 24–26.

Material examined. 5 specimens, Stn. BSS 158, Central Bass Strait, 66 km S of Rodondo Island, 39°49.5'S, 146°18.5'E, 82 m depth, "sand-silt-mud", 13 November 1981, coll. R. Wilson, RV Tangaroa.

Remark. Similipedia diarris was originally described from 45 specimens collected off Wilson's Promontory at 65 m depth. The present specimens are from slightly further south, and slightly deeper water. The only other species of the genus, *S. eminescui* Guţu, 1989, was recorded from the north-east Mozambique Channel.

Subfamily **Pagurapseudinae** Lang, 1970

The Pagurapseudinae incorporates species which are obligately adapted to living within gastropod shells, and show extreme morphological adaptations, often convergent with those of pagurid decapods. In particular, the pereon and pleon are twisted, the pleotelson consequently asymmetrical, the number of pleopods is usually reduced, the chelipeds are robust and often asymmetrical, the first pereopods are proportionately large (long), and the second to sixth pereopods bear rows of short, cylindrical spines or tubercles on the merus, carpus and propodus, used for gripping the inside of the empty snail-shell.

There are three genera described within this subfamily, *Pagurapseudes* Whitelegge 1901, *Pagurotanais* Bouvier, 1918, and *Macrolabrum* Băcescu, 1976(b), but, as more species have been discovered over the years, there has been some confusion over the features which distinguish or characterize them (see Guţu, 1996b; Bamber, 2007; 2008). *Pagurotanais* is distinguished in having an exopodite present on the cheliped (absent in one species) but absent on pereopod 1 (these being respectively absent and present in the other two genera). *Macrolabrum* was distinguished by, and named for, an unusually long epistome exceeding the tip of the rostrum (anterior margin of the carapace) when viewed from above. In comparison with *Pagurapseudes*, this genus usually also has pronounced cheliped dimorphism in the male and robust distal setae or spines on the uropod endopod; other features which have been cited are the basis of pereopod 1 being conspicuously wider than subsequent articles, and the presence of large plumose setae on the maxilliped palp. However, some of these features are subjective, and some overlap these two genera as defined by the other characters.

A further character, disregarded before but confirmed in the present material, which does serve to distinguish these genera consistently is the conformation of the pleopods. These are best developed in *Pagurapseudes* species, with two equal linguiform rami, each as long as the basis (protopod) and with a few setae on all margins (e.g. Fig. 44H), and present on at least 1 and up to 5 pereonites (juveniles have fewer pairs). In *Macrolabrum* species, the pleopods are present as only two pairs in adults, again well developed and biramous, but, while the exopod is similar to that of *Pagurapseudes* species, the endopod is characteristically shorter and almost circular (e.g. Fig. 50H). In *Pagurotanais* species, the pleopods are either absent entirely (including the generotype, see Bouvier, 1918), or present as a single pair, in the male only in one species, and of highly reduced form with the rami bearing 1 to 3 setae, and shorter than the basis. (e.g. McSweeney, 1982, figs 4G, 6C, unfortunately described as *Pagurapseudes*).

As the other features have not been found to be entirely consistent (e.g. the epistome of *Macrolabrum distonyx* Bamber, 2007 does not exceed the anterior margin of the carapace), this pleopod character is most stable in distinguishing the genera. As a result, *Pagurapseudes abrucei* Băcescu 1981, incidentally a species with a notably wide basis to pereopod 1 (less than twice as long as wide), is moved to *Macrolabrum*. The three genera may thus be keyed out as follows:

1. Pereopod 1 without exopodite; pleopods in the adult absent, or present as a single pair with reduced, unequal rami shorter than basis and bearing 3 or fewer setae; epistome not exceeding anterior margin of carapace ... *Pagurotanais*
   Pereopod 1 with conspicuous exopodite; pleopods present in the adult, with well-developed rami, at least one of which is linguiform and subequal in length to the basis ... 2
2. Rami of pleopods subequal in length, linguiform; epistome not exceeding anterior margin of carapace ... *Pagurapseudes*
   Endopod of pleopods circular and shorter than exopod; epistome usually (but not always) exceeding anterior margin of carapace ... *Macrolabrum.*

The original material of the generotype *Pagurapseudes spinipes*, from New South Wales, probably included more than one species. The type-description clearly accords with a *Pagurapseudes,* and is good enough to recognize as a species. Those specimens which Whitelegge (1901) mentions as females having no pleopods may well have been *Pagurotanais koonungai* Bamber, 2008 (recorded from Brisbane), while his other specimens with less than three pleopods were possibly juveniles or other species.

Five distinct species of the Pagurapseudinae were found in the Bass Strait material, all new, doubling the species complement for this subfamily in Australia.

Genus ***Pagurapseudes*** Whitelegge, 1901

Pagurapseudes victoriae sp.nov.

Figures 41–44

Material examined. 1 brooding ♀ (J57789), holotype, Stn CPBS 03N, Western Port, 38°20.56'S 145°15.08'E, 2 m depth, 5 April 1965; 3 ♀♀ (1 brooding), 1 ♂ (J57790), paratypes, same sample as holotype; 2 ♀♀ (J48009), paratypes, Stn CPBS 25S, Western Port, 38°21.63'S 145°15.08'E, 9 m depth, 23 February 1965, sand; 1 ♀ with oostegites, 2 ♂♂ (J48004), paratypes, Stn CPBS 11S, Western Port, 38°22.00'S 145°13.38'E, 3 m depth, 17 March 1965, shelly gravel; 3 ♀♀ (J56614) , 2 ♀♀ (56612), paratypes, 95 further specimens (unregistered), Stn PPBES 985, Port Phillip Bay, 38°21.00'S 144°41.5'E, 9 m depth, 9 December 1971, sand; 3 ♀♀ (J43098), paratypes, Port Phillip Bay "wet sandy region", 38°10.51'S 144°43.9'E, 7.5 m depth, 17 October 1994, sand (labelled "*P. spinipes*"); 2 ♀♀ (J56618), paratypes, 1 ♂, 4 ♀♀ (unregistered), Stn BSS180, Central Bass Strait, 39°12.9'S 146°27.3'E, 65 m depth, 18 November 1981, medium sand, coll. R.S. Wilson; 5 ♀♀ (J56617), paratypes, 10 ♀♀ (unregistered), Stn BSS170, Eastern Bass Strait, 31°51.8S 148°26.5'E, 130 m depth, 15 November 1981, fine sand, coll. R.S. Wilson; 1 brooding ♀, 1 ♂ (J56613), paratypes, Stn BSS209, Eastern Bass Strait, 38°18.0'S 147°37.0'E, 55 m depth, 31 July 1983, muddy fine shell, coll. M. Gomon & R.S. Wilson.

Other material. A further 447 specimens from the Tasmanian Coast, Flinders Island, Western Port, Port Phillip Bay and throughout the Bass Strait, at depths from 5 to 69 m.

Description of female. Body (Fig. 41A) typical of a pagurapseudid, pleon skewed to the right and curved under pereon; small, holotype about 5 mm long. Cephalothorax (Fig. 41B) subrectangular, as long as wide, rostrum variable (Fig. 42): often trilobed, anterior margin either smooth (Fig. 42A), or with fine (Fig. 42B) or coarse (Fig. 42C) denticulation, this variation irrespective of gender or maturity; lateral margins of branchial chamber with 8 or 9 plumose setae, sparse plumose setae scattered over dorsal surface of branchial chambers. Eyelobes distinguished with anterior pointed apophysis, eyes present as group of black-pigmented ocelli. Epistome not visible dorsally. Each pleonite with anterolateral and posterolateral tufts of plumose setae; pereonite 1 shortest, 0.3 times as long as cephalothorax; pereonite 2 1.4 times as long as pereonite 1; pereonite 3 longer, pereonite 4 longest, nearly twice as long as pereonite 1; pereonites 5 and 6 progressively shorter, pereonite 6 just longer than pereonite 2 (all pereonites respectively 3.0, 2.0, 1.4, 1.3, 1.4 and 1.5 times as wide as long). Pleon with five free subequal, asymmetrical pleonites, each pleonite about one-third as long as pereonite 6, with sparse lateral and occasional dorsal plumose setae. Pleonites 1 to 3 only bearing pleopods. Pleotelson almost semicircular, longer than last two pleonites together, just shorter than wide, with sparse plumose lateral setae and simple distal setae.

Antennule (Fig. 43A) proximal peduncle article 3.25 times as long as wide, with conspicuous inner-distal tridentate apophysis and inner-medial expansion bearing tooth-like apophyses and two plumose setae; outer margin also denticulate, each "tooth" with an adjacent plumose seta. Second peduncle article 0.3 times as long as first, expanded distally to 1.5 times as long as wide, with plumose distal setae; third article as long as second, fourth article one-third length of third. Main flagellum of five (rarely six) segments, with single aesthetascs on each segment; accessory flagellum of two (rarely three) segments, distally not quite reaching distal edge of third segment of main flagellum.

Antenna (Fig. 43B) with two basal articles fused into wide proximal peduncle article inner margin bearing denticulation and distal apophysis and two plumose and three penicillate setae, outer margin with blunt apophysis; third article as long as wide, 0.4 times as long as fused basal articles, with single simple seta; fourth peduncle article half as long as fused basal articles, naked; fifth article just longer than fourth, with one simple and four penicillate distal setae. Flagellum of two segments, distal segment with three distal setae.

Labrum (Fig. 43D) bilobed, rounded, sparsely setose, small pointed epistome present (Fig. 43C). Left mandible (Fig. 43E) with finely denticulate outer margin, quadricuspid pars incisiva, tricuspid lacinia mobilis, setiferous lobe with simple and bifurcate setae, pars molaris round, blunt, with ventrodistal spinules on grinding surface; palp of three articles, proximal article with robust, plumose inner seta, second article longest, twice as long as proximal article, with 13 inner distally-denticulate setae in distal half; third article two-thirds as long as second, with nine progressively longer distally-denticulate setae along inner margin, distal seta longer than article. Right mandible as left but without lacinia mobilis (Fig. 43F). Labium (Fig. 43I) typically marginally setose, palp with two strong distal setae, fine outer setules and longer inner setae. Maxillule (Fig. 43G) inner endite with five plumose distal setae outer apophysis and row of simple setae, inner margin with fine setules; outer endite with ten distal spines, inner and outer margins setose; palp (Fig. 43G') of two articles with distinct articulation, distally with three setae each bearing rounded setulose tips. Maxilla (Fig. 43H) outer margin setulose, outer lobe of moveable endite with two subdistal and seven distal finely setulose setae, inner lobe with four simple and four setulose setae; fixed endite outer lobe with two bifurcate, two trifurcate, two setulose and three bilaterally denticulate distal spines, inner lobe with four longer plumose setae and rostral row of 20 setae. Maxilliped (Fig. 43K) basis with seven distal plumose setae, inner margin with two rows of denticulation and plumose seta; proximal palp article with simple outer margin with one plumose and one simple setae, and short spine, inner margin naked; second article with coarsely denticulate inner and outer margins, three plumose seta on outer margin, two shorter simple setae and five plumose setae along inner margin; third article widening distally, with coarsely denticulate outer margin, six inner simple setae; fourth article with ten distal and outer sub-distal setae each with fine denticulation in distal half; endite (not figured) with finely setose outer margin, simple distal spines, three coupling-hooks. Epignath (Fig. 43J) large, inner lobes conspicuous, distal spine proximally setose.

Chelipeds (Fig. 44A) showing no conspicuous dimorphism. Compact basis 1.3 times as long as wide, with complex proximal surface denticulations dorsally and ventrally, three mid-ventral simple setae, one simple and two plumose subdistal ventral setae; exopodite absent. Merus quadrate, distal half of ventral margin with coarse denticulation, three inner and one ventral subdistal plumose setae and four mid-

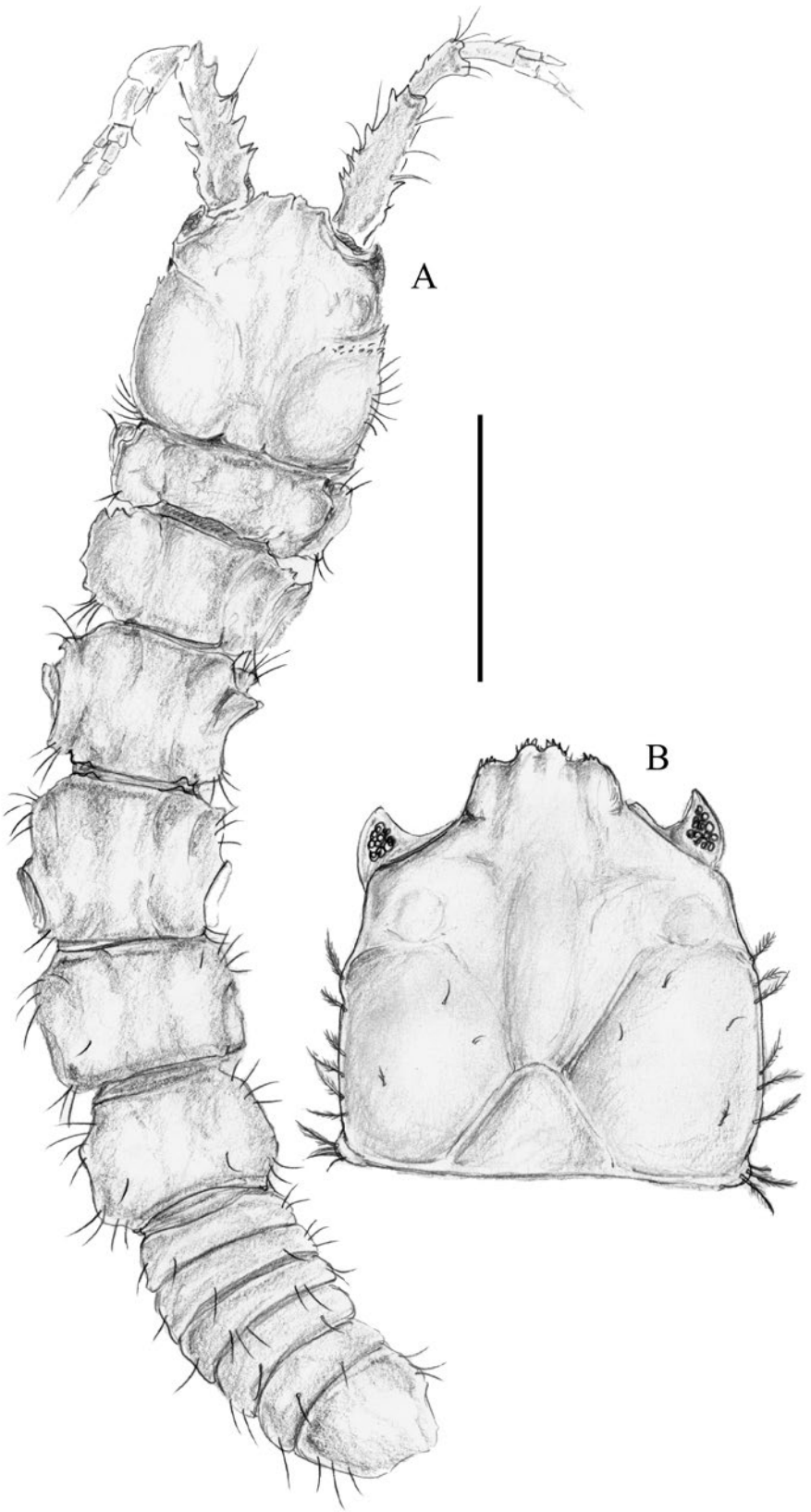

Fig. 41. *Pagurapseudes victoriae* sp. nov., female. A, dorsal; B, cephalothorax. Scale = 1 mm.

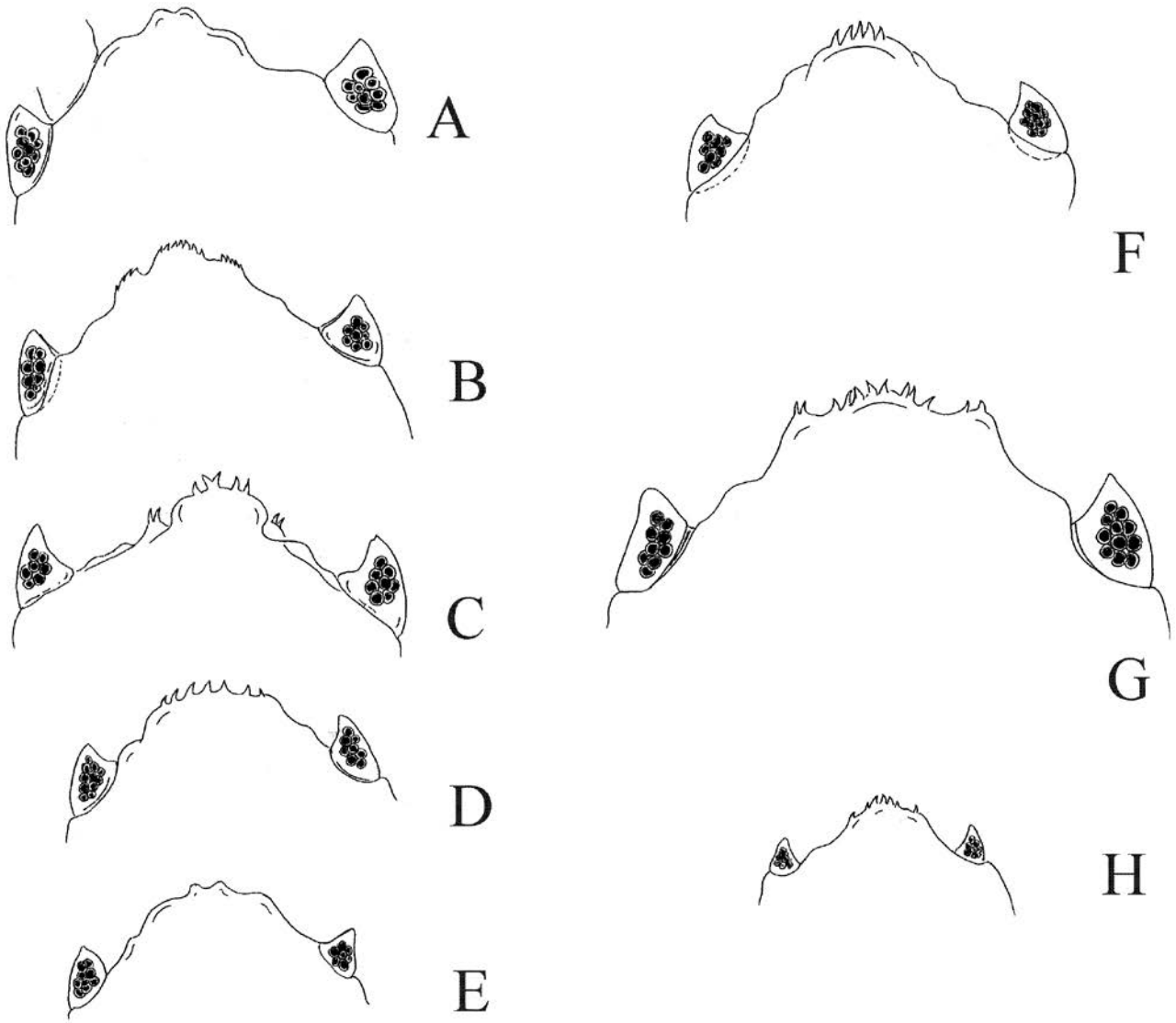

Fig. 42. *Pagurapseudes victoriae* sp. nov., anterior of carapace of A-E, females (lengths of carapaces 1.2 mm – 0.9 mm); F, ovigerous female (length of carapace 1.3 mm); G, ovigerous female (length of carapace 1.7 mm); H, manca.

ventral simple setae. Carpus elongate, twice as long as wide, widening distally, with denticulate inner margin, sparse dorsal and ventral marginal fine setae, two plumose and one simple inner proximal setae. Propodus elongate, 2.1 times as long as wide, with few ventral setae; fixed finger with four ventral setae, three setae adjacent to cutting edge, saw-like row of small tooth-like spines distally on cutting edge (Fig. 44A'); dactylus curved, cutting-edge with fine denticulations and three distal tooth-like spines (Fig. 44A').

Pereopod 1 (Fig. 44B) longest pereopod, coxa with slight apophysis having denticulate margin and one simple and one plumose setae; basis 2.3 times as long as wide, dorsal margin bearing seven plumose setae interspersed amongst triangular tooth-like apophyses with further four submarginal plumose setae, ventral margin with four ventral and one distal plumose setae, two simple ventrodistal setae; exopodite present (Fig. 44B'), large, distal article with seventeen plumose setae. Ischium one-quarter as long as basis, with mid-dorsal simple seta, ventrally with one plumose and two simple distal setae. Merus 0.8 times as long as basis, dorsally with two distal setae, ventral margin with plumose setae and distal spine. Carpus shorter than merus, with four ventral spines, each with crenulate anterior face, interspersed with setae. Propodus 1.4 times as long as carpus, with five ventral spines. Dactylus curved, 0.8 times as long as propodus, with fine ventral setae, unguis slender, sharp, 0.4 times as long as dactylus.

Pereopods 2 to 6 similar to each other, each about one-half to one-third as long as pereopod 1. Pereopod 2 (Fig. 44C)

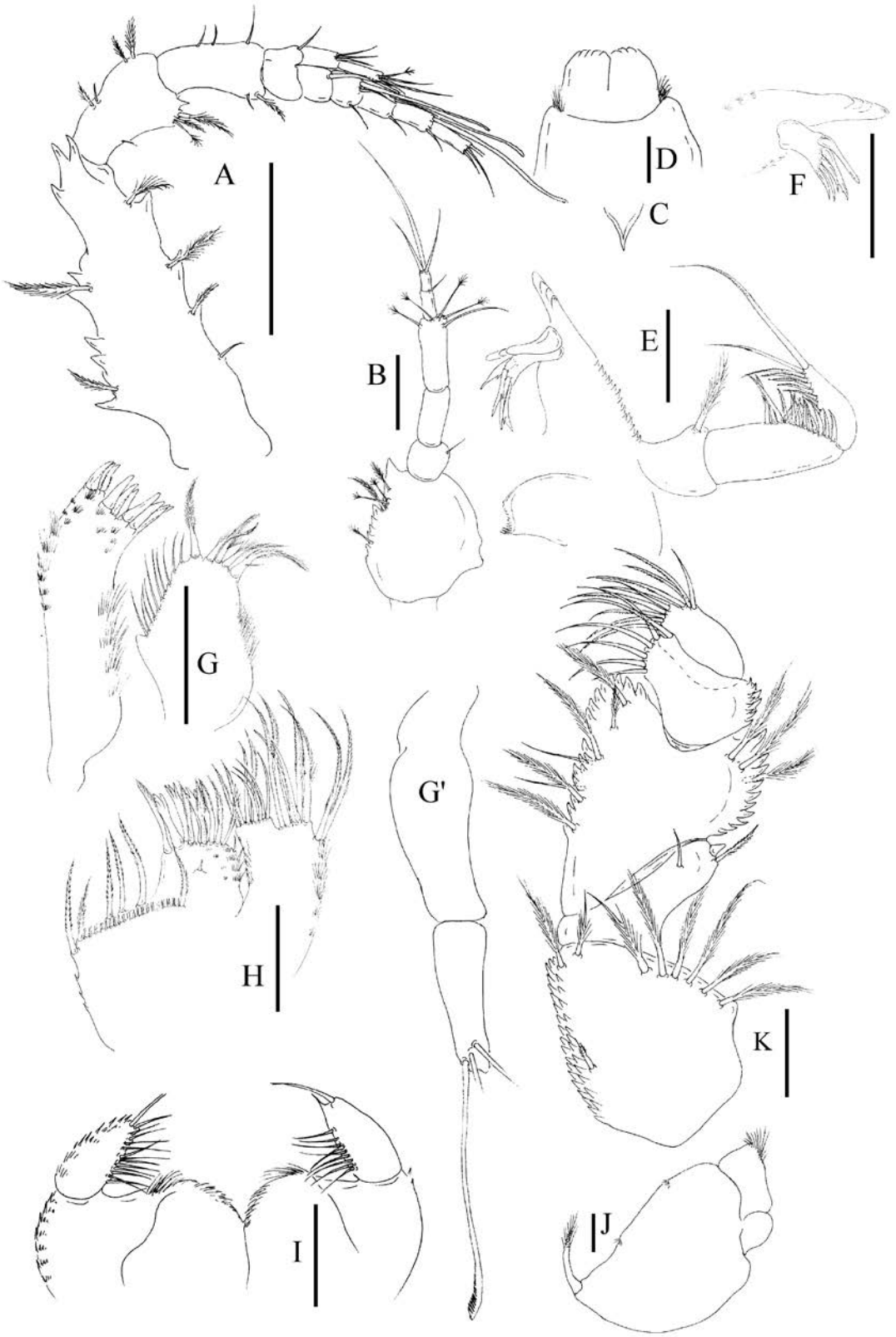

Fig. 43. *Pagurapseudes victoriae* sp. nov., female paratype. A, antennule; B, antenna; C, epistome; D, labrum; E, left mandible; F, right mandible; G, maxillule endites; G', maxillule palp; H, maxilla; I, labium; J, epignath; K, maxilliped. Scale A-B = 0.1 mm; C-K = 0.01 mm.

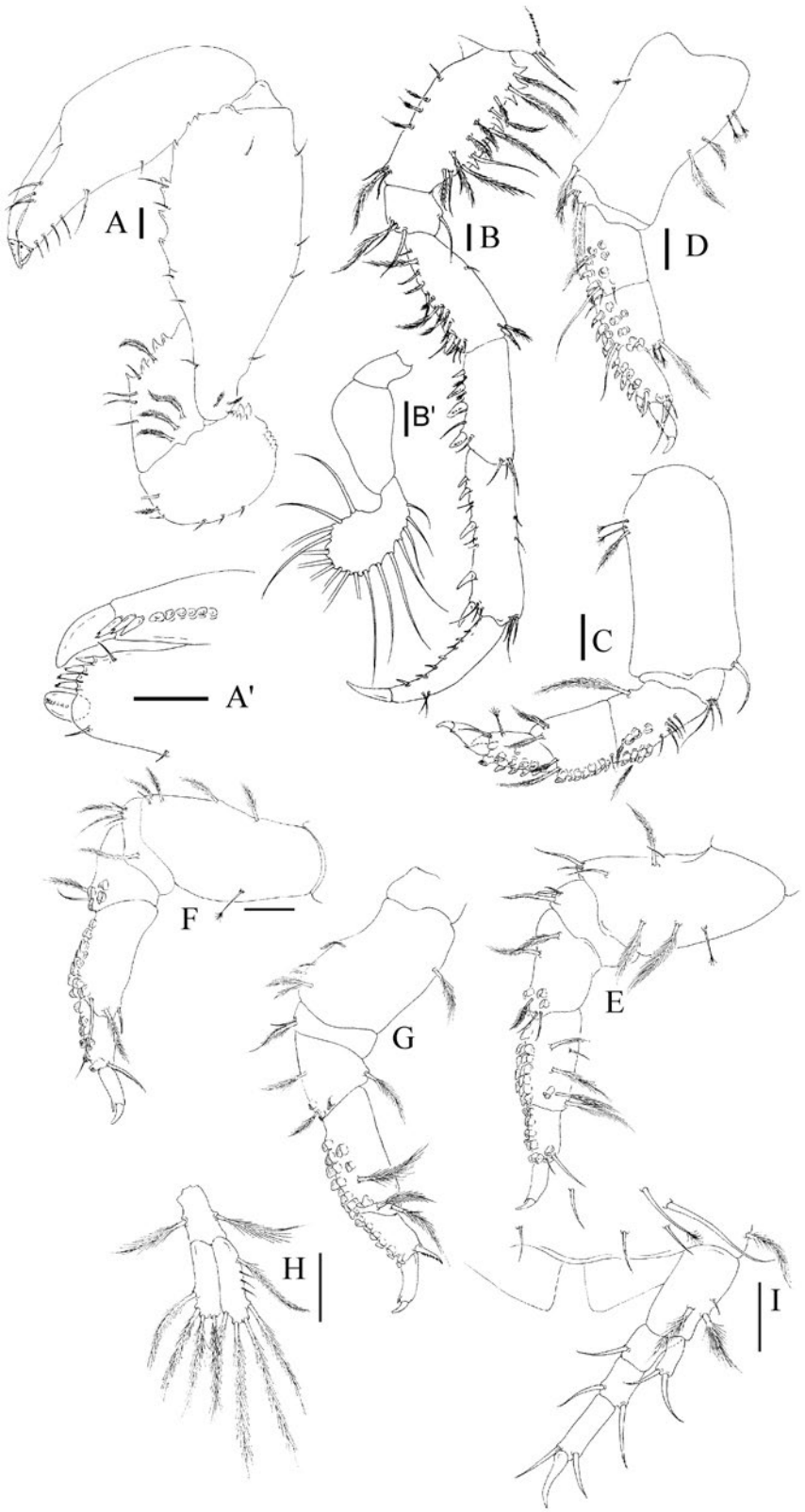

Fig. 44. *Pagurapseudes victoriae* sp. nov., female paratype. A, cheliped; A', detail of chela; ; B, pereopod 1; B', exopod; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

basis stout, 2.2 times as long as wide, with one plumose and two penicillate dorsoproximal setae, simple ventrodistal seta; ischium with three ventrodistal setae. Merus, carpus and propodus bearing "sucker-like" spines, generally in two ventral rows, and plumose setae as figured. Merus longer than carpus; propodus 0.8 times as long as carpus, distal propodal spine simple, stout; dactylus and unguis not fused into hook-like claw, dactylus with minute inner distal spine. Pereopod 3 (Fig. 44D) with more plumose setae on basis, no dorsal seta on merus. Pereopod 4(Fig. 44E) basis stouter, 1.7 times as long as wide, fewer "sucker-like" spines on merus, without stout distal propodal spine. Pereopod 5 (Fig. 44F) as pereopod 4. Pereopod 6 (Fig. 44G) basis with only one plumose dorsal seta, propodus with distal denticulate spine adjacent to dactylus.

Pleopods (Fig. 44H) only present on pleonites 1 to 3, biramous, reduced; basis with single dorsal and ventral plumose setae; exopod with outer proximal and three distal plumose setae, endopod with four distal plumose setae, inner margin with three simple setae and proximal plumose seta.

Uropod (Fig. 44I) biramous, basis with two plumose distal setae; endopod longer than basis, of three segments increasing in length, second segment distally with two setae, third segment twice as long as first with one stout and two more slender distal setae; exopod of one segment, just shorter than proximal endopod segment, with two distal setae.

Description of male. Male closely similar to female, chelipeds not significantly dimorphic, but antennule with main flagellum of six segments. Penial tubercle conspicuous ventrally on pereonite 6.

Etymology. Named after the State of Victoria (and thus indirectly Queen Victoria), off which this species is by far the commonest pagurapseudid.

Remarks. P. inquilinus Bamber 2007, from 440–450 m depth off New Caledonia, is the only previously-described species of *Pagurapseudes* to have two segments in the accessory flagellum of the antennule (all others having only one), and shows many similarities to the present species in the morphology of the antennule, antenna and pereopods, but has seven segments in the main flagellum (in both sexes). *P. victoriae* sp. nov. is also distinguished in having the complex denticulation on the maxilliped basis and palp (absent in *P. inquilinus*), and only three setae on the maxillule palp (six in *P. inquilinus*); conversely, the New Caledonia species has ventral spine-like apophyses rather than simple setae on the basis of the cheliped, and simple spines rather than plumose setae proximally on the cheliped carpus, and is without the dorsal denticulations on the basis of pereopod 1, has fewer lateral but more dorsal plumose setae on the carapace, and the uropod exopod is longer than the proximal endopod segment (shorter in *P. victoriae,* indeed, notably small for the genus).

The only species of *Macrolabrum* to have two segments in the accessory flagellum of the antennule are *M. aenigmaticus* Guţu, 1997, (from Bali), *M. boeri* Băcescu 1981 and *M. abrucei* (Băcescu, 1981) comb. nov. (both from the Great Barrier Reef), but those species have only four segments in the main flagellum (the distal segment being comparatively minute in all three), and no complex apophyses on the proximal article of the antennule peduncle (as well as typical *Macrolabrum* pleopods).

The variation in the numbers of antennular flagella articles, although consistent in their distinction from other species, and the variation in denticulation of the rostrum in the present species are notable, as these characters have been used (albeit not in isolation) in distinguishing between other pagurapseudid species, which are rarely taken in such profusion as was *P. victoriae.*

Pagurapseudes victoriae was collected throughout the Bass Strait, at depths from 2 to 130 m, on sandy substrata.

Pagurapseudes kimbla sp. nov.

Figures 45–47

Material examined. 1 ♀ with oostegites (56368), holotype, Stn BSS185, Western Bass Strait, 38°48.0'S 143°14.5'E, 47 m depth, 20 November 1981, hard rock, coll. R.S. Wilson; 1 juvenile (J56613), paratype, Stn BSS68, Western Bass Strait, 39°27'S 142°55'E, 183 m depth, 10 October 1980, bryozoan mud, coll. G C B Poore; 1 ♀ (J56370), paratype, Stn BSS171, Eastern Bass Strait, 38°53.7'S 147°55.2'E, 71 m depth, 18 November 1981, medium sand, coll. R.S. Wilson; 1 ♀ with oostegites (J55834), paratype, Stn BSS162, Central Bass Strait, 40°09.2'S 147°31.9'E, 51 m depth, 14 November 1981, shelly sand, coll. R.S. Wilson; 1 ♀ (J56369), paratype, Stn BSS203, Central Bass Strait, 39°22.0'S 144°18.3'E, 60 m depth, 23 November 1981, coarse sand, coll. R.S. Wilson; 1 subadult (J29171), paratype, Stn MSL EG88, Eastern Bass Strait, 37°52.65'S 148°42.15'E, 49 m depth, 4 June 1991, coarse sand, coll. N Coleman; 1 ♀ (J29172), paratype, Stn MSL EG115, Eastern Bass Strait, 37°52.65'S 148°42.15'E, 49 m depth, February 1991, coarse sand, coll. N Coleman; 1 brooding ♀ (J29173), paratype, Stn MSL EG111, Eastern Bass Strait, 37°52.65'S 148°42.15'E, 49 m depth, February 1991, coarse sand, coll. N Coleman; 1 subadult (J51377), paratype, Stn VC 27 C1, Central Bass Strait, 36°23.92'S 145°18.43'E, 40 m depth, 11 May 1998, fine sand, coll. N Coleman.

Description of female. Body (Fig. 45A) typical of a pagurapseudid, small, holotype about 1.7 mm long. Cephalothorax (Fig. 45B) slightly rounded, just longer than wide, with convex anterior margin, rostrum a finely-denticulate semicircle; lateral carapace without denticulations, sparse, irregular plumose setae. Eyelobes rounded, eyes present as group of black-pigmented ocelli. Epistome not apparent. Pereonites 1 and 3 subequal, two-thirds as long as cephalothorax, pereonite 1 with paired anterolateral plumose or simple setae and single posterolateral simple setae; pereonite 2 shortest, 0.6 times as long as cephalothorax; pereonites 4 to 6 subequal, 0.9 times as long as cephalothorax; pereonite 5 longest, as long as cephalothorax. Pleon of five free subequal pleonites, each pleonite about half as long as cephalothorax. Pleonites 1, 2 and 3 only bearing pleopods. Pleotelson semicircular, 1.5 times as long as last pleonites, with plumose lateral seta on each side, paired longer and single shorter simple setae above uropod attachment, and two small posterior spines (Fig. 47I).

Antennule (Fig. 46A) proximal peduncle article 3.3 times as long as wide, with three larger and one smaller inner spine-like apophyses accompanied by plumose setae, no distal apophysis; outer margin with two proximal tooth-like apophyses and numerous penicillate and fewer plumose setae. Second peduncle article 0.35 times as long as first, with array

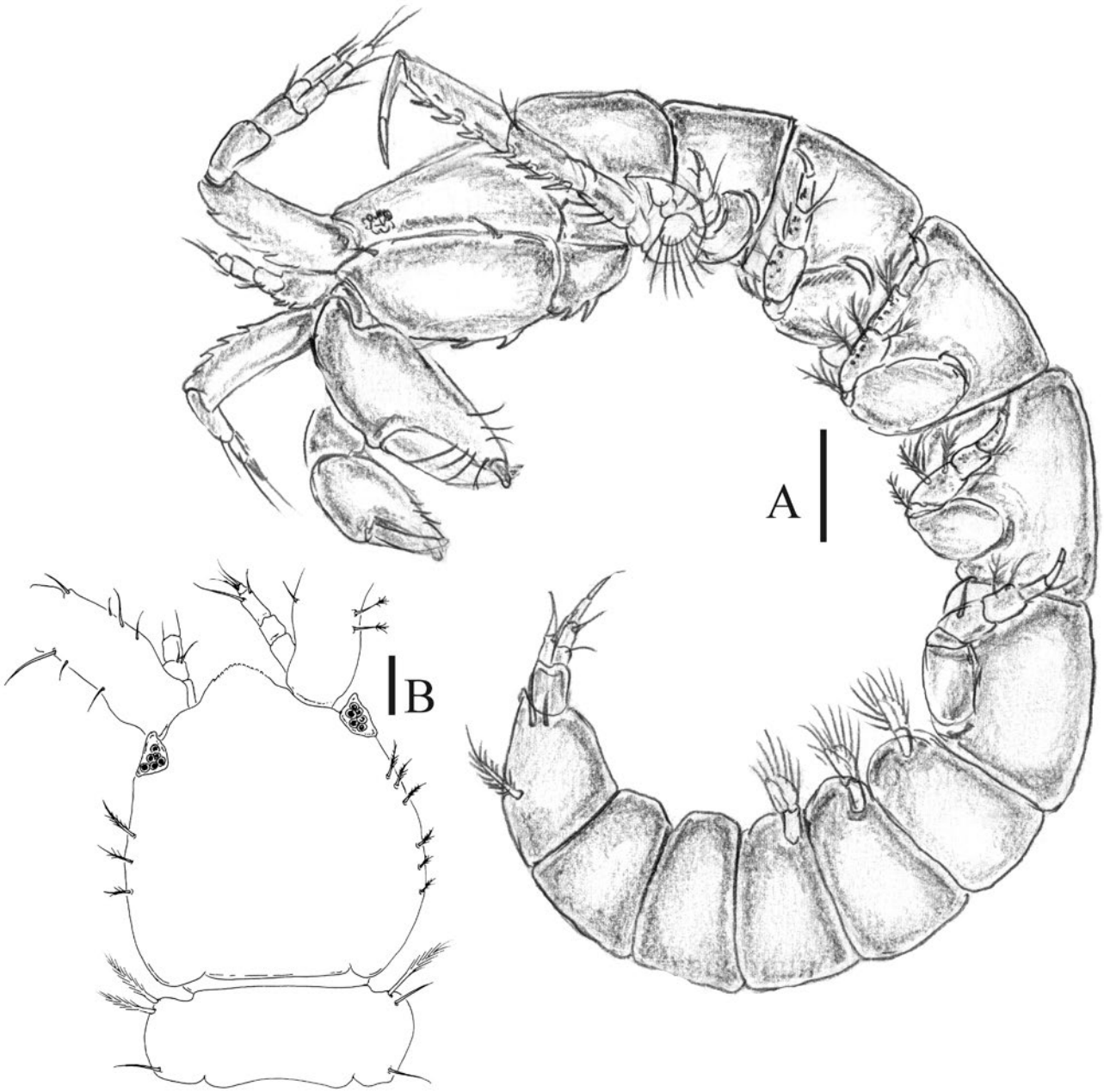

Fig. 45. *Pagurapseudes kimbla* sp. nov., holotype female. A, lateral view; B, cephalothorax. Scale = 0.1 mm.

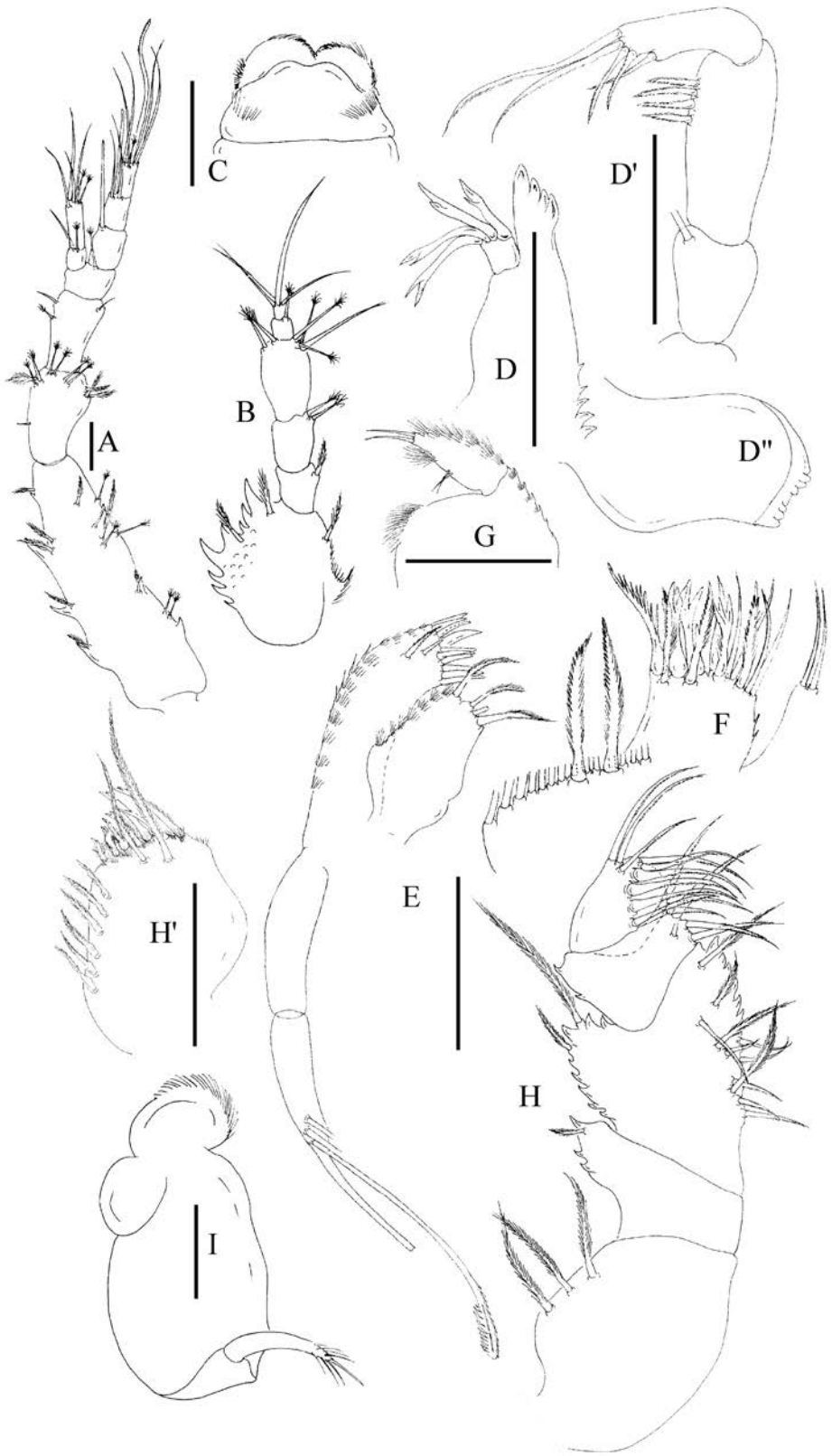

Fig. 46. *Pagurapseudes kimbla* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; D', mandible palp; D" mandible molar; E, maxillule; F, maxilla; G, labium; H, maxilliped; H', maxilliped endite; I, epignath. Scale = 0.1 mm.

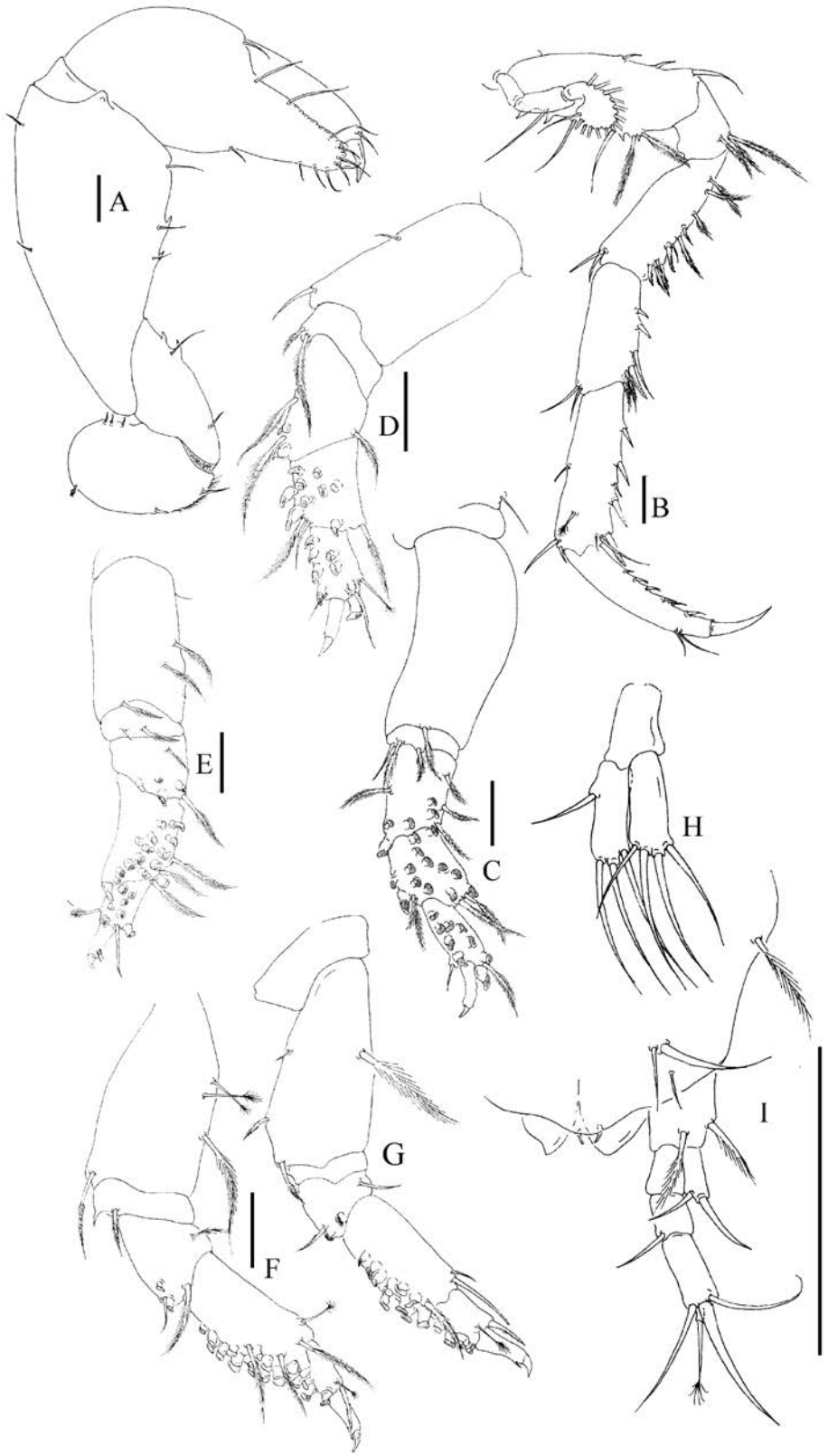

Fig. 47. *Pagurapseudes kimbla* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

of plumose and penicillate distal setae; third article 0.9 times as long as second, fourth article 0.4 times as long as third. Main flagellum of three segments, with single aesthetascs on each segment; accessory flagellum of two segments, distally not quite reaching distal edge of second segment of main flagellum.

Antenna (Fig. 46B) with two basal articles fused into wide proximal peduncle article with complex inner denticulation, outer tooth-like apophysis and paired inner and single outer plumose setae; third article 1.3 times as long as wide with outer plumose seta; fourth peduncle article just longer than third, with two outer penicillate setae; fifth article twice as long as third with distal array of penicillate setae and one simple seta. Flagellum of two segments, distal segment with four distal setae.

Labrum (Fig. 46C) bilobed, rounded, sparsely setose. Right mandible (Fig. 46D) outer margin denticulate, with quadricuspid pars incisiva, setiferous lobe with four bifurcate setae, pars molaris (Fig. 46D') round, blunt, with marginal crenulations; palp (Fig. 46D") of three articles, proximal article with single long, plumose inner seta (broken on figure), second article longest, 1.8 times as long as proximal article, with four inner distally setulose setae in distal half; third article 0.8 times as long as second, with five progressively longer distally setulose setae in distal third, distal seta longer than article. Left mandible as right but with narrow, tricuspid lacinia mobilis (not figured). Labium (Fig. 46G) outer margin denticulate, palp with two distal setae and setulose margins. Maxillule (Fig. 46E) inner endite with four plumose distal setae (one broken on figure), outer apophysis and setulose margin; outer endite with 10 distal spines, outer margin finely setose; palp of two articles with distinct articulation, distally with four simple setae with rounded setulose tips. Maxilla (Fig. 46F) moveable endite damaged in preparation; fixed endite outer lobe with four simple, one sabre-like, three trifurcate, one setulose and three bilaterally denticulate distal spines, inner lobe with two longer plumose setae and rostral row of 13 setae. Maxilliped (Fig. 46H) basis with three outer plumose setae; proximal palp article with tridenticulate outer margin with one plumose seta, inner margin naked; second article with coarse denticulations along inner and outer margins, one long and one short plumose setae on outer margin, seven setulose setae and four plumose setae along inner margin; third article with bidenticulate outer margin, six inner marginal simple setae each with fine denticulation in distal half; distal article with seven inner-marginal and three distal setae, each with fine denticulation in distal half; endite (Fig. 46H') with naked outer margin, seven compound distal spines decreasing in size inwards and two subdistal plumose setae. Epignath (Fig. 46I) large, inner lobes conspicuous, distal spine with setae surrounding tip.

Chelipeds (Fig. 47A) showing no conspicuous dimorphism. Compact basis 1.6 times as long as wide, with three dorsoproximal setae, ventroproximal penicillate seta, mid-ventral spine and ventrodistal seta, ventrodistal margin densely setulose; exopodite absent. Merus quadrangular, two ventral simple setae and two tooth-like apophyses on ventrodistal margin. Carpus elongate, twice as long as wide, widening distally, with sparse dorsal and ventral fine setae and two tooth-like apophyses on mid-ventral margin. Propodus robust, as long as wide, fixed finger with three ventral, three distal and three dorsal setae, row of small rounded teeth along cutting edge; moveable finger stout, curved, with two distal setae.

Pereopod 1 (Fig. 47B) longest pereopod, with basis slender, 4.7 times as long as wide, dorsal margin bearing five plumose setae interspersed amongst six triangular tooth-like apophyses, ventral margin with two spines in distal half and distal simple seta; exopodite present, large, distal article with thirteen plumose setae. Ischium one-quarter as long as basis, with naked dorsal margin, three ventrodistal plumose setae. Merus 0.6 times as long as basis, with two simple dorsodistal setae, ventral margin with nine plumose setae and two subdistal spines. Carpus shorter than merus, with one ventral simple and two ventrodistal plumose setae and three ventral spines. Propodus 1.3 times as long as carpus, with four slender ventral spines. Dactylus curved, as long as propodus, with fine ventral setae, unguis slender, sharp, 0.4 times as long as dactylus.

Pereopods 2 to 6 similar to each other, each about one-half to one-third as long as pereopod 1. Pereopod 2 (Fig. 47C) basis stout, twice as long as wide, with plumose ventrodistal seta; ischium with paired ventrodistal setae. Merus, carpus and propodus bearing "sucker-like" spines, generally in two ventral rows, and plumose setae as figured. Merus 1.2 times as long as carpus; propodus 1.1 times as long as carpus, without distal spine; dactylus and unguis not fused, with minute inner seta. Pereopod 3 (Fig. 47D) similar but carpus as long as propodus. Pereopod 4 (Fig. 47E) slightly more compact, basis 1.7 times as long as wide, fewer "sucker-like" spines on merus, carpus longer than merus or propodus. Pereopod 5 (Fig. 47F) as pereopod 4. Pereopod 6 (Fig. 47G) propodus with dorsodistal denticulate spine.

Pleopods (Fig. 47H) only present on pleonites 1, 2 and 3, biramous, reduced; basis naked; exopod with outer proximal and three distal plumose setae, endopod with four distal plumose setae. Uropod (Fig. 47I) biramous, basis with two plumose distal setae; endopod longer than basis, of three segments, first distally naked, second segment as long as first with simple distal seta, third segment with three distal setae and one penicillate seta; exopod of one segment, subequal in length to proximal endopod segment, with two distal setae.

Male. Unknown.

Etymology. The HMAS *Kimbla* was one of the vessels used on the Bass Strait Survey between 1979 and 1984 (noun in apposition).

Remarks. Pagurapseudes kimbla sp. nov. is the only species of the genus to have two segments in the accessory flagellum and three in the main flagellum of the antennule. Equally, no previously described species of the related genus *Macrolabrum* has this combination of antennular flagellar segments. The present species is also unusual in having the propodus of pereopod 2 longer than the carpus (in other species it is conspicuously shorter). The only other species of *Pagurapseudes* to have only two segments in the antennular accessory flagellum are *P. inquilinus* Bamber (2007) from 440–450 m depth off New Caledonia, which has seven segments in the main

flagellum (Bamber, 2007), and *P. victoriae* (see above) which has 5 or 6 segments in the main flagellum. Both of those species have one dorsal and one ventral seta on the pleopod basis, whereas *P. kimbla* has none.

Pagurapseudes kimbla was taken only occasionally, from throughout the Bass Strait at depths from 40 to 183 m, and on varied substrata.

Genus ***Macrolabrum*** Băcescu, 1976

Macrolabrum tangaroa sp. nov.

Figures 48–50

Material examined. 1 ♂ (J56366), holotype, Stn BSS202, Western Bass Strait, 39º00.2'S 144º33.9'E, 74 m depth, 23 November 1981, sandy shell, coll. R.S. Wilson.

Description of male (limited by dissection of half of only available specimen). Body (Fig. 48A) typical of a pagurapseudid, small, holotype about 1.85 mm long. Cephalothorax apparently naked, rostrum (Fig. 49A) convex, smooth. Eyelobes distinguished with anterior pointed apophysis, eyes present as group of black-pigmented ocelli. Epistome not visible dorsally. Pereonites 1, 3 and 5 subequal, about 0.6 times as long as cephalothorax; pereonites 2 and 4 subequal, 1.15 times as long as pereonite 3; pereonite 6 longest, 1.45 times as long as pereonite 3. Pleon with five free subequal pleonites, each pleonite about half as long as pereonite 6. Pleonites 1 and 2 only bearing pleopods. Pleotelson semicircular, about as long as last two pleonites together, with plumose lateral seta and simple posterior seta on each side (Fig. 50I).

Antennule (Fig. 49B) proximal peduncle article 2.25 times as long as wide, margins without denticulation or apophyses inner margin with simple setae, outer margin with simple setae and two penicillate setae in distal half; second peduncle article 0.44 times as long as first with simple mesial and distal setae; third article 0.6 times as long as second, fourth article half length of second. Main flagellum of two segments, with single aesthetascs on each segment; accessory flagellum of one segment, distally just reaching distal edge of second segment of main flagellum.

Antenna (Fig. 49C) with two basal articles fused into wide proximal peduncle article with complex inner denticulation and single inner and outer-distal plumose setae; second article not as long as wide, with small inner distal spine; third peduncle article 1.5 times as long as second, fourth 2.5 times as long as second, both with distal penicillate setae. Flagellum of two very short segments, distal segment with one short and one very long distal setae, longer seta 1.5 times as long as distal three peduncle articles together.

Labrum (not figured) bilobed, rounded, sparsely setose, epistome present, not reaching anterior margin of carapace. Left mandible (Fig. 49D) with quadricuspid pars incisiva, narrow, bicuspid lacinia mobilis, setiferous lobe with four variously crenulate setae, pars molaris round, blunt, with distal marginal crenulations; palp (Fig. 49D') of three articles, basal article with single ventrodistal plumose seta, second article with five ventral plumose setae in distal half, third article with six plumose setae in distal third, these setae progressively longer distally such that proximal seta half length of article, distal seta more than twice as long as article; right mandible not seen. Labium (Fig. 49G) typically marginally setose, palp with two distal setae. Maxillule (Fig. 49E) inner endite with four distally-setulose distal setae, no outer apophysis; outer endite with 9 distal spines, outer and inner margins densely setose; palp (Fig. 49E') of two articles with distinct articulation, distally with four simple setae. Maxilla (Fig. 49F) outer margin naked, outer lobe of moveable endite with two subdistal and five distal simple setae, inner lobe with five simple setae; fixed endite outer lobe with five simple, one sabre-like, one trifurcate and two bilaterally denticulate distal spines and subdistal bilaterally denticulate spine, inner lobe with two longer distally denticulate setae and rostral row of 15 setae; one large inner distally denticulate seta. Maxilliped (Fig. 49H) basis with two inner plumose setae, three inner marginal denticulations, outer margin with small setose apophysis and two fine setae; proximal palp article with coarsely denticulate inner and outer margins and with one inner and one outer plumose seta; second article with coarsely denticulate inner and outer margins extended into large teeth inner-distally, and with six submarginal plumose setae and four plumose setae along inner margin, single outer plumose seta; third article with four setae on slight inner apophysis, each with fine denticulation in distal half; fourth article with six distal and two outer subdistal simple setae, each with fine denticulation in distal half; endite not seen. Epignath (Fig. 49I) large, marginally densely setose, inner lobes inconspicuous, distal spine setose.

Cheliped (Fig. 50A) with compact basis 1.2 times as long as wide, dorsally naked, ventrally with proximal seta, mud-ventral spine and six distal setae; exopodite absent. Merus subtriangular, with ventral plumose setae and ventrodistal denticulate triangular apophysis. Carpus unusually wide, 1.8 times as long as wide, widening distally to form cuff into which reflexed propodus could sit, cuff lined with crenulations; dorsally with sparse proximal plumose and simple setae, ventrally with sparse simple setae. Propodus robust, as long as wide with four ventral setae; fixed finger only half length of body of propodus ("palm"), with three ventrodistal and five dorsal setae, saw-like row of small teeth distally on cutting edge; moveable finger stout, curved, with three distal setae and one seta on cutting edge.

Pereopod 1 (Fig. 50B) longest pereopod, with stout basis 2.2 times as long as wide, dorsal margin bearing nine plumose setae but no apophyses, two subdistal submarginal outer plumose setae, ventral margin with three simple setae and plumose ventrodistal seta; exopodite present, large, distal article with fifteen plumose setae. Ischium 0.2 times as long as basis, with naked dorsal margin, simple ventral seta and single ventrodistal plumose seta. Merus 0.6 times as long as basis, naked, ventral margin with six plumose setae and nine shorter denticulate setae. Carpus just shorter than merus, with two ventral and three ventrodistal denticulate setae and longer ventrodistal simple seta, dorsodistally with two simple and two denticulate setae. Propodus as long as merus, with three ventral spines and two ventrodistal spines with adjacent simple setae. Dactylus curved, longer than propodus, with fine ventral setae, unguis slender, sharp, 0.6 times as long as dactylus.

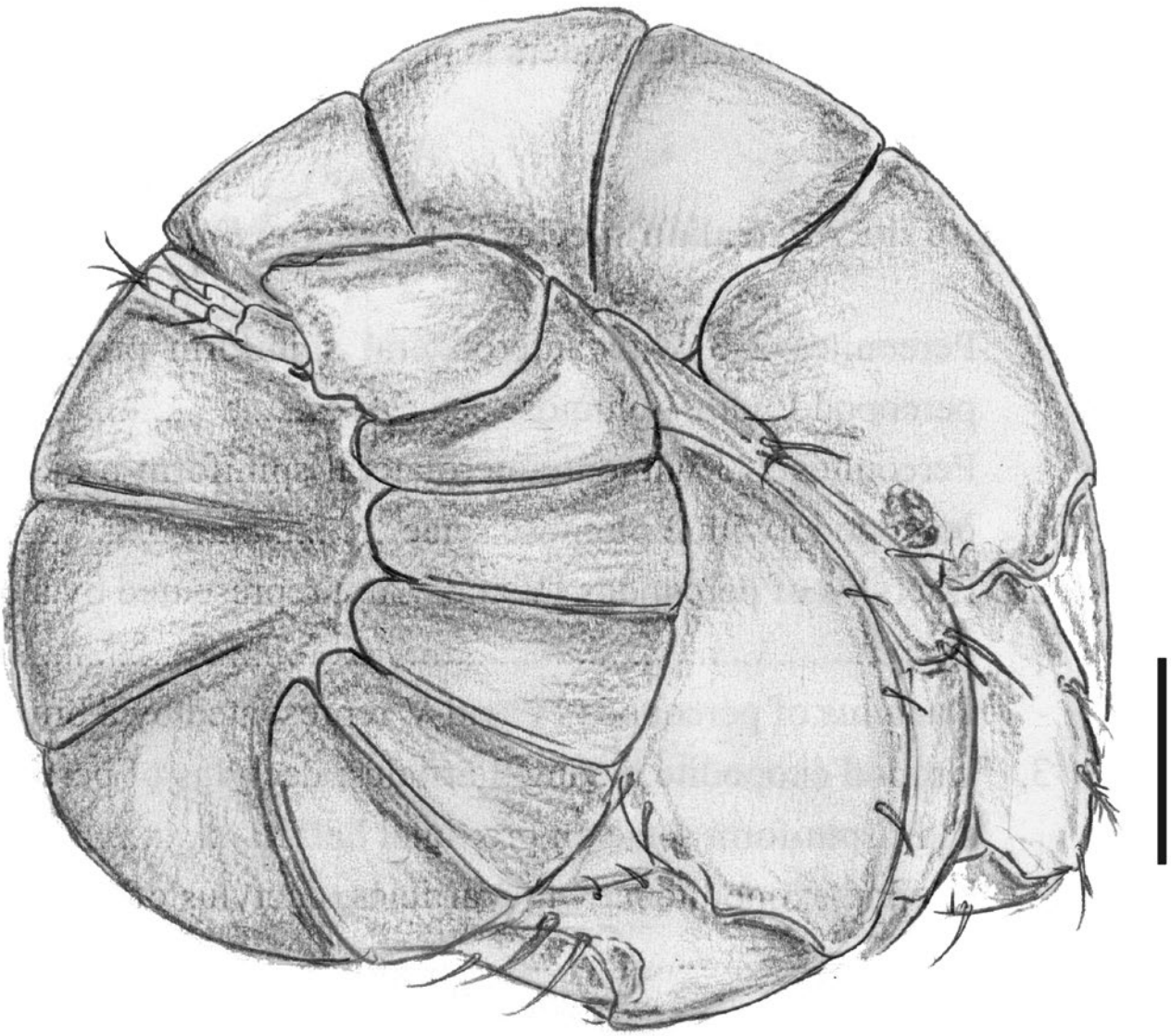

Fig. 48. *Macrolabrum tangaroa* sp. nov., holotype female. A, lateral view. Scale = 0.1 mm.

Pereopods 2 to 6 similar to each other, each about one-half as long as pereopod 1. Pereopod 2 (Fig. 50C) basis stout, 1.75 times as long as wide, with two plumose ventral seta; ischium with four plumose ventrodistal setae. Merus, carpus and propodus bearing "sucker-like" spines, generally in three ventral rows, and plumose setae as figured. Merus just shorter than carpus; propodus 0.3 times as long as carpus, with minutely denticulate distal spine; dactylus and unguis not fused, together longer than propodus. Pereopod 3 (Fig. 50D) with more setae on basis, only three plumose setae on ischium, carpus proportionately longer. Pereopod 4 (Fig. 50E) with only two plumose setae on ischium, carpus shorter than merus. Pereopod 5 (Fig. 50F) similar to pereopod 3, fewer sucker-like spines on merus. Pereopod 6 (Fig. 50G) with only one plumose seta on ischium.

Pleopods (Fig. 50H) only present on pleonites 1 and 2, biramous, reduced; basis with two dorsal but no ventral plumose setae; exopod with five distal plumose setae, endopod almost circular, with nine distal and inner plumose setae. Uropod (Fig. 50I) biramous, basis with one simple and one plumose distal setae; endopod longer than basis, of two segments, first segment shorter than basis, naked, second segment with three robust distal setae and one penicillate seta; exopod of two segments, first segment shorter than proximal endopod segment, second segment reaching half length of distal endopod segment, with two distal setae.

Female. Unknown.

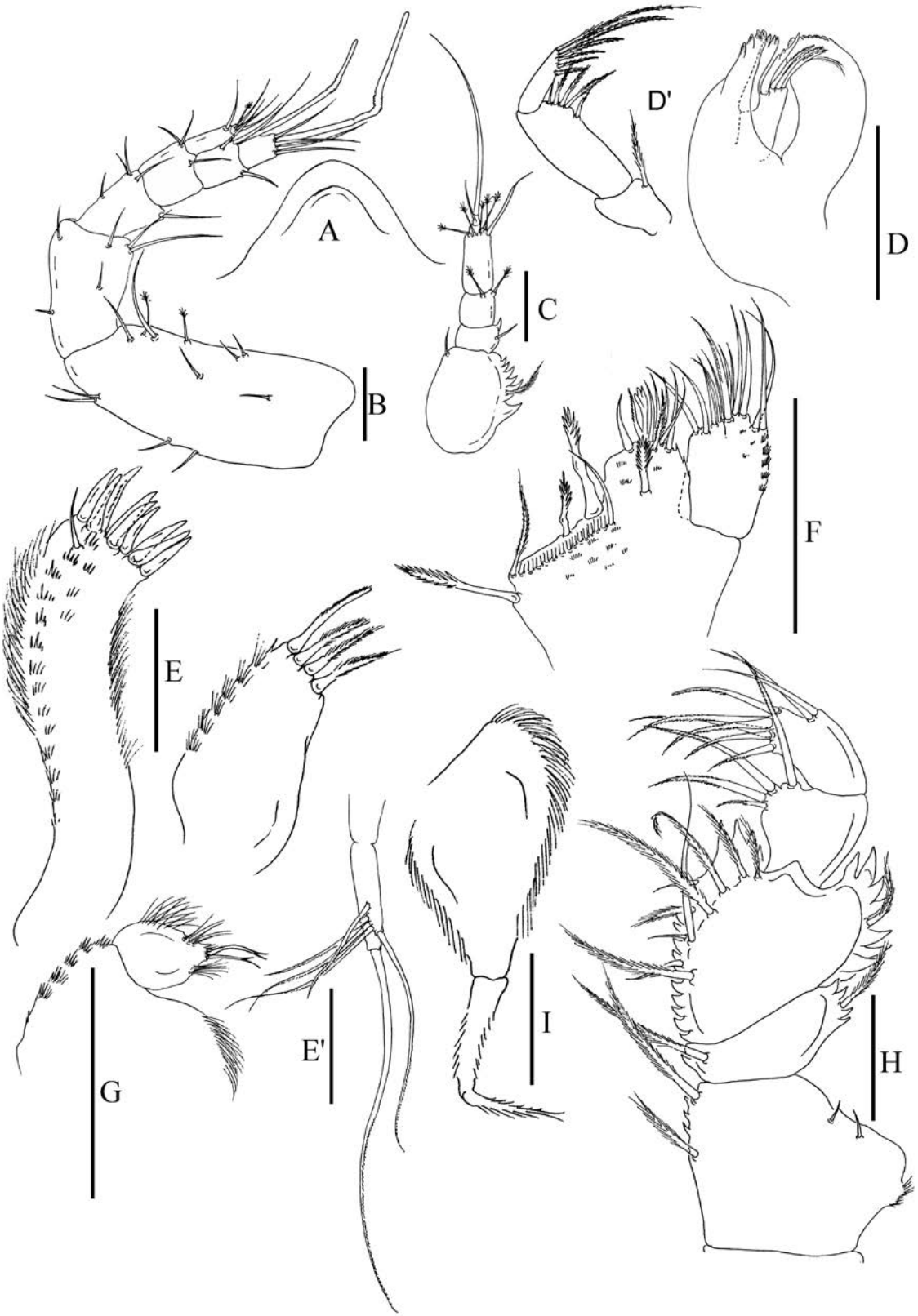

Fig. 49. *Macrolabrum tangaroa* sp. nov., female paratype. A, rostrum; B, antennule; C, antenna; D, left mandible; D', mandible palp; E, maxillule; E', maxillule palp; F, maxilla; G, labium; H, maxilliped; I, epignath. Scale = 0.1 mm.

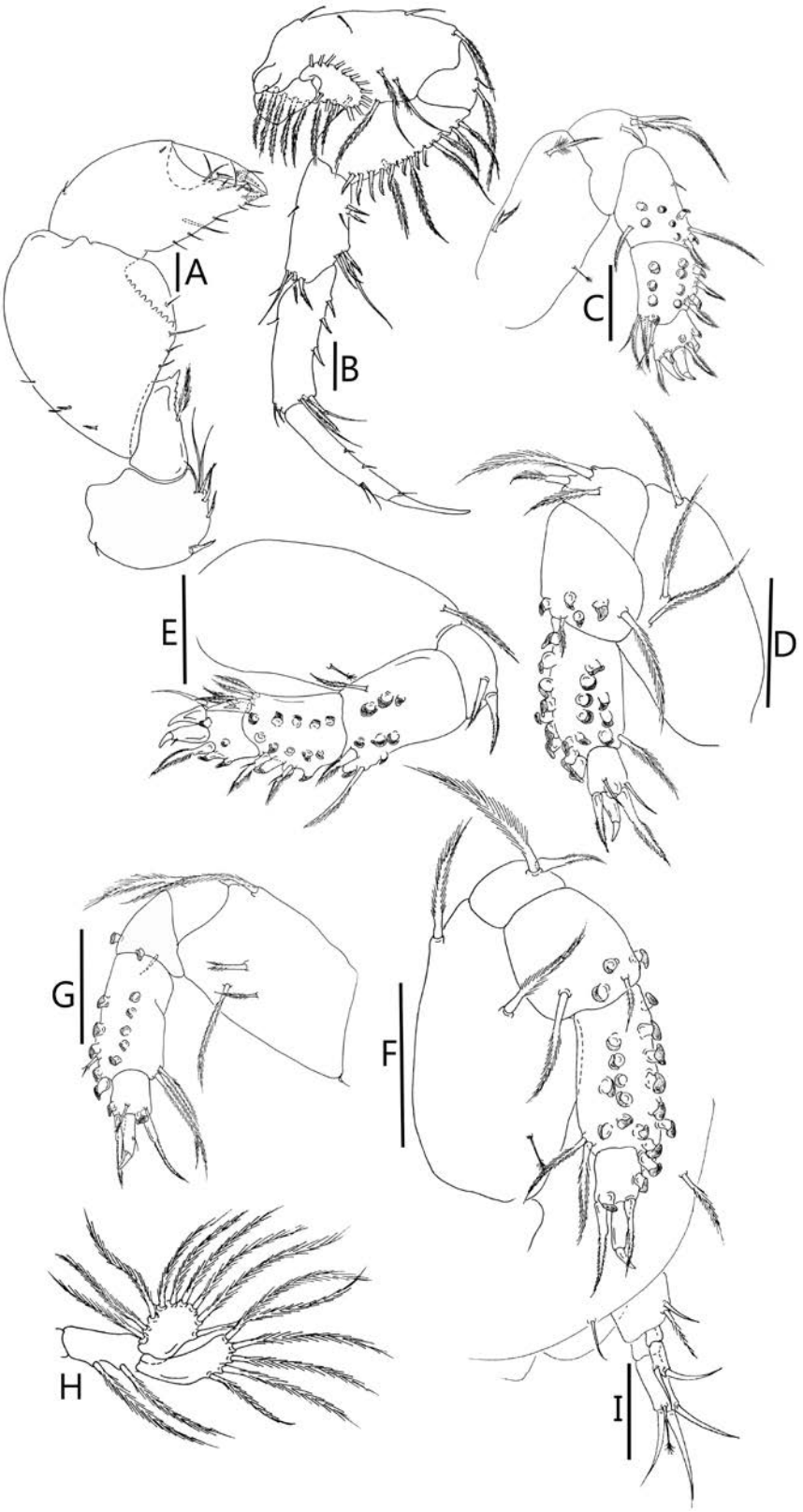

Fig. 50. *Macrolabrum tangaroa* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

Etymology. The RV *Tangaroa* was one of the vessels used on the Bass Strait Survey between 1979 and 1984 (noun in apposition).

Remarks. Unusually for a *Macrolabrum* species, the epistome of *M. tangaroa* sp. nov. does not exceed the anterior margin of the carapace (a condition also found in *M. distonyx*, a species with a three-segmented uropod endopod). The only other *Macrolabrum* species to have two segments in both uropod rami is *M. aenigmaticus* (known only from a juvenile), but that species differs from *M. tangaroa* in having a four-segmented main flagellum and a two-segmented accessory flagellum on the antennule, a propodus on pereopod 2 not shorter than the carpus, and distinct setation on the pereopod 1 basis, *inter alia*. The extremely wide, almost oval, cheliped carpus of *M. tangaroa* appears to be unique in the genus, but may represent a sexual dimorphism (males are not known for all species). The very short propodus on pereopod 2 is also an unusual and characterizing feature of this species.

The single specimen of *Macrolabrum tangaroa* was taken at 74 m depth in the western Bass Strait.

Macrolabrum sarda sp. nov.

Figures 51–54

Material examined. 1 ♀ (J57788), holotype, Stn SA63, Flinders Island, South Australia, "The Hotspot" reef, 5 n miles W of N end of Flinders Island, 33º40.30'S 134º22.00'E, 17 m depth, 19 April 1995, SCUBA, coll. G.C.B. Poore; 1 ♀, 1 ♂ (J56372), paratypes, same sample as Holotype; 1 ♀ (J56373), paratype, Stn SA59, Flinders Island, South Australia, bay on NW coast of Flinders Island, 33º41.42'S 134º28.30'E, 3 m depth, 23 November 1981, hand dredge, coll. G.C.B. Poore; 1 ♀ (J56366), paratype, Stn BSS180, Central Bass Strait, 8 km south of South East Point, Wilsons Promontory, Victoria, 39º12.9'S 146º27.3'E, 65 m depth, 18 November 1981, medium sand, coll. R.S. Wilson.

Description of female. Body (Fig. 51A) typical of a pagurapseudid, small, holotype about 3.5 mm long. Cephalothorax (Fig. 51A, B) subrectangular, slightly narrower anteriorly, almost as long as wide, with denticulate rostrum; paired plumose setae behind ocular lobe, lateral margins with six hooked spine-like apophyses and seven plumose setae. Eyelobes distinct, eyes present as group of black-pigmented ocelli. Epistome conspicuous, exceeding anterior margin of carapace, visible dorsally. Pereonite 1 with undulating anterior and posterior margins, 0.4 times as long as cephalothorax and 2.8 times as wide as long, laterally with seven or eight plumose setae on each side; pereonite 2 similar to but just longer than pereonite 1, twice as wide as long, laterally with two plumose setae on each side; pereonites 3 to 6 naked. Pleon 0.4 times as long as whole body, with five free subequal pleonites, each pleonite nearly as long as pereonite 6 and slightly wider than long; pleonites 1 and 2 only bearing pleopods. Pleotelson subrectangular, about twice as long as last pleonite, 1.5 times as long as wide, with three lateral setae on each side.

Antennule (Fig. 52A) proximal peduncle article 3.5 times as long as wide, inner margin with four proximal spine-like apophyses accompanied by simple setae, further simple setae in distal half, outer margin with proximal penicillate setae, distal simple setae and distal spine; second peduncle article 0.5 times as long as first, inner spine-like apophysis at mid-length, both margins with single mid-length plumose seta and tuft of distal plumose setae; third article 0.85 times as long as second, with short inner and outer plumose setae; fourth article one-third length of third. Main flagellum of four segments including minute distal segment, first, second and third segments with 3, 2 and 1 aesthetascs respectively; accessory flagellum of three segments, first segment short, second segment longest and distally exceeding distal edge of first segment of main flagellum, third segment minute.

Antenna (Fig. 52B) with two basal articles fused into wide proximal peduncle article bearing complex denticulation along inner margin, one plumose and one simple inner setae; third article one-third length of fused proximal articles, as long as wide with inner distal spine-like apophysis and outer distal spine and adjacent simple seta; fourth peduncle article twice as long as third with inner distal spine-like apophysis and outer distal penicillate seta; fifth article 2.5 times as long as third with distal crown of penicillate setae and long outer simple seta. Flagellum of two unequal segments, distal segment with three distal setae.

Labrum (not figured) bilobed rounded, sparsely setose, epistome large, exceeding rostrum. Left mandible (Fig. 52C) with heavily denticulate outer margin, quadricuspid pars incisiva, tricuspid lacinia mobilis, setiferous lobe with four distally denticulate setae, pars molaris round, blunt, crushing face with marginal crenulations; palp of three articles, proximal article with inner distal crenulations and long, plumose inner seta, second article longest, 1.7 times as long as proximal article, inner margin with five plumose and two simple marginal setae, and 23 shorter simple setae essentially in two rows; third article half as long as second, with six progressively-longer inner setae and two outer setulose subdistal setae. Right mandible (Fig. 52D) as left but without lacinia mobilis. Labium (Fig. 52G) with hook-like denticulation on outer margin, palp elongate, setose, with two distal setae. Maxillule (Fig. 52E) inner endite with four distally-denticulate distal setae and outer apophysis below setose margin, outer endite with 9 distal spines, outer margin setose; palp of two articles with indistinct articulation, distally with six setae each minutely denticulate in its distal half. Maxilla (Fig. 52F) outer margin setulose, outer lobe of moveable endite with two subdistal and five distal simple setae, inner lobe with seven simple setae and one plumose seta; fixed endite outer lobe with fpur simple, three trifurcate and one bilaterally denticulate distal spines, inner lobe with one longer distally denticulate seta and rostral row of 16 setae. Maxilliped (Fig. 52H) basis with two inner and three distal setae and small outer setulose apophysis; proximal palp article with denticulate inner and outer margins, and one inner and one outer plumose setae; second article with denticulate inner and outer margins, outer margin with one distal and three marginal plumose setae, inner margin with two distal plumose setae and two more in proximal half, and sparse simple setae; third article with five simple and four finely-denticulate inner marginal setae; distal article with six finely-denticulate inner-marginal and distal setae, paired outer subdistal plumose setae; endite (Fig. 52H') with finely setose outer margin, distally with two plumose setae and five bi- or trifurcate spines progressively smaller towards inner

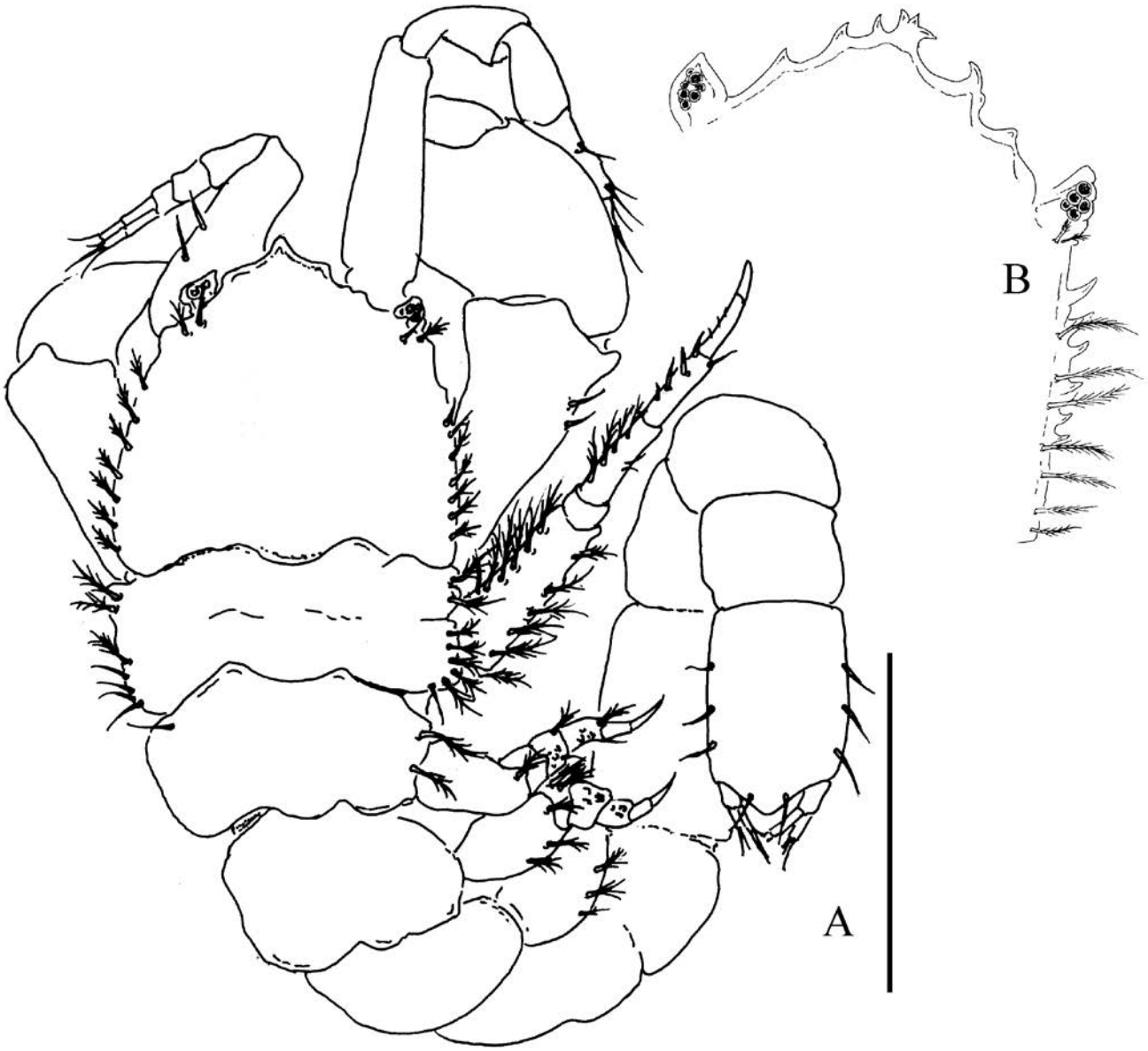

Fig. 51. *Macrolabrum sarda* sp. nov. A, adult female, dorsal view; B, cephalothorax. Scale = 1 mm.

margin, and two subdistal plumose setae; three coupling-hooks. Epignath (Fig. 52I) large, oval, distal spine coarsely setose.

Chelipeds showing dimorphism. Right cheliped (Fig. 53B) with compact basis 1.3 times as long as wide, with three dorsal setae on slight apophysis, mid-ventral finely-denticulate spine, two ventrodistal finely-denticulate spines and ventrodistal plumose seta; exopodite absent. Merus subtriangular with pronounced distal triangular extension, five simple and three plumose ventral setae. Carpus elongate, 2.3 times as long as wide, dorsally with sparse fine setae and mid-dorsal hook-like apophysis, ventrally with denticulate margin in distal half, four simple and one plumose marginal setae. Propodus robust, 1.35 times as long as wide, with three ventral and one dorsoproximal short setae; fixed finger wide, blunt, distally rounded, claw nor evident, with row of crenulations distally and tuft of three proximal setae on cutting edge, two ventral setae; moveable finger stout, strongly curved, cutting edge with rounded crenulations. Left chela (not figured) more slender, fixed finger pointed with distal claw.

Pereopod 1 (Fig. 54A) longest pereopod, coxa with triangular apophysis bearing two plumose setae; basis stout, 2.3 times as long as wide, with mid-proximal spine, dorsal margin expanded, expansion incomplete distally, bearing 19 plumose setae interspersed with eleven triangular spinules, ventral margin with three proximal simple setae, three central plumose setae and one distal plumose seta; exopodite present (Fig. 54A'), large, second

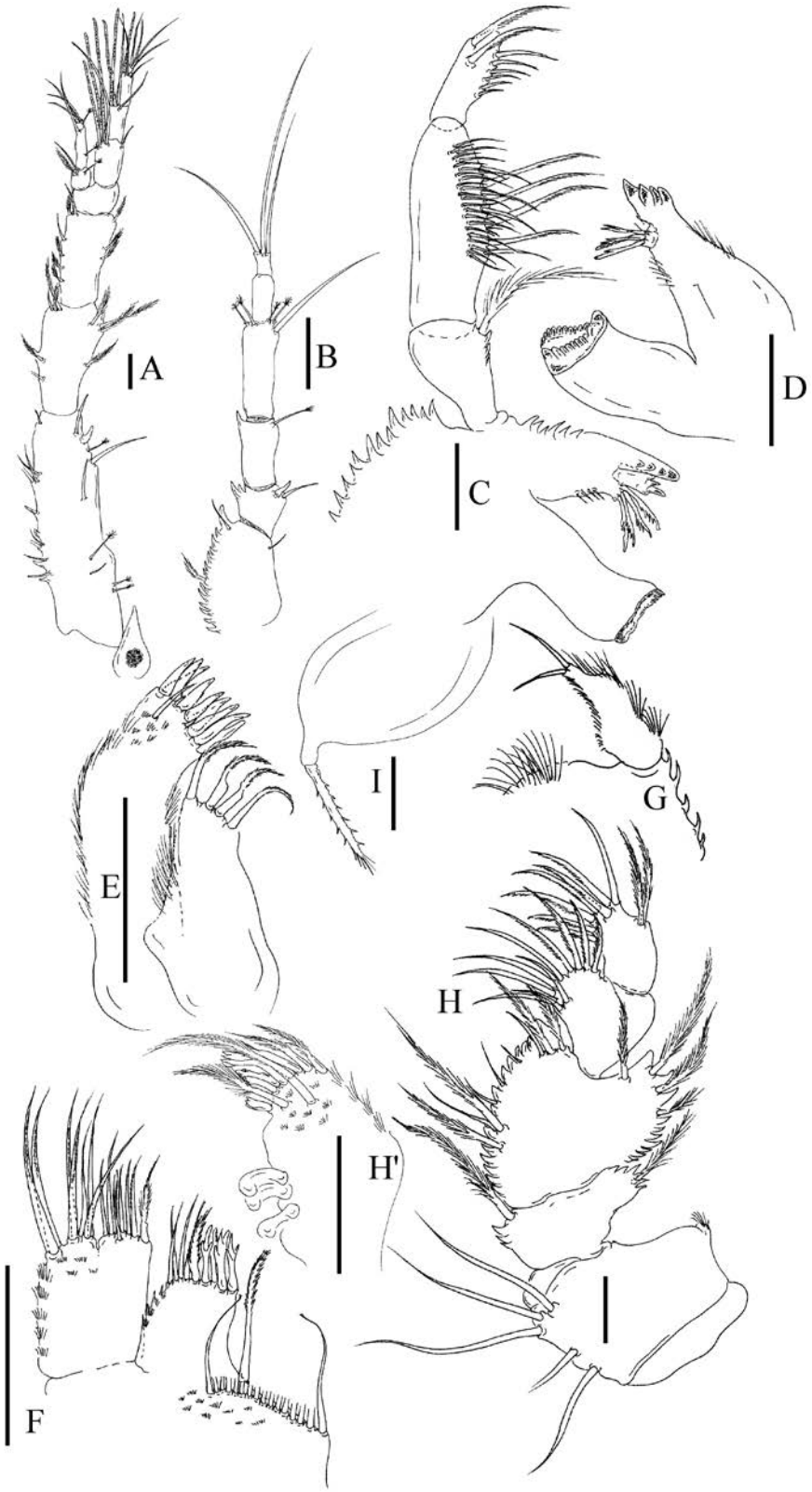

Fig. 52. *Macrolabrum sarda* sp. nov., female paratype. A, antennule; B, antenna; C, left mandible; D, right mandible; E, maxillule; F, maxilla; G, labium; H, maxilliped; H', maxilliped endite; I, epignath. Scale = 0.1 mm.

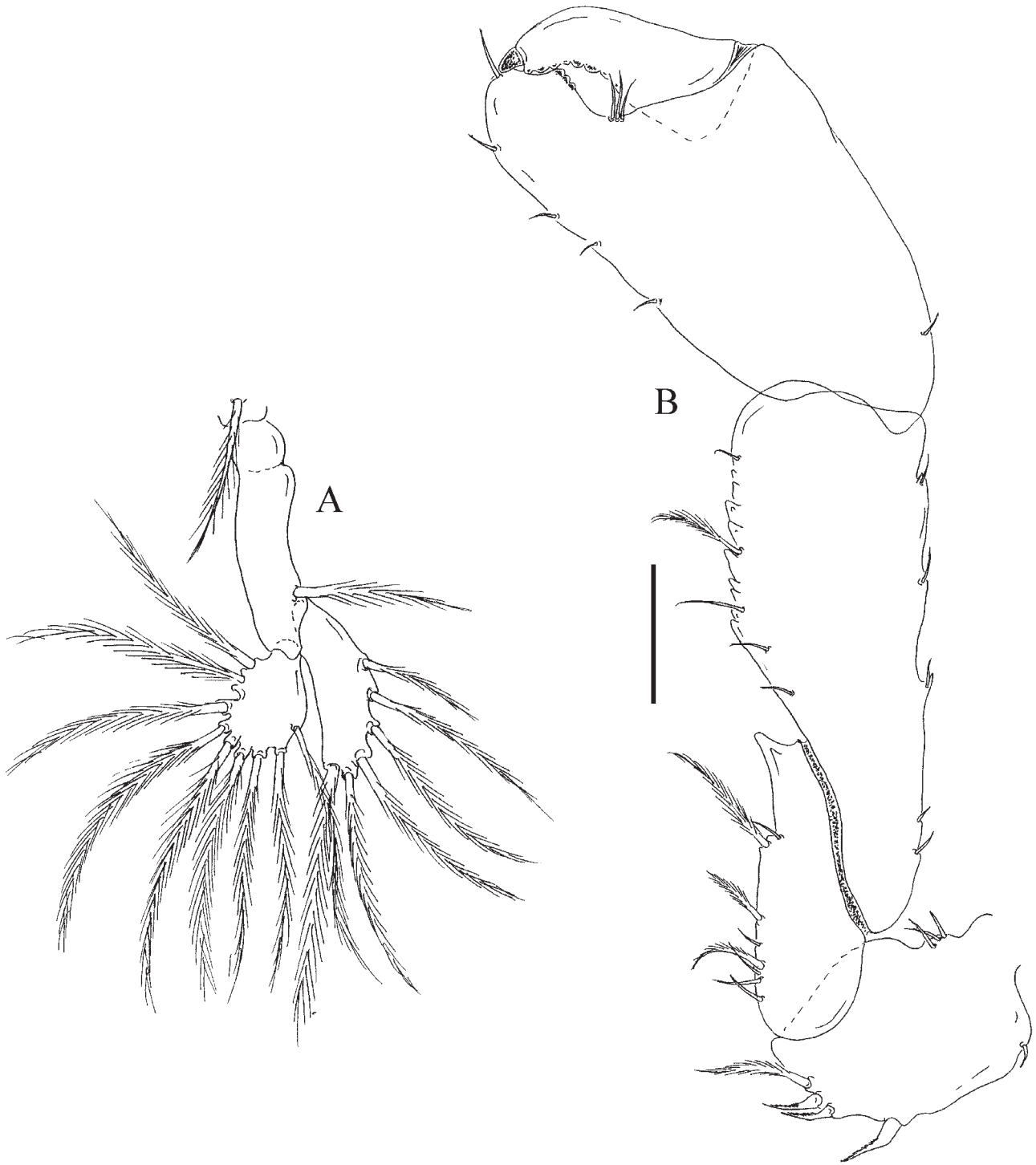

Fig. 53. *Macrolabrum sarda* sp. nov. A, pleopod; B, cheliped, female. Scale = 0.1mm.

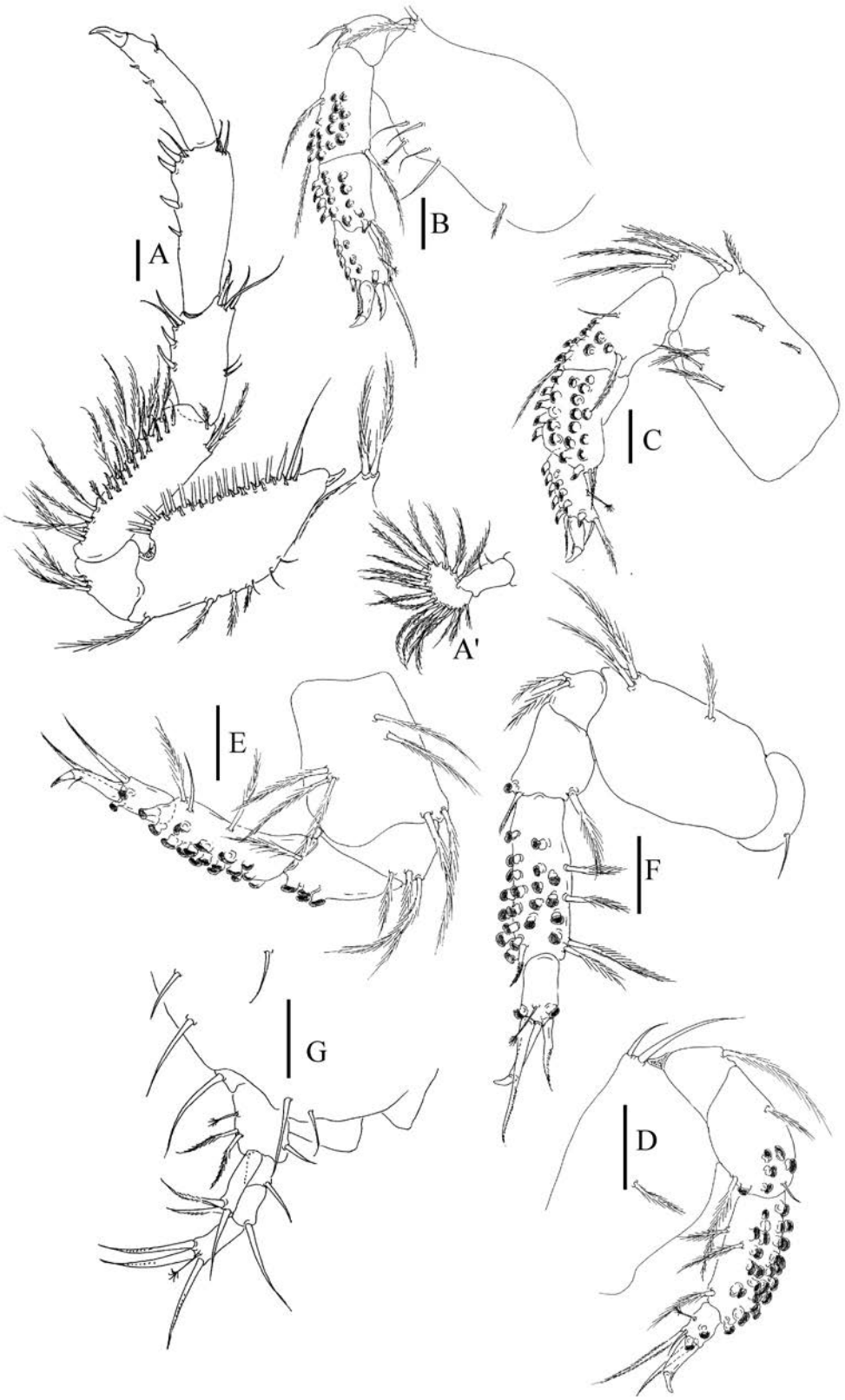

Fig. 54. *Macrolabrum sarda* sp. nov., male paratype. A, pereopod 1; A', pereopod 1, exopod; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, uropod. Scale = 0.1 mm.

article with two dorsal setules, distal article with 18 plumose setae. Ischium as long as wide, with naked dorsal margin, three plumose ventral setae. Merus 0.8 times as long as basis, dorsally with two plumose and one simple distal setae, ventrally with 10 marginal plumose setae, 17 submarginal denticulate setae in two rows. Carpus short, half length of merus, ventrally with three spines and subdistal simple setae, and with two mid dorsal simple setae and dorsodistal tuft of three simple setae and one spine. Propodus 1.7 times as long as carpus, with four ventral spines in distal half and sparse distal setae. Dactylus stout, curved, 0.8 times as long as propodus, with three ventral and one dorsal setae, unguis slender, sharp, 0.3 times as long as dactylus.

Pereopods 2 to 6 similar to each other, each about one-half to one-third as long as pereopod 1. Pereopod 2 (Fig. 54B) coxa with simple seta; basis stout, 1.9 times as long as wide, dorsally with plumose proximal seta and four simple and one penicillate setae in distal half, ventrally with two distal plumose setae; ischium with paired ventrodistal setae. Merus, carpus and propodus bearing "sucker-like" spines, generally in three ventral rows, and sparse plumose setae as figured. Merus 1.5 times as long as basis; carpus 0.7 times as long as merus; propodus 0.75 times as long as carpus; dactylus and unguis not fused, with minute inner seta, together 0.8 times as long as propodus; adjacent distal propodal, spine simple but with inner distal fine denticulation. Pereopod 3 (Fig. 54C) with only plumose setae on basis, three ventrodistal plumose setae on ischium, dorsal penicillate seta on propodus. Pereopod 4 (Fig. 54D) slightly more compact, basis 1.5 times as long as wide; fewer sucker-like spines on merus; carpus just longer than merus; propodus short, 0.3 times as long as carpus, with two denticulate distal spines; dactylus plus unguis 1.5 times as long as propodus. Pereopod 5 (Fig. 54E) as pereopod 4 but with more plumose setae on basis and ischium. Pereopod 6 (Fig. 54F) carpus twice as long as merus, only one sucker-like spine on merus.

Pleopods (Fig. 53A) only present on pleonites 1 and 2, biramous, reduced; basis with single dorsal and no ventral plumose seta, and suggestion of proximal articulation; exopod with six outer and distal plumose setae, endopod almost circular, with eight marginal plumose setae.

Uropod (Fig. 54G) biramous, basis outer margin with two plumose and one penicillate setae, inner margin with one subdistal simple seta; endopod longer than basis, of three segments increasing in length, first and second segments each with inner distal simple seta, third segment with three stout distal setae each with fine serrations in distal half and one penicillate seta; exopod of one segment, subequal in length to proximal two endopod segments together, with three distal setae each with fine serrations in distal half.

Male. Closely similar to female, chelipeds not significantly sexually-dimorphic.

Etymology. The SV *Sarda* was one of the vessels used on the Bass Strait Survey between 1979 and 1984 (noun in apposition).

Remarks. The only other species of Macrolabrum to show minute distal segments on both flagella of the antennule are *M. aenigmaticus, M. boeri* and *M. abrucei*, but these have only two segments in the accessory flagellum; further, *M. aenigmaticus* has no pleopod basis setae and only two uropod endopod segments, while the other two have only one uropod exopod segment, and *M. boeri* has six ventral setae on the pleopod basis.

In fact, the only other species of the Pagurapseudinae to have a three-segmented accessory flagellum on the antennule is *Pagurapseudes victoriae* (see above), and then only in rare, larger individuals, while the complex setation of the basis and merus of pereopod 1 and of the second mandible palp article are unique to *Macrolabrum sarda* sp. nov..

Macrolabrum sarda sp. nov. was recorded from the Central Bass Strait, at 65 m on medium sand, as well as from South Australia at 3 to 17 m depth.

Macrolabrum haikung sp. nov.

Figures 55–57

Material examined. 1 brooding ♀ (J57787), holotype, Stn CRUST 23, "The Whaleback", Bommie, 0.5 km S of Point Hicks, Victoria, 37°48.30'S 149°16.48'E, 13 m depth, 08 April 1989, SCUBA, coll. G.C.B. Poore; 14 ♀♀ (J56374), paratypes, same sample as Holotype; 1 ♀ (27697), paratype, Stn BSS175, Eastern Bass Strait, 40 km north of Deal Island, Tasmania, 39°05.8'S 147°26.2'E, 59 m depth, 18 November 1981, medium sand, coll. R.S. Wilson.

Description of female. Body (Fig. 55A) typical of a pagurapseudid, pleon skewed to the right and curved under pereon; small, holotype about 2.4 mm long. Cephalothorax slightly longer than wide, rostrum rounded, finely denticulate (Fig. 55B). Eyelobes distinguished with anterior pointed apophysis, eyes present as group of black-pigmented ocelli. Epistome not conspicuous. Pereonites 1, 2 and 3, 4 subequal, 0.3 times as long as cephalothorax; pereonites 4 and 5 subequal, 1.4 times as long as pereonite 1; pereonite 6 longest, 1.7 times as long as pereonite 1. Pleon of five free subequal pleonites, each pleonite about 0.7 times as long as pereonite 6; pleonites 1 and 2 only bearing pleopods. Pleotelson (Fig. 57I) subrectangular, about as long as last pleonite, 1.4 times as wide as long, with single plumose lateral seta on each side, and paired simple posterior setae.

Antennule (Fig. 56A) compact, proximal peduncle article 2.2 times as long as wide, without apophyses, inner margin sparsely setose, inner margin with three penicillate and one simple setae distally; second peduncle article 0.4 times as long as first with simple distal setae; third article 0.7 times as long as second, with simple distal setae; fourth article half length of second, with two simple and one penicillate distal setae. Main flagellum of two segments, with simple setae and single aesthetasc on each segment; accessory flagellum of one segment, distally exceeding distal edge of first segment of main flagellum.

Antenna (Fig. 56B) with two basal articles fused into wide proximal peduncle article bearing inner denticulation and plumose seta, outer margin expanded into a flange with two simple setae; third article shorter than wide, one-fifth length of combined proximal articles, with simple inner seta; fourth peduncle article 1.7 times as long as third, with inner penicillate seta; fifth article three-times as long as third, with penicillate and simple distal setae. Flagellum of two minute segments, proximal segment with penicillate seta, distal segment with two distal setae.

Fig. 55. *Macrolabrum haikung* sp. nov., holotype female. A, lateral view; B, rostrum. Scale = 0.1 mm.

Labrum (not figured) bilobed, rounded, sparsely setose. Right mandible (Fig. 56C) with tricuspid pars incisiva, setiferous lobe with three trifid setae, pars molaris slender, round, blunt, simple; palp of three articles, proximal article with long, plumose inner seta, second article longest, twice as long as first article, naked; third article as long as first, with four progressively longer distal setae and one outer subdistal seta, each seta finely denticulate. Left mandible (not figured) as right but with narrow, bicuspid lacinia mobilis. Labium typically marginally setose, palp (Fig. 56F) with setulose margins and two distal setae. Maxillule (Fig. 56D) inner endite with four finely serrate distal setae, margins naked, no outer apophysis; outer endite with 9 serrate distal spines, outer margin setose; palp of two articles, distally with outer setules and three simple setae. Maxilla (Fig. 56E) outer margin naked, outer lobe of moveable endite with two subdistal and four distal simple setae, inner lobe with six simple setae; fixed endite outer lobe with three simple, three trifurcate and one bilaterally denticulate distal spines, inner lobe with one longer distally denticulate seta and rostral row of 10 setae. Maxilliped (Fig. 56G) basis with two inner plumose setae, outer margin denticulate and with one short plumose seta; proximal palp article with two denticulations and one plumose seta on inner and outer margins; second article with denticulate inner and outer margins, outer margin with two plumose setae, inner margin with four plumose and two simple setae; third article with three inner marginal simple setae; distal article with seven finely-denticulate and one simple distal setae, paired outer subdistal setae each with setules at mid-length and finely-denticulate distal half; endite (Fig. 56G') with naked outer margin, five bifurcate distal spines, and two coupling-hooks. Epignath (Fig. 56H) narrow, inner lobes conspicuous, distal spine with short marginal setules in distal half.

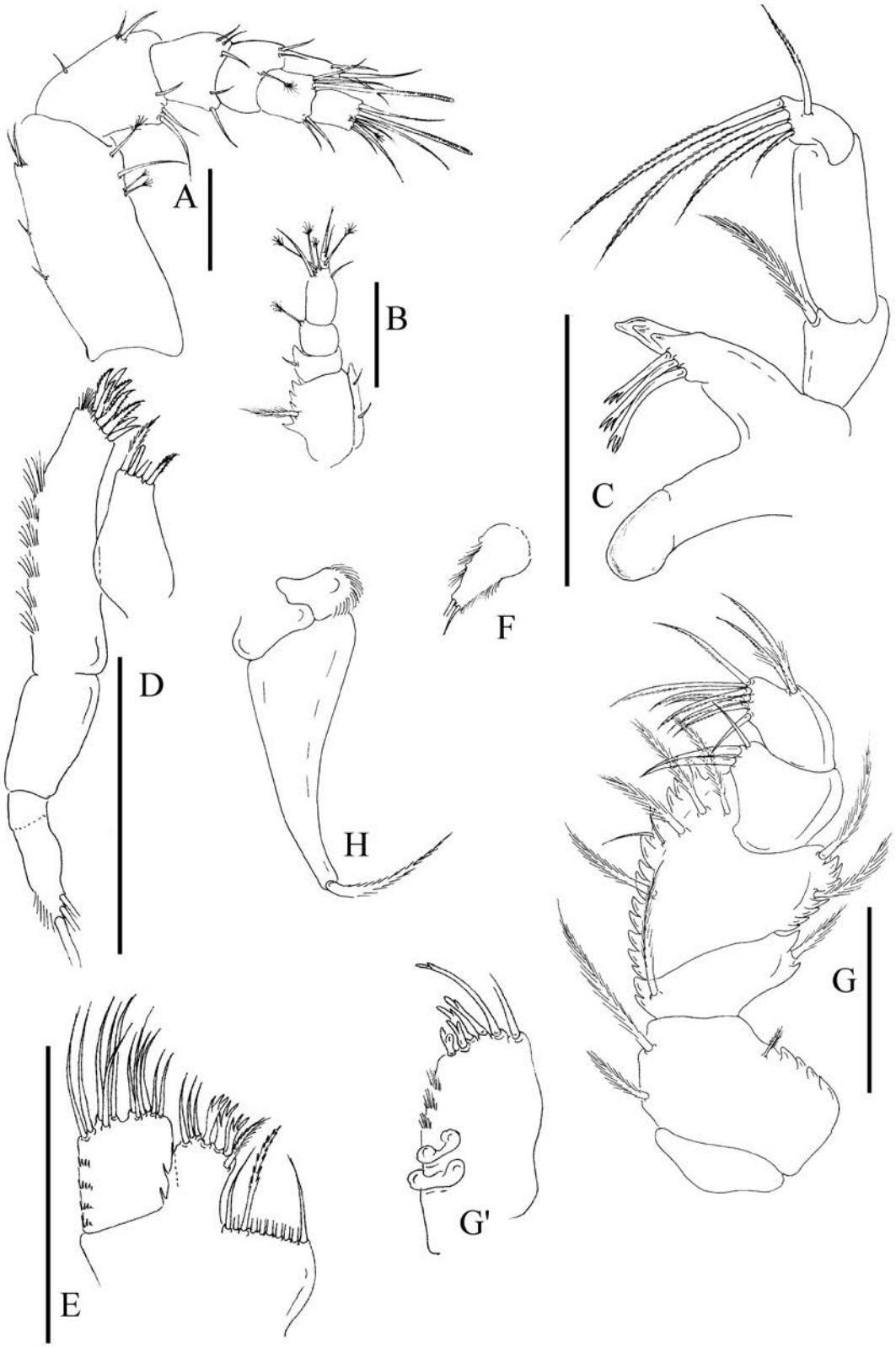

Fig. 56. *Macrolabrum haikung* sp. nov., female paratype. A, antennule; B, antenna; C, left mandible; D, maxillule; E, maxilla; F, labial palp; G, maxilliped; G', maxilliped endite; H, epignath. Scale = 0.1 mm.

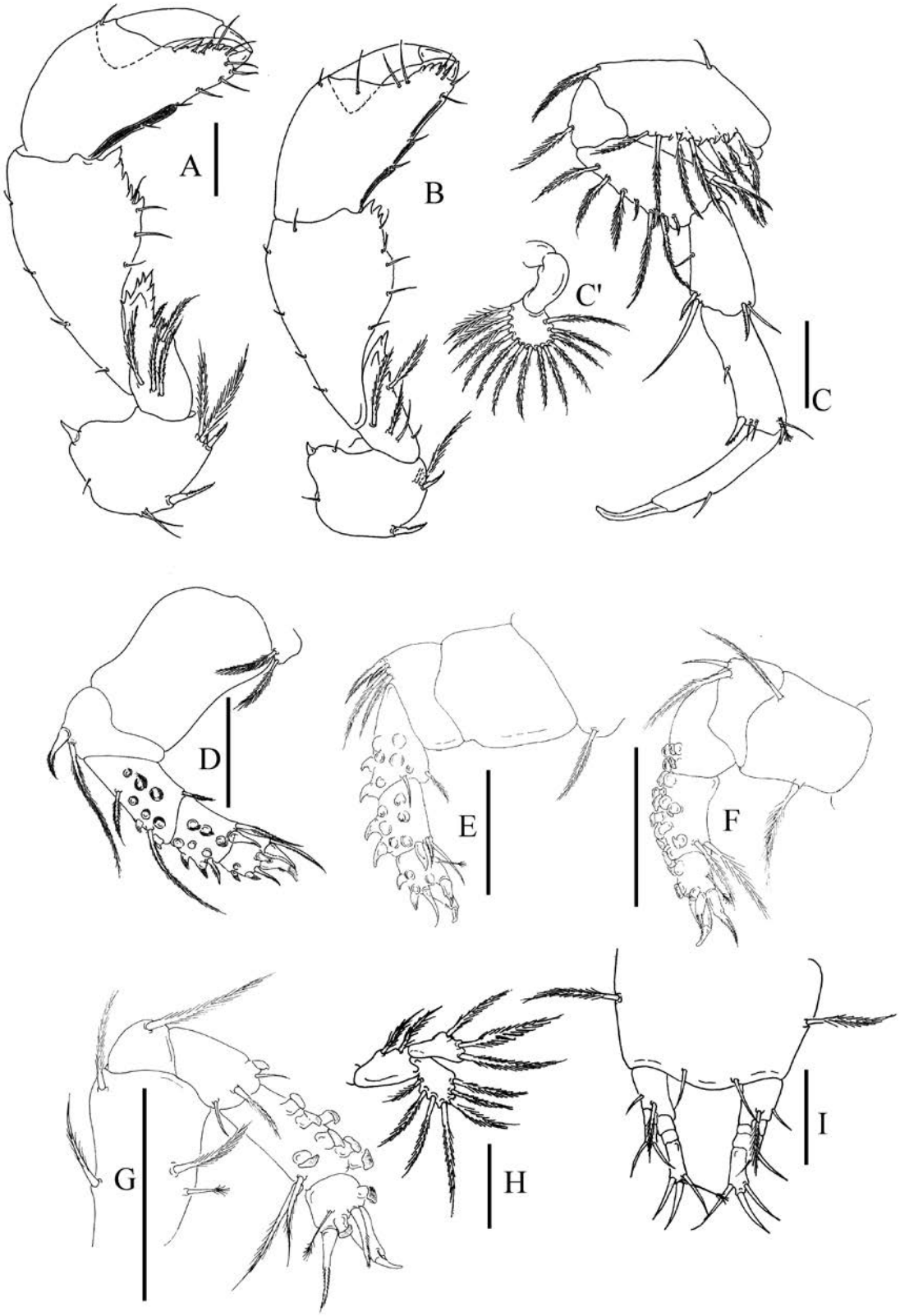

Fig. 57. *Macrolabrum haikung* sp. nov., female paratype. A, right cheliped; B, left cheliped; C, pereopod 1; C', exopod; D, pereopod 2; E, pereopod 3; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

Chelipeds showing slight dimorphism. Right cheliped (Fig. 57A) with compact basis 1.1 times as long as wide, with mid-ventral spine, two simple setae proximal to this, and two plumose setae and one spine ventrodistally; stout proximal spine dorsally; exopodite absent. Merus subtriangular, with complex, denticulate triangular distal apophysis, two mid-ventral, two inner-proximal and three outer-proximal plumose setae. Carpus elongate, 1.65 times as long as wide, widening distally, with six teeth in ventrodistal denticulation, four ventral and four dorsal simple setae. Propodus 1.3 times as long as wide, single dorsodistal seta, ventrally with two simple setae and expanded into thin flange; fixed finger with three ventral, one distal and five dorsal marginal setae, crenulate cutting edge; moveable finger stout, curved, naked. Left cheliped (Fig. 57B) similar, ventral denticulations on carpus limited to three on distal apophysis, chela slightly more slender (propodus 1.2 times as long as wide), with fewer setae and denticulation restricted to distal half of cutting edge of fixed finger.

Pereopod 1 (Fig. 57C) longest pereopod, with stout basis twice as long as wide, dorsal margin bearing seven plumose setae interspersed amongst triangular tooth-like apophyses, and three rounded paddle-like apophyses proximally; ventral margin with simple proximal seta and distal plumose seta; exopodite present (Fig. 57C'), large, second article naked, distal article with thirteen plumose setae. Ischium 0.3 times as long as basis, with single ventral plumose seta. Merus relatively compact for the genus, twice as long as wide, 0.75 times as long as basis, with two denticulate dorsodistal setae, ventral margin with five longer plumose setae and four shorter denticulate spines. Carpus shorter than merus, with denticulate spine and simple seta dorsodistally and ventrodistally. Propodus as long as merus, with dorsodistal group of one simple seta, one penicillate seta and one curved spine, ventrodistally with two simple setae and one denticulate spine. Dactylus almost straight, just longer then propodus, with single dorsal but no ventral setae, unguis slender, curved, blunt, half as long as dactylus.

Pereopods 2 to 6 similar to each other, each about one-half to one-third as long as pereopod 1. Pereopod 2 (Fig. 57D) basis stout, 1.7 times as long as wide, naked; ischium with one shorter and one longer ventrodistal setae. Merus, carpus and propodus bearing "sucker-like" spines, generally in three ventral rows, and sparse plumose setae as figured. Merus longer carpus; propodus 0.6 times as long as carpus, both with stout, finely denticulate distal spine; dactylus and unguis not fused, with minute inner seta. Pereopod 3 (Fig. 57E) with very short basis, shorter than wide, ischium with three ventrodistal plumose setae, merus with fewer sucker-like spines, merus and carpus subequal in length, carpus and propodus both with stout, finely denticulate distal spine. Pereopod 4 as pereopod 5. Pereopod 5 (Fig. 57F) with one dorsal and one ventrodistal setae on basis, one longer and one shorter ventrodistal setae on ischium, merus without setae, shorter than carpus; stout, finely denticulate distal spine on propodus only. Pereopod 6 (Fig. 57G) basis with two plumose dorsal setae, mid-ventrally with plumose seta and penicillate seta; ischium with one ventrodistal seta; merus with only one sucker-like spine; unguis mounted subdistally on dactylus.

Pleopods (Fig. 57H) only present on pleonites 1 and 2, biramous, reduced; basis with two ventral plumose setae; exopod with three distal plumose setae, endopod almost circular with seven marginal plumose setae. Uropod (Fig. 57I) biramous, basis with one simple and one plumose distal setae; endopod longer than basis, of three segments, first and second segments subequal, distally naked, third segment longer than first two together, with three stout distal setae and one penicillate seta; exopod of two segments, together subequal in length to proximal two endopod segments together, with two distal setae.

Male. Unknown.

Etymology. The FRV *Hai Kung* was one of the vessels used on the Bass Strait Survey between 1979 and 1984 (noun in apposition).

Remarks. The only other species of *Macrolabrum* with three and two segments in the uropod endopod and exopod respectively, and two and one segments in the antennular main and accessory flagellum respectively is *M. distonyx*, from New Caledonia (see Bamber, 2007), which also has a proximal spine on the cheliped basis like *M. haikung* sp. nov. and an epistome not exceeding the anterior margin of the carapace, but that species has a far more elongate antennule with denticulation on the proximal peduncle article, a triangular, denticulate rostrum, four spines on the mandible palp second article, more slender pereopod bases, and a huge chela on the right cheliped, *inter alia*.

Indeed, the present species is unique in its extremely compact pereopod bases, the relatively short articles of pereopod 1 with

Table 1. Numbers of segments in the antennule flagella and uropod rami, for all described Australian species of Pagurapseudinae.

Species	Main flagellum	Accessory flagellum	Uropod exopod	Uropod endopod
Pagurotanais koonungai Bamber, 2008	3	1	1	2
Macrolabrum abrucei (Bãcescu 1981)	4	2	1	3
Macrolabrum boeri Bãcescu 1981	4	2	1	3
Macrolabrum impedimenta Bamber, 2005	2	1	1	2
Macrolabrum tangaroa sp. nov.	2	1	2	2
Macrolabrum sarda sp. nov.	4	3	1	3
Macrolabrum haikung sp. nov.	2	1	2	3
Pagurapseudes spinipes Whitelegge 1901	4	1	1	3
Pagurapseudes victoriae sp. nov.	5 (6)	2 (3)	1	3
Pagurapseudes kimbla sp. nov.	3	2	1	3

their sparse setation, the lack of ventral setae on the dactylus of pereopod 1, the subdistal attachment of the unguis on pereopod 6, the serration of the distal spines on the maxillule outer endite, and in particular the inner flange on the antenna proximal article and the ventral flange on the cheliped propodus.

Macrolabrum haikung was taken from the Eastern Bass Strait at 13 to 59 m depth on medium sand.

Comment on the Pagurapseudinae of Australia

The known Pagurapseudinae of Australia are largely easily distinguishable by the numbers of segments in the antennule flagella and in the uropod rami, as shown in Table 1.

Suborder **Tanaidomorpha** Sieg, 1980

Superfamily **Paratanaoidea** Lang, 1949

Family **Paratanaidae** Lang, 1949

Subfamily **Paratanaidinae** Lang, 1949

Genus ***Paratanais*** Dana, 1952

Paratanais malignus Larsen, 2001

Figures 58–59

Paratanais malignus Larsen, 2001, 368–372, figs 11–13, 17.

Material examined. 1 ♀ (J56667), Stn BUN2, off Honeysuckle Hill, Bunurong, Victoria, 38°40.32'S 145°37.47'E, 10 to 11 m depth, 1 April 1997, SCUBA, coll. T,D. O'Hara. 2 ♀♀ (J56668), 1 ♀ (J56669), Stn WV11, Beware Reef, near Cape Conran, Victoria, 37°49.21'S 148°47.23'E, 5 to 6 m depth, 15 April 1998, SCUBA, coll. T,D. O'Hara. 3 ♀♀ (J56670), Stn WV13, Sailor's Grave, off East Cape Conran, Victoria, 37°48.13'S 148°44.41'E, 4 to 5 m depth, 15 April 1998, SCUBA, coll. T,D. O'Hara. 1 ♀ (J56671), Stn WV5, Cheviot Beach, Point Nepean, Victoria, 38°18'S 144°40'E, 1.9 to 3.5 m depth, 31 March 1998, SCUBA, coll. T,D. O'Hara. 1 ♀ (J56694), Stn BSS 213T, Eastern Bass Strait, 24 km SW of Lakes Entrance, Victoria, 38°03'S 147°50'E, 45 m depth, 01 October 1983, otter trawl, coll. M. Gomon & R.S. Wilson. 1 ♀ (J56734), Stn BSS 181S, Central Bass Strait, 26 km SE of Aireys Inlet, Victoria, 38°39.48'S 144°18.12'E, 79 m depth, very fine sand, 19 November 1981, WHOI epibenthic sledge, coll. R.S. Wilson. 1 ♀ (J56738), Stn BSS 188, Western Bass Strait, 30 km SSW of Warrnambool, Victoria, 38°38.12'S 142°35.00'E, 59 m depth, 20 November 1981, coll. R.S. Wilson. 1 ♀ (J56766), Stn PPBES 1218, Port Phillip Bay, off Brighton, Victoria, 37°54.45'S 144°58.30'E, 4 m depth, coll. Department of Fisheries & Wildlife Marine Pollution Studies. 3 juveniles (J57546), Stn BSS 158, Central Bass Strait, 66 km S of Rodondo Island, Victoria, 39°48.36'S 146°18.48'E, 82 m depth, sand with silt and mud, 13 November 1981, coll. R.S. Wilson. Numerous other lots in the collections of Museum Victoria.

This species is particularly recognizable owing to its having a leaf-shaped spine at junction of the chela fingers; other characterizing features are the rugose lacinia mobilis of the left mandible, and the dorsal field of marginal setules on article 2 of the antenna peduncle. The additional material found here allows some additions to the type-description of Larsen (2001). The original type-material included only females and mancae; the present material also includes the male, which is described below.

Supplementary description of female. Body-length up to 3.7 mm. Distal spine on article three of antennal peduncle often not showing articulation; labrum densely setose (Fig. 58A). Pars molaris of left mandible with elaborate distal spination (Fig. 58B). Maxilla (Fig. 58C) subtriangular, naked. Maxilliped (Fig. 58D) endites with anteromedial seta (originally described as absent in the more limited type-material), second palp article with long simple seta in addition to serrated spine and finely shorter setulose seta.

Cheliped (Fig. 58E) carpus with long inner seta; fixed finger of propodus with two ventral setae. Pereopods 1 to 3 (Figs 58F, G) with seta on coxa.

Description of male. Body (Fig. 59A) shorter than that of female, 2.6 mm long, 4.8 times as long as wide. Cephalothorax subtriangular, as long as wide, longer than pereonites 1 to 3 together; large eyes present, with large pigmented ocelli. Pereonite 1 shortest, pereonites 2 and 3 progressively longer, pereonite 3 twice as long as pereonite 1, pereonites 4 to 6 equal in length, 2.7 times as long as pereonite 1. Pleon with five free subequal pleonites bearing pleopods.

Antennule (Fig. 59B) of seven articles, proximal article 1.2 times as long as wide, with inner tuft of penicillate setae; second article 0.7 times as long as wide, about half length of first, with inner seta longer than article width; third article less than half length of second with longer inner and shorter outer distal setae. Flagellum of four segments; first segment very short, with proximal and distal rows of aesthetascs; second segment 2.5 times as long as wide, with distal row of aesthetascs; third segment as long as second, with simple distal seta; fourth segment shorter than third, distally with two penicillate and five simple setae, and single aesthetasc.

Antenna similar to that of female.

Mouthparts (Fig. 59C) largely reduced. Maxilliped basis with single distal seta, endites naked, palp with simple setae longer than those of female.

Cheliped (Fig. 59D) compact, more robust than that of female; carpus just longer than wide, with longer ventral and shorter dorsal single setae; propodus with inner comb-row of 14 setae; fixed finger with numerous fine spinules ("teeth") along cutting edge; dactylus strongly curved, with two setae on inner margin.

Pereopods (Fig. 59E, F, G) more slender than those of female, pereopods 2 and 3 similar to pereopod 1; posterior pereopods with bases about 2.5 times as long as wide, propodi nearly five times as long as wide and as long as carpus and merus together.

Pleopods (Fig. 59H) similar to those of female, but setae longer.

Uropod (Fig. 59I) rami more slender than those of female; exopod almost as long as proximal endopod segment; proximal endopod segment with additional array of penicillate setae in proximal half.

Remarks. The type material of *Paratanais malignus* was collected in kelp epifauna at 4 to 4.5 m depth in Botany Bay, New South Wales. The present material extends the known distribution to throughout the Bass Strait in depths from 2 to 82 m on sandy to muddy substrata.

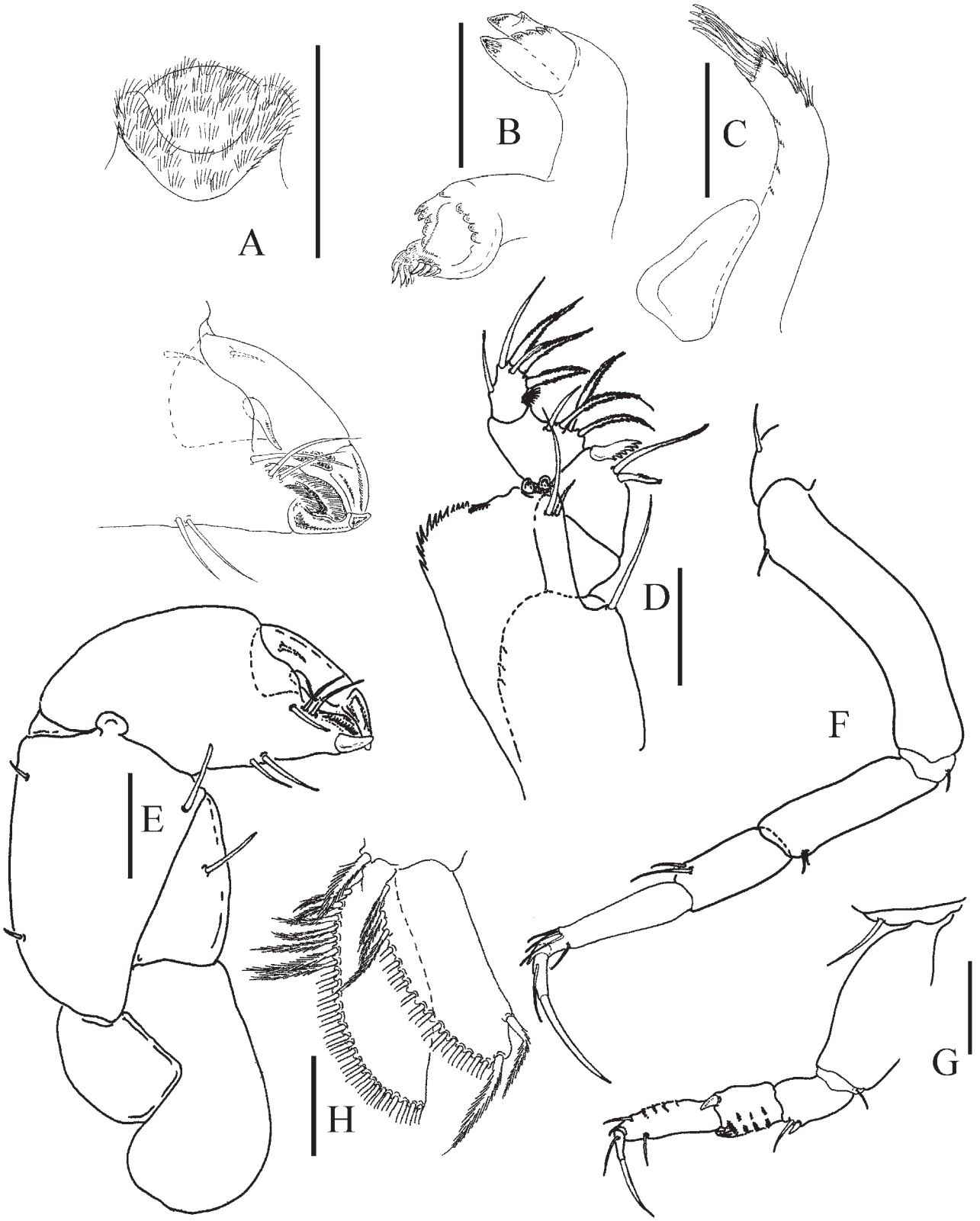

Fig. 58. *Paratanais malignus*, female. A, labrum; B, left mandible; C, maxilla and maxillule endite; D, maxilliped; E, cheliped with detail of chela fingers; F, pereopod 1; G, pereopod 3; H, pleopod. Scale = 0.01 mm for A to D, 0.1 mm for E to H.

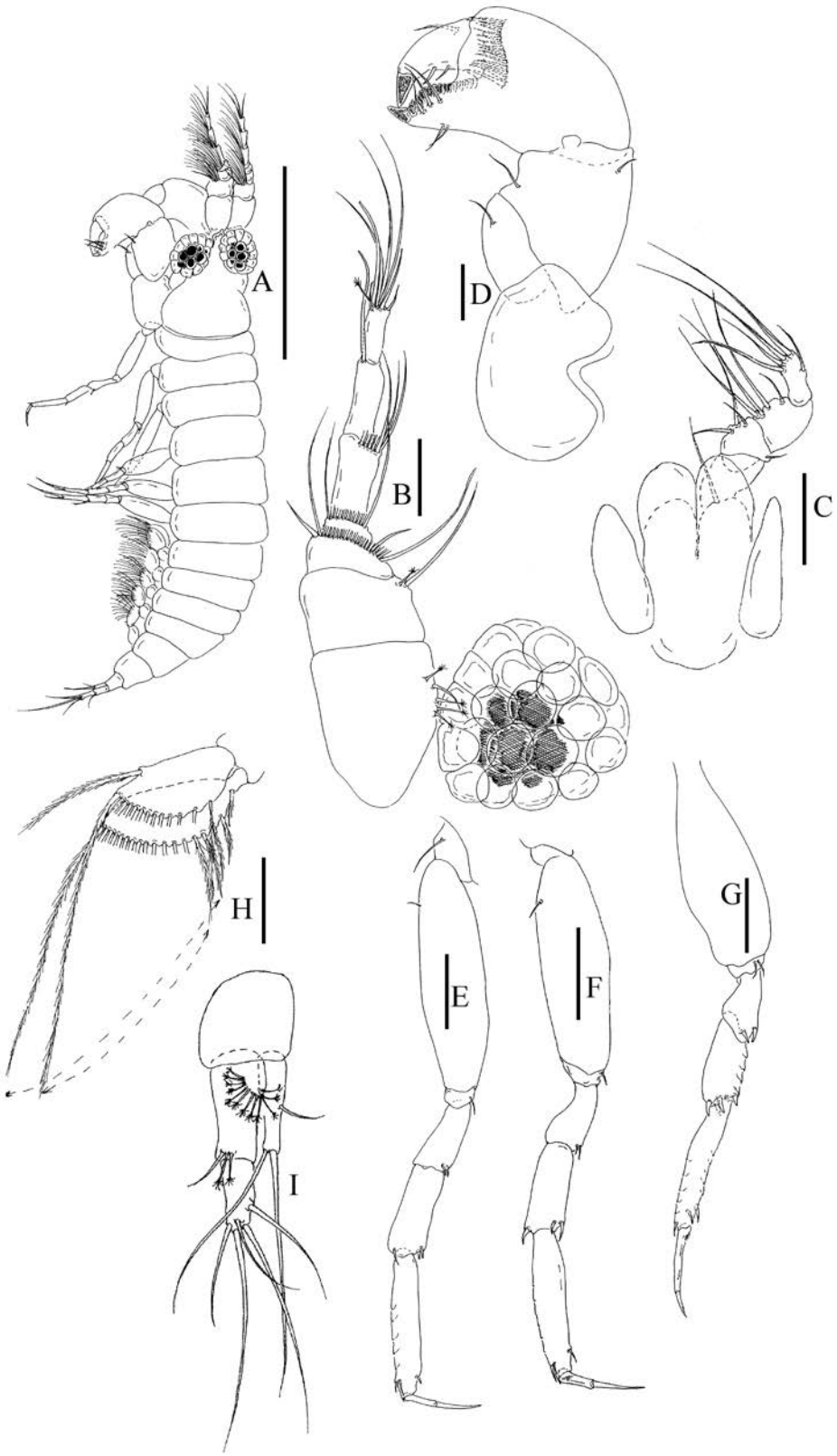

Fig. 59. *Paratanais malignus*, male. A, dorsal; B, antennule; C, mouthparts; D, cheliped; E, pereopod 1; F, pereopod 2; G, pereopod 4; H, pleopod; I, uropod. Scale = 1 mm for A, 0.1 mm for B to I

Paratanais tanyherpes sp. nov.

Figures 60–62

Material examined. 1 ♀ (J56762), holotype, Stn CPBS-N 32, Western Port, off Crib Point, 30°20.83'S 145°13.48'E, 13 m depth, sandy gravel, 23 March 1965, coll. A.J. Gilmour, Smith-McIntyre Grab. 1 ♀ (J56763), paratype, Stn CPBS-A 4, Western Port, off Crib Point, 38°21'S 145°14'E, 9 m depth, sand, 12 October 1964, coll. A.J. Gilmour, Smith-McIntyre Grab. 4 ♀♀ (J56755), paratypes, Stn CPBS-N 31, Western Port, off Crib Point, 38°20.93'S 145°13.62'E, 15 m depth, fine sand and mud, 29 March 1965, coll. A.J. Gilmour, Smith-McIntyre Grab. 1 ♀ (J56757), paratype, Stn CPA 22, Cape Paterson, Victoria, 38°41'S 145°36'E, 0 m depth, 07 March 1982, coll. R.S. Wilson & H.M. Lew-Ton. 2 ♀♀ (J56754), paratypes, Stn BSS 174 S, Eastern Bass Strait, 25 km NE of Deal Island, Tasmania, 39°16.8'S 147°33.2'E, 57 m depth, medium sand, 18 November 1981, coll. R.S. Wilson, WHOI epibenthic sled. 2 ♀♀ (J56761), paratypes, Stn BSS 155, Central Bass Strait, 38 km SW of Cape Paterson, 38°55.5'S 147°17.0'E, 70 m depth, fine sand, 12 October 1964, coll. R.S. Wilson. 1 ♀ (J57533), paratype, Stn BSS 203, Central Bass Strait, 44 km NE of Cape Wickham, King Island, 39°22'S 144°18.3'E, 60 m depth, coarse sand, 23 November 1981, coll. R.S. Wilson. 1 ♀ (J56689), paratype, Stn BSS 199, Western Bass Strait, 20 km SSW of Stokes Point, King Island, 40°19.5'S 143°48.8'E, 71 m depth, fine mud, 22 November 1981, coll. R.S. Wilson. 3 ♀♀ (J56722), paratypes, Stn BSS 192 DRC, Western Bass Strait, 44 km SW of Cape Otway, 39°06.7'S 143°07.4'E, 81 m depth, medium sand, 21 November 1981, coll. R.S. Wilson. 4 ♀♀ (J56705), paratypes, Stn BSS 209, Eastern Bass Strait, 40 km SSW of Lakes Entrance, 38°18.0'S 147°37.0'E, 55 m depth, muddy fine shell, 31 July 1983, coll. M.F. Gomon & R.S. Wilson. 3 ♀♀ (J56764), paratypes, Stn BSS 173, Eastern Bass Strait, 30 km north of North Point Flinders Island, 39°26.3'S 147°48.7'E, 49 m depth, medium sand, 17 November 1981, coll. R.S. Wilson. 1 ♀ (J56756), paratype, Stn CPBS-S 32, Western Port, off Crib Point, 38°21.6'S 145°13.7'E, 13 m depth, muddy sand, 12 March 1965, coll. A.J. Gilmour. 1 ♀ (J56765), 2 ♀♀ (J56758), 1 ♀ (J56759), paratypes, Stn CPBS-N 32, Western Port, off Crib Point, 38°20.83'S 145°13.48'E, 13 m depth, sandy gravel, 23 March 1965, coll. A.J. Gilmour, Smith-McIntyre Grab. 1 ♀ (J57542), paratype, Stn CPBS-S 26, Western Port, off Crib Point, 38°22.18'S 145°15.22'E, 10 m depth, sand, 26 February 1965, coll. A.J. Gilmour, Smith-McIntyre Grab. 1 ♀ (J57563), paratype, Stn SPPS 5, Southern Port Phillip Bay, 38°17.3'S 144°41.4'E to 38°16.4'S 144°41.8'E, 7 m depth, coll. Marine Research Group of Victoria, dredge.

Description of female. Body (Fig. 60A) elongate, 8.7 times as long as wide, holotype 3 mm long. Cephalothorax subrectangular, 1.4 times as long as wide, twice as long as pereonite 1, with slight triangular rostrum, naked. Pereonite 1 shortest, pereonites 2 and 3 about 1.5 times as long as pereonite 1; pereonite 4 longest, 1.9 times as long as pereonite 1; pereonites 5 just shorter than pereonite 4, pereonite 6 just shorter than pereonite 2 (all pereonites respectively 1.5, 1.1, 1.0, 0.9, 0.9 and 1.1 times as wide as long). Pleonites 3.6 times as wide as long, pleonites 1 to 4 with one plumose, articulating lateral seta on each side. Pleotelson semicircular, short, twice as long as pleonite 5, 1.7 times as wide as long, distally with four posterolateral setae, marginal single simple setae either side of each uropod attachment, and marginal penicillate seta distal of uropod attachment (Fig. 62I).

Antennule (Fig. 61A) of five articles, shorter than cephalothorax; proximal article 1.6 times as long as wide, with inner tufts of penicillate setae and short outer-distal simple seta; second article wider than long, about one-third length of first, with inner distal tuft of penicillate setae and simple seta longer than article width; third article two-thirds length of second with inner and outer distal setae; fourth article slender, tapering, almost as long as second and third articles together, with one distal seta; distal article minute, with four distal setae and single aesthetasc.

Antenna (Fig. 61B) proximal article compact, naked; second article just shorter than wide, ventral margin produced, without distal apophyses, with mid-ventral seta, shorter laterodistal and dorsodistal seta, dorsal margin densely setulose; third article two-thirds as long as wide, shorter than second article, dorsal margin convex, with stout dorsodistal spine; fourth article just longer than second, with two distal simple setae and mesial and distal penicillate setae; fifth article half as long as fourth with one distal seta; sixth article minute with one very short and four longer distal setae.

Labrum (Fig. 61C) hood-shaped, apically rounded, setose. Left mandible (Fig. 61D) with wide, crenulate lacinia mobilis, right mandible (Fig. 61E) pars incisiva bilobate; left pars molaris (Fig. 61D') robust distally with both sharp, slender and short, rounded "teeth". Labium (Fig. 61G) simple, densely and finely setose, without palp. Maxillule (Fig. 61F) with nine distal spines, rows of outer and inner setae on endite, palp not retrieved. Maxilla (Fig. 61F) linguiform, naked. Maxilliped (Fig. 61H) endites characteristic of genus, with denticulate outer margin, two ovate spines and long single inner seta; palp first article with outer-distal seta; second article with two simple setae and one shorter denticulate, reflexed spine, distal rows of microtrichia; third article with three marginal and one submarginal inner, finely denticulate setae; fourth article with five distal finely-denticulate setae and fine inner setules; single distal seta on basis comfortably exceeding distal margin of first palp article but not exceeding distal margin of endites.

Cheliped (Fig. 62A) compact, basis 2.1 times as long as wide, with dorsodistal seta; merus triangular, occupying almost all of ventral margin of carpus, with single mid-ventral seta; carpus 1.75 times as long as wide, with proximal and distal dorsal setae and two longer ventrodistal setae; propodus 1.25 times as long as wide, fixed finger short, half as long as body of propodus ("palm"), with two ventral setae and three setae alongside cutting edge; with lamellate apophyses on cutting edge, terminal spine robust; dactylus with outer margin smooth, two proximal simple setae on cutting edge.

Pereopod 1 (Fig. 62B) longer than others, coxa simple with long seta; basis slender, arcuate, 4.15 times as long as wide, with dorsal seta in proximal third; ischium compact with single seta; merus slender, with single ventrodistal seta; carpus 0.8 times as long as merus, with one longer and two shorter dorsodistal setae; propodus 1.75 times as long as carpus, with two subdistal setae and fine dorsodistal sharp apophysis; dactylus with dorsoproximal seta exceeding tip of dactylus; unguis slender, curved, twice as long as dactylus, both together 1.1 times as long as propodus. Pereopod 2 (Fig. 62C) more compact than pereopod 1, basis 2.9 times as long as wide; merus 0.7 times as long as carpus, merus with two ventrodistal setae; carpus with one dorsodistal seta, and one dorsodistal and two ventrodistal curved, finely denticulate spines; propodus twice as long as carpus, and just longer than dactylus plus unguis. Pereopod 3 (Fig. 62D) similar to pereopod 2.

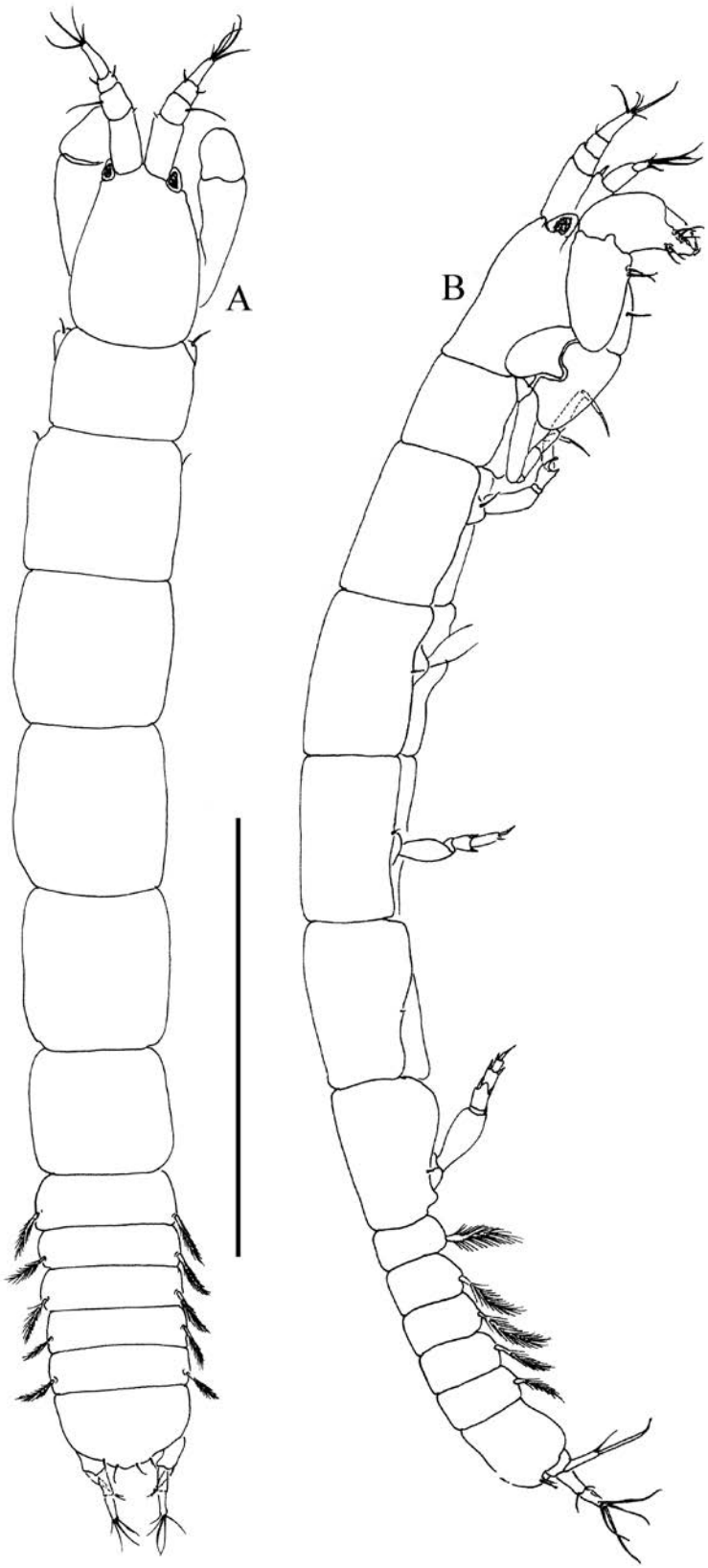

Fig. 60. *Paratanais tanyherpes* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1 mm.

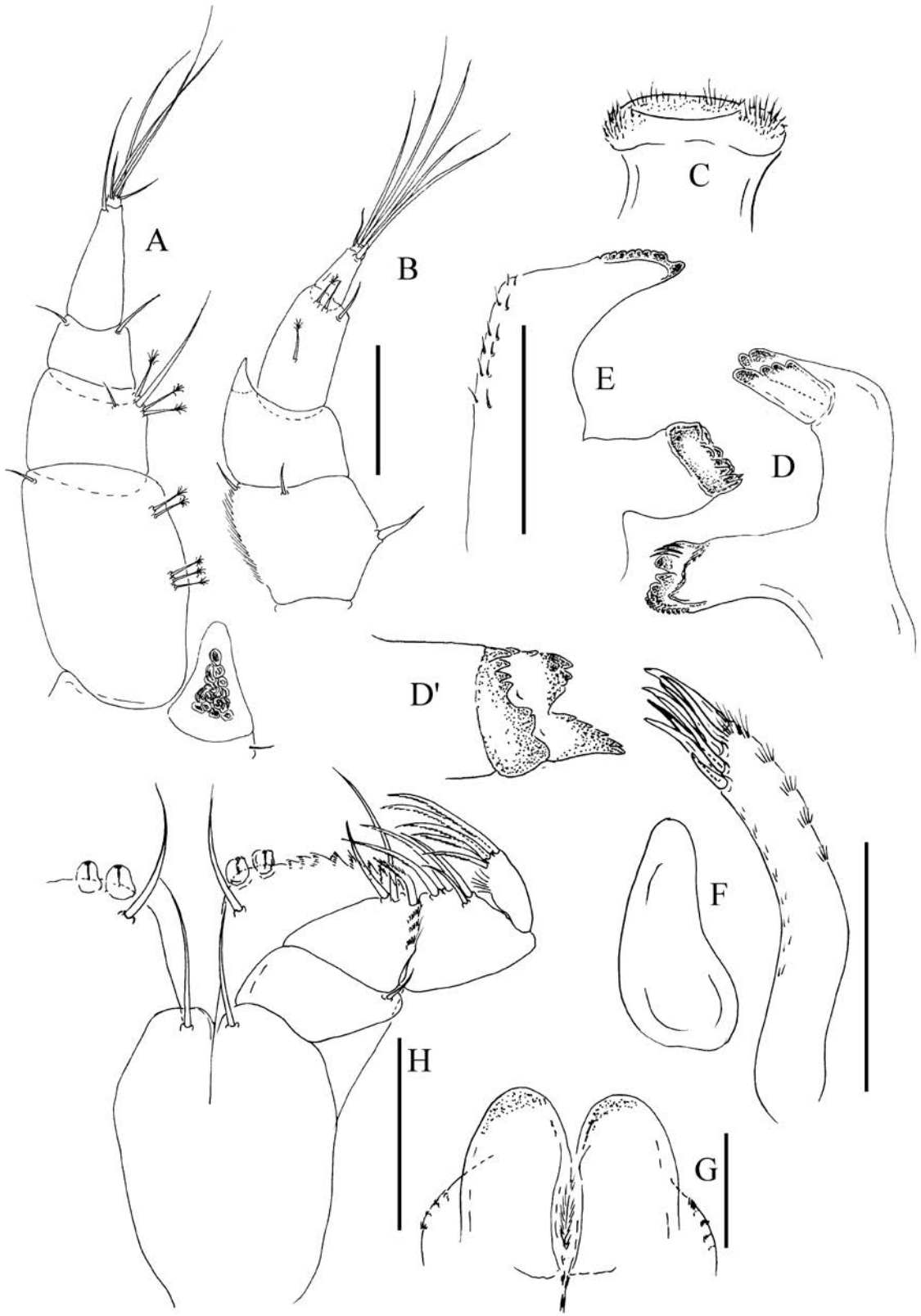

Fig. 61. *Paratanais tanyherpes* sp. nov., female paratype. A, antennule; B, antenna (proximal article not shown); C, labrum; D, left mandible, with D', detail of molar process; E, right mandible; F, maxillule endite and maxilla; G, labium; H, maxilliped. Scale = 0.2 mm.

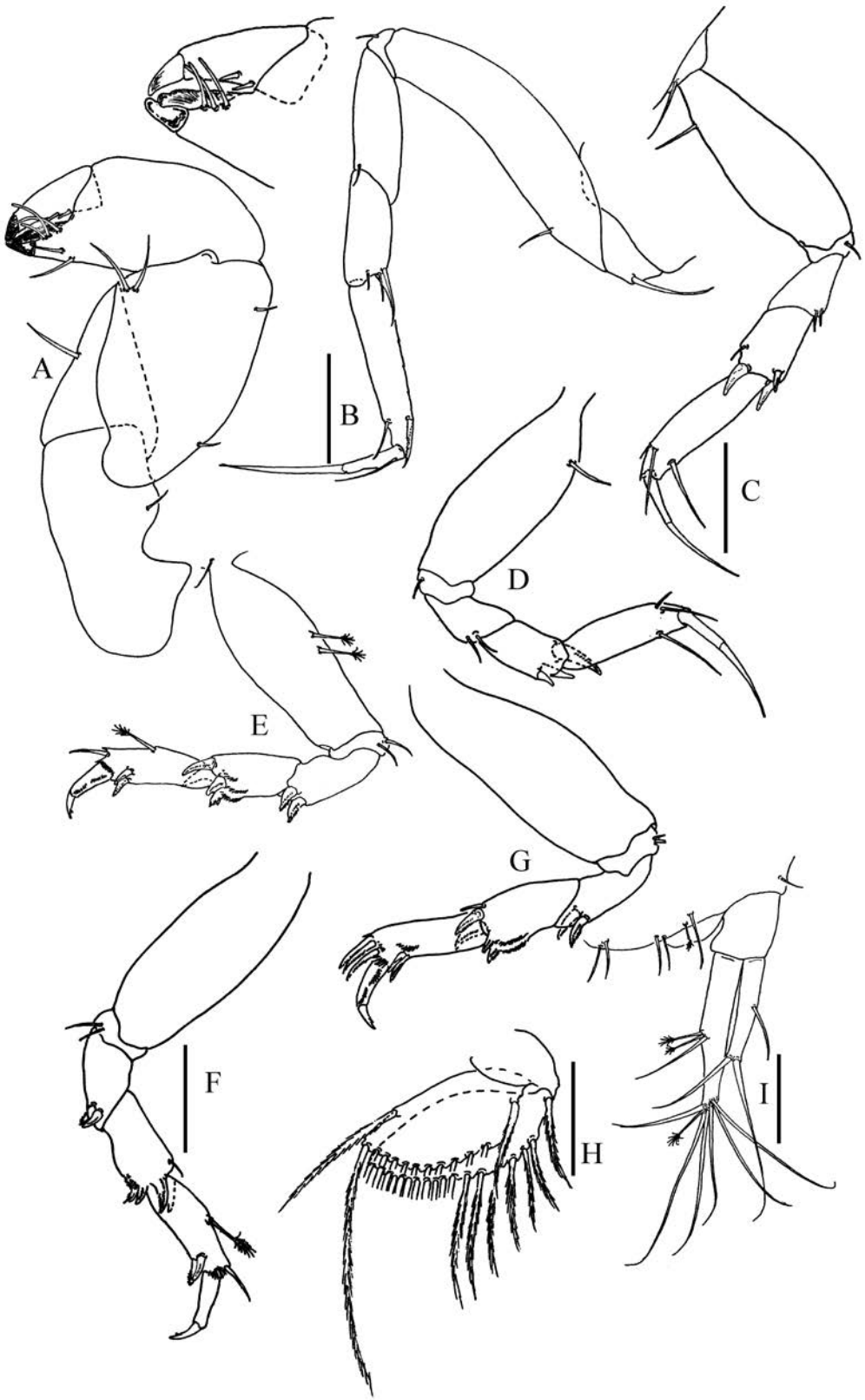

Fig. 62. *Paratanais tanyherpes* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

Pereopod 4 (Fig. 62E) slightly more robust than anterior pereopods, basis 2.8 times as long as wide with two mid-ventral penicillate setae; merus and carpus subequal in length, each with two ventrodistal curved, finely-denticulate spines, carpus also with two dorsodistal curved, finely-denticulate spines, ventrodistal surface of carpus with rows of microtrichia; propodus 1.4 times as long as carpus, with simple dorsodistal seta, mid-dorsal penicillate seta, two ventrodistal curved, finely-denticulate spines, and row of fine setules along distal margin; dactylus stout, with microtrichia; unguis distinct, curved, with minute ventrodistal denticulation, half length of dactylus, both together 0.6 times as long as propodus. Pereopod 5 (Fig. 62F) as pereopod 4. Pereopod 6 (Fig. 62G) as pereopod 4, but propodus with three dorsodistal serrate spines and no dorsal penicillate seta.

Pleopods (Fig. 62H) all alike, with naked basis, endopod with single inner subdistal plumose seta; exopod without setae on inner margin, proximal seta on outer margin of both rami separated from remaining setae.

Uropod (Fig. 62I) basis naked, exopod of one segment, over half as long as endopod, with one mesial and two unequal distal setae; endopod of one segment, with mesial and distal tufts of penicillate and simple setae; rami slender.

Male. Unknown.

Etymology. From the Greek *tanaos* – long and *herpes* – a creeping thing, the present species being the most elongate yet known in the genus.

Remarks. There are only two described species of *Paratanais* with a single-segmented uropod endopod, viz. *P. intermedius* Dojiri & Sieg, 1997 (q.v.) from 98 to 591 m depth in the Santa Maria Basin, California, and *P. wanga* Bamber, 2008 from 4 to 26 m in Moreton Bay, Queensland. Although the description and figures of *P. intermedius* are poor, it is distinct from *Paratanais tanyherpes* sp. nov. in having a more elongate antenna (peduncle articles 2 and 3 clearly longer than wide), the distal seta on the maxilliped basis not reaching the distal margin of first palp article, the merus of the cheliped covering only some 75% of the ventral margin of the carpus, the merus on pereopod 1 shorter than the carpus, and the uropod rami much less elongate. *P. wanga* is distinct from *P. tanyherpes* in having the second antennal peduncle article 1.4 times as long as wide, and again the uropod rami much less elongate. In many respects, *P. tanyherpes* is very close in morphology to the New Zealand species *P. tara* Bird, 2011, with which it shares the proportions of the antennule, the setation/spination of the antennule, of many details of the maxilliped, but that species differs in having a two-articled uropod endopod (*inter alia*).

Paratanais tanyherpes is further distinguished from these three species, and indeed all others in the genus, in being very elongate, the body being nearly nine times as long as wide ("about 6" times in *P. intermedius*; 6.4 times in *P. wanga*; up to 7.5 times in *P. tara*; eight times as long as wide in the previously most-elongate species, *P. martinsi* Bamber & Costa, 2009, q.v.). *P. tanyherpes* was found throughout the Bass Strait, including in Western Port and Port Phillip Bay, at depths between 0 to 81 m.

Paratanais vetinari Bamber, 2005

Figures 63–64

Paratanais vetinari Bamber, 2005, 712–716, figs 51–52.

Material examined. 1 ♂ (J58466), 5 ♀♀ (J56735), Stn 190, 81-T-1, Western Bass Strait, 50 km SSW of Warrnambool, Victoria, 38º49.5'S 142º35.4'E, 89 m depth, coarse sand, 21 November 1981, coll. R.S. Wilson. 1 ♀ (J56666), Stn WV5, Cheviot Beach, Point Nepean, Victoria, 38º18'S 144º40'E, 3.5 to 5 m depth, 31 March 1998, SCUBA, coll. T,D. O'Hara. 1 ♀ (J56663), Stn BUN4, East of Eagles Nest, Victoria, 38º40.46'S 145º39.14'E, 5 to 11 m depth, 01 April 1997, SCUBA, coll. coll. T,D. O'Hara *et al*.. 1 ♀ (J46369), Stn WV2, Schomberg Reef, near Peterborough, Victoria, 38º36.49'S 142º53.19'E, 3.5 to 5 m depth, 19 May 1998, SCUBA, coll. T,D. O'Hara. 3 ♀♀ (J51620), Stn VC 08 C1, Western Bass Strait, 38º14.36'S 142º10.11'E, 40 m depth, 14 May 1998, Smith-McIntyre Grab, coll. N. Coleman. 1 ♀ (J46370), Stn CRUST 21, "The Whaleback", bommie 0.5 km S of Point Hicks, 37º48.30'S 149º16.48'E, 13 m depth, 08 April 1989, SCUBA, coll. G.C.B. Poore. 1 ♀ (J56665), 1 ♀ (J56662), Stn WV13, Sailor's Grave, off East Cape Conran, Victoria, 37º48.13'S 148º44.41'E, 4 to 5 m depth, 15 April 1998, SCUBA, coll. T,D. O'Hara. 1 ♀ (J56664), Stn WV8, Nepean Bay, Point Nepean, Victoria, 38º18.24'S 144º39.28'E, 5 to 6 m depth, 08 April 1998, SCUBA, coll. T.D. O'Hara. Numerous other lots in the collections of Museum Victoria.

Paratanais vetinari was described initially from Esperance, southern Western Australia, based on four females. The present females seem to agree with the type-description; the presence of the male in the Bass Strait material allows its first description.

Description of male. Body (Fig. 63A, B) smaller and more compact than that of female, 1.8 mm long, 5 times as long as wide. Cephalothorax narrow in anterior half, 1.15 times as long as wide, longer than pereonites 1, 2 and 3 together, with conspicuous triangular rostrum; eyes present, large, pigmented. Six free dorsoventrally-flattened pereonites; pereonite 1 shortest, pereonites 2 just longer than pereonite 1, both short and with single anterolateral seta on each side; pereonites 3 to 6 subequal in length (all pereonites respectively 4.4, 3.7, 2.4, 2.4, 2.2 and 2.1 times as wide as long). Pleon laterally convex, with five free subequal pleonites bearing pleopods; pleonites 4.6 times as wide as long. Pleotelson semicircular, short, les than twice as long as pleonite 5, 2.2 times as wide as long.

Antennule (Fig. 63C) peduncle of three articles, proximal article twice as long as wide, second article 0.6 times as long as wide, about one-third length of first, with inner simple seta longer than article width; third article half length of second with inner and outer distal setae; flagellum of seven segments, segments progressively longer distally, segments 1 to 6 with subdistal rows of 8 or 9 aesthetascs, distal segment with one penicillate and four simple distal setae.

Antenna (Fig. 63D) of six articles, proximal article compact, naked; second article shorter than wide with single simple distal and mesial setae; third article as long as wide, about half as long as second article, naked; fourth article 1.25 times as long as second; fifth article longer than fourth, slender, tapering; sixth article minute with five distal setae.

Mouthparts largely atrophied; maxilla (Fig. 63F) subtriangular, naked; maxilliped (Fig. 63E) endites narrow, with single distal seta, basis with long distal seta, palp with

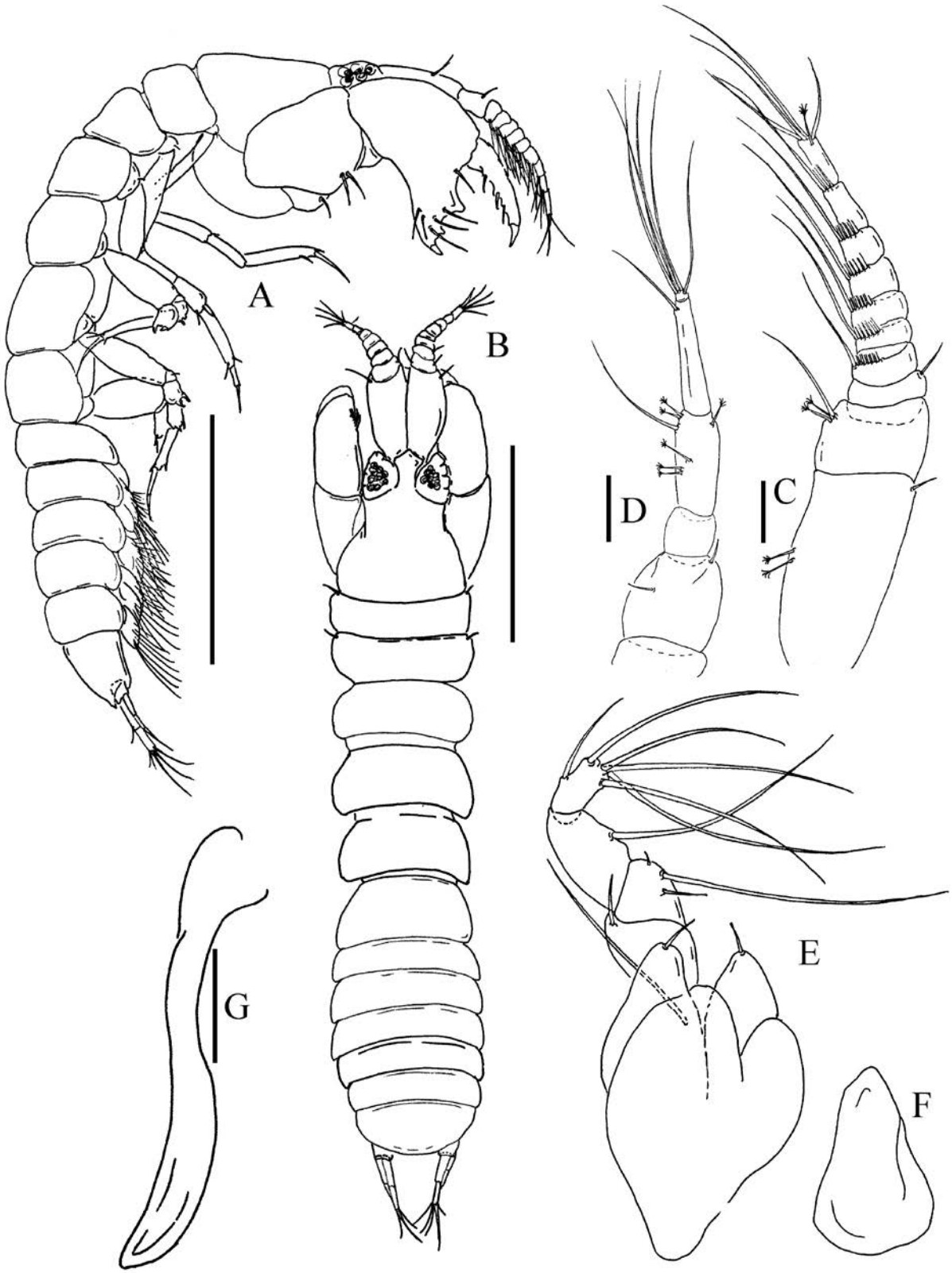

Fig. 63. *Paratanais vetinari*, male. A, lateral view; B, dorsal view; C, antennule; D, antenna; E, maxilliped; F, maxilla; G, epignath. Scale A-B = 0.5 mm; C-G = 0.1 mm.

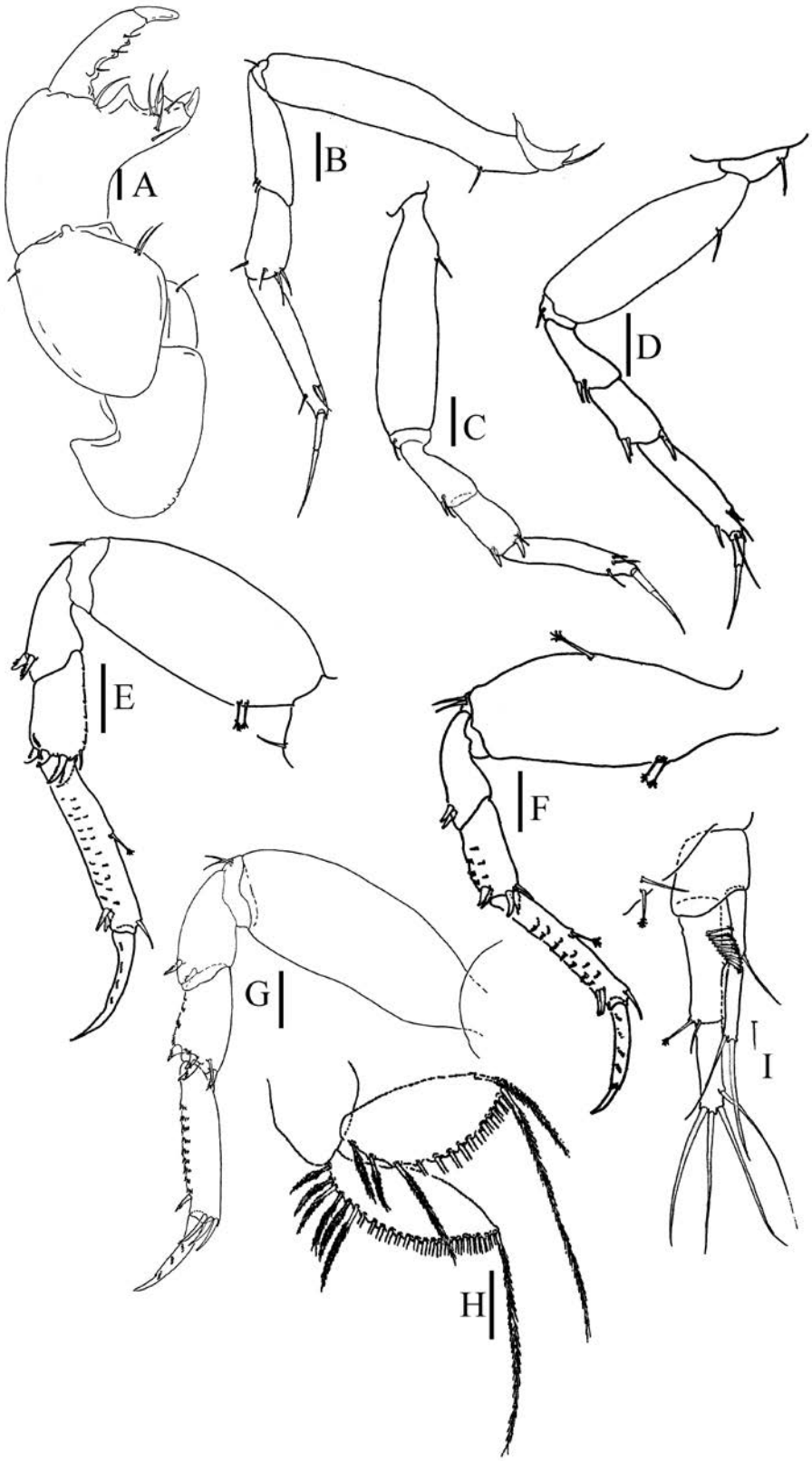

Fig. 64. *Paratanais vetinari*, male. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

simple setae much longer than those of female; epignath (Fig. 63G) narrow, linguiform.

Cheliped (Fig. 64A) similar to that of female, merus shorter, carpus 1.3 times as long as wide; propodus proportionately longer, fixed finger with triangular tooth-like apophysis proximally on cutting edge; dactylus with three simple setae on cutting edge.

Pereopods 1 to 3 (Fig. 64B, C, D) similar to those of female, merus of pereopod 1 1.3 times as long as carpus, distal spines on carpi of pereopods 2 and 3 simple and more slender.

Pereopods 4 to 6 (Fig. 64E, F, G) proximally similar to those of female, but propodus 6 times as long as wide with dense ventral fields of microtrichia, dactylus and unguis two-thirds as long as propodus, articulation between the two indistinct, dactylus with fields of microtrichia.

Pleopods (Fig. 64H) all alike, similar to those of female but setae proportionately longer.

Uropod (Fig. 64I) similar to but more elongate than that of female, distal exopod segment longer than proximal segment; proximal endopod segment with inner array of penicillate setae.

Remarks. Of the seven previously-described species of *Paratanais* from Australasia (including *P. tanyherpes* above), only *P. vetinari* and *P. maleficus* Larsen, 2001 have a two-segmented uropod exopod. Females of these two are most easily distinguished by the uropod segments being more than twice as long as wide in *P. vetinari*, but less than 1.5 times as long as wide in *P. maleficus*. Most features of the appendages of the male of *P. maleficus* as described and figured by Larsen (2001) are different from those shown here. Another characteristic feature of the present species is the subdistal ventral seta on the propodus of pereopods 2 and 3 being longer than the dactylus (shorter in *P. maleficus*). The only other species described with a two-segmented uropod exopod is *P. hessleri* Kudinova-Pasternak, 1985 (q.v.), but, despite the relatively poor description, that species has the subdistal ventral propodus seta on pereopods 2 and 3 shorter than the dactylus, and it clearly has a more elongate body, antennules and antennae, *inter alia*.

The type-collection of *Paratanais vetinari* was from 20 to 30 m depth on gravelly sand with rhodoliths and sparse macroalgae. In the Bass Strait, this species was collected from between 3.5 and 89 m depth on sandy substrata, including sympatrically with *P. malignus*.

Subfamily **Bathytanaidinae** Larsen & Heard, 2001

Genus ***Bathytanais*** Beddard, 1886

Bathytanais bathybrotes (Beddard, 1886)

Figures 65–67

Paratanais bathybrotes Beddard, 1886(a), 119 – *Bathytanais bathybrotes* Bamber, 2008, 175–176, literature.

Material examined. 12 specimens (including 2 brooding ♀♀) (J56271), 1 ♂ (J56272), from sand wall at front of Pope's Eye, Port Philip Bay, 7 m depth, 28 February 1982, coll. R Lipson.

The female of this species was comprehensively redescribed by Lang (1972); however, the male was previously unknown – indeed, no male of any *Bathytanais* species has been recorded before, making the following description particularly important.

Description of male. Body (Fig. 65A, B) with typical gross appearance of a *Paratanais* male, 2.1 mm long, 5.3 times as long as wide. Cephalothorax subrectangular, as long as wide, as long as pereonites 1 to 3 together, with conspicuous subtriangular rostrum; eyes large, one-third as long as cephalothorax, with black ommatidia. Pereonite 1 shortest, pereonites 2, and 3 subequal in length, 1.4 times as long as pereonite 1, pereonites 4 and 5 subequal, 1.8 times as long as pereonite 1, pereonite 6 just shorter than pereonite 5 (all pereonites respectively 3.6, 2.7, 2.8, 2, 2 and 2.3 times as wide as long). Pleon of five free subequal pleonites bearing pleopods, ventrally with blunt keel; pleonites 2.7 times as wide as long and 1.2 times as long as pereonite 1. Pleotelson (Fig. 47K) semicircular, as long as pereonite 6, 1.5 times as wide as long.

Antennule (Fig. 66A) of three peduncular and four flagellar articles, proximal peduncle article 1.9 times as long as wide, with outer mesial tufts of penicillate setae, inner distal simple seta; second article just shorter than wide, 0.4 times as long as first article, with outer-distal tuft of penicillate setae; third article one-third length of second, with two simple distal setae; first flagellar article half as long as third peduncle article, with proximal and distal rows of six or seven aesthetascs and outer-distal simple seta; second and third flagellar articles subequal in length, four times as long as first, with distal rows of six aesthetascs; fourth flagellar article just shorter than third, distally with four simple setae, one penicillate seta and one aesthetasc.

Antenna (Fig. 66B) of six articles, proximal article compact, naked; second article with ventrodistal tuft of three penicillate setae and one ventrodistal and one dorsodistal simple setae; third article as long as wide, 0.6 times as long as second article, with dorsodistal seta; fourth article twice as long as third, with one mid-dorsal and three dorsodistal penicillate setae, single dorsal and ventral subdistal simple setae; fifth article 0.9 times as long as fourth with one dorsal subdistal seta; sixth article minute with five simple and one penicillate distal setae.

Mouth parts underdeveloped in comparison with those of female. Labrum (Fig. 66C) apically rounded, naked. Mandibles absent. Maxillule (Fig. 66D) with naked endite and simple palp bearing distal setule; maxilla (Fig. 66D) ovoid, naked. Maxilliped (Fig. 66E) endites relatively wide, with two minute ovate tubercles and single inner seta; palp first article with outer-distal seta; second article with three inner-distal simple setae; third article with three inner setae in proximal half; fourth article with five inner to distal setae and one outer subdistal seta; single inner seta on basis not reaching distal margin of endites.

Cheliped (Fig. 66F) compact, basis twice as long as wide, naked; merus subtriangular, ventrally convex, with one mid-ventral seta; carpus 1.3 times as long as wide with two mid-ventral setae, one dorsoproximal and one dorsodistal fine setae; propodus as long as wide, with inner comb-row of 12 setae; fixed finger just shorter than palm, with two ventral setae, three setae adjacent to cutting edge; dactylus with dorsoproximal seta, two proximal setae on cutting edge.

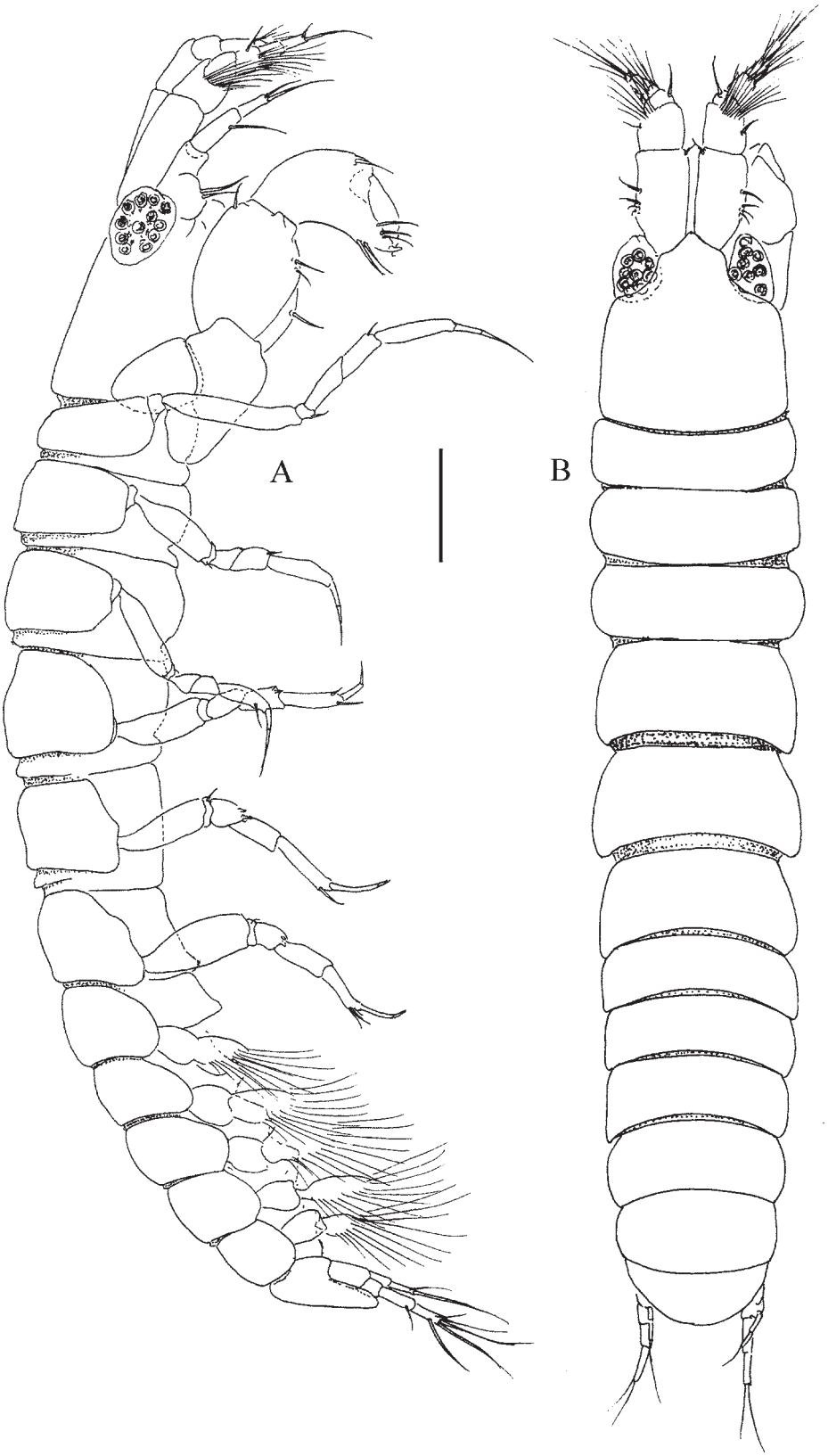

Fig. 65. *Bathytanais bathybrotes*, male. A, lateral; B, dorsal. Scale = 0.2 mm.

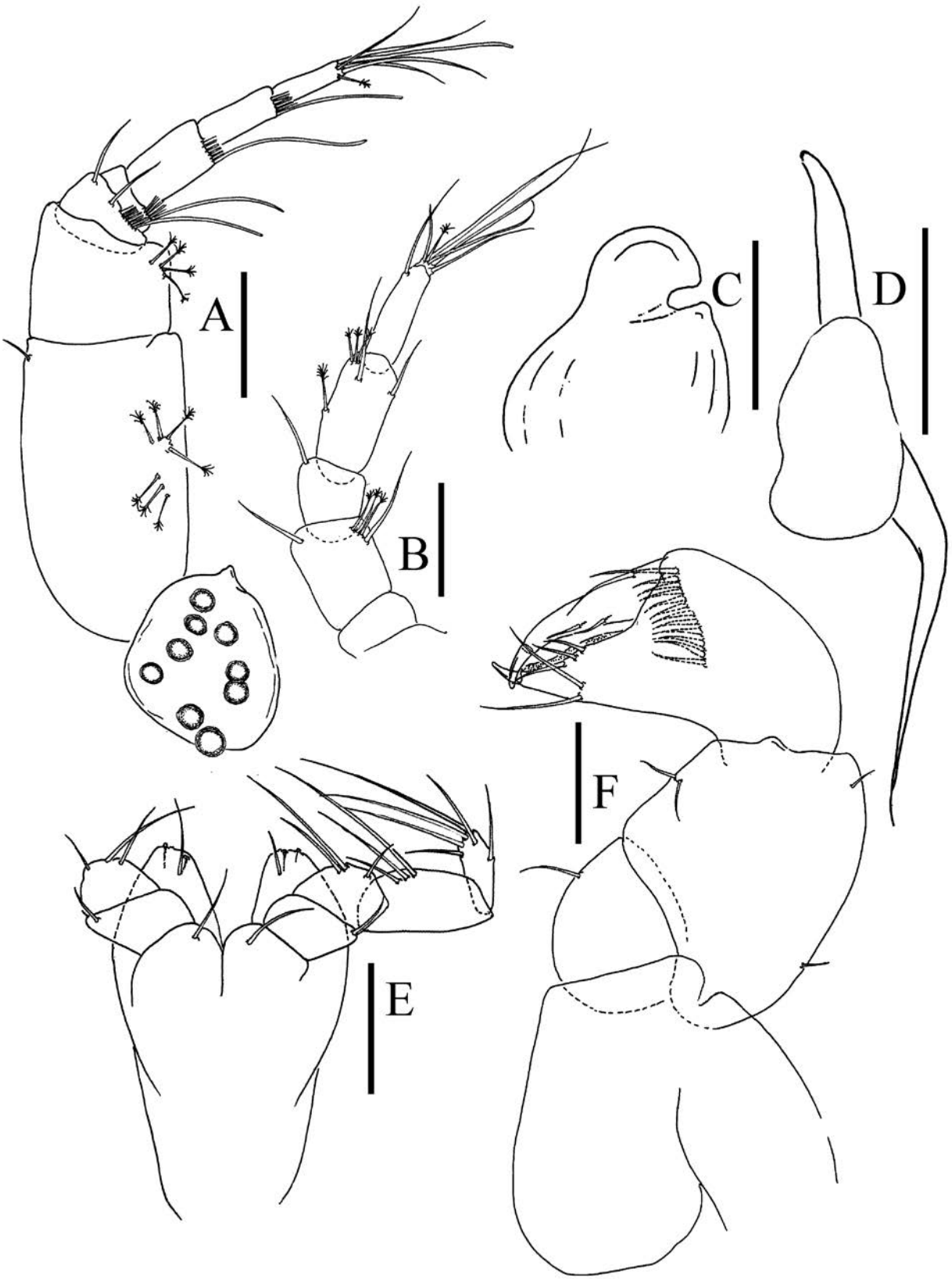

Fig. 66. *Bathytanais bathybrotes*, male. A, antennule; B, antenna; C, labrum; D, maxillule and maxilla; E, maxilliped; F, cheliped. Scale = 0.1 mm.

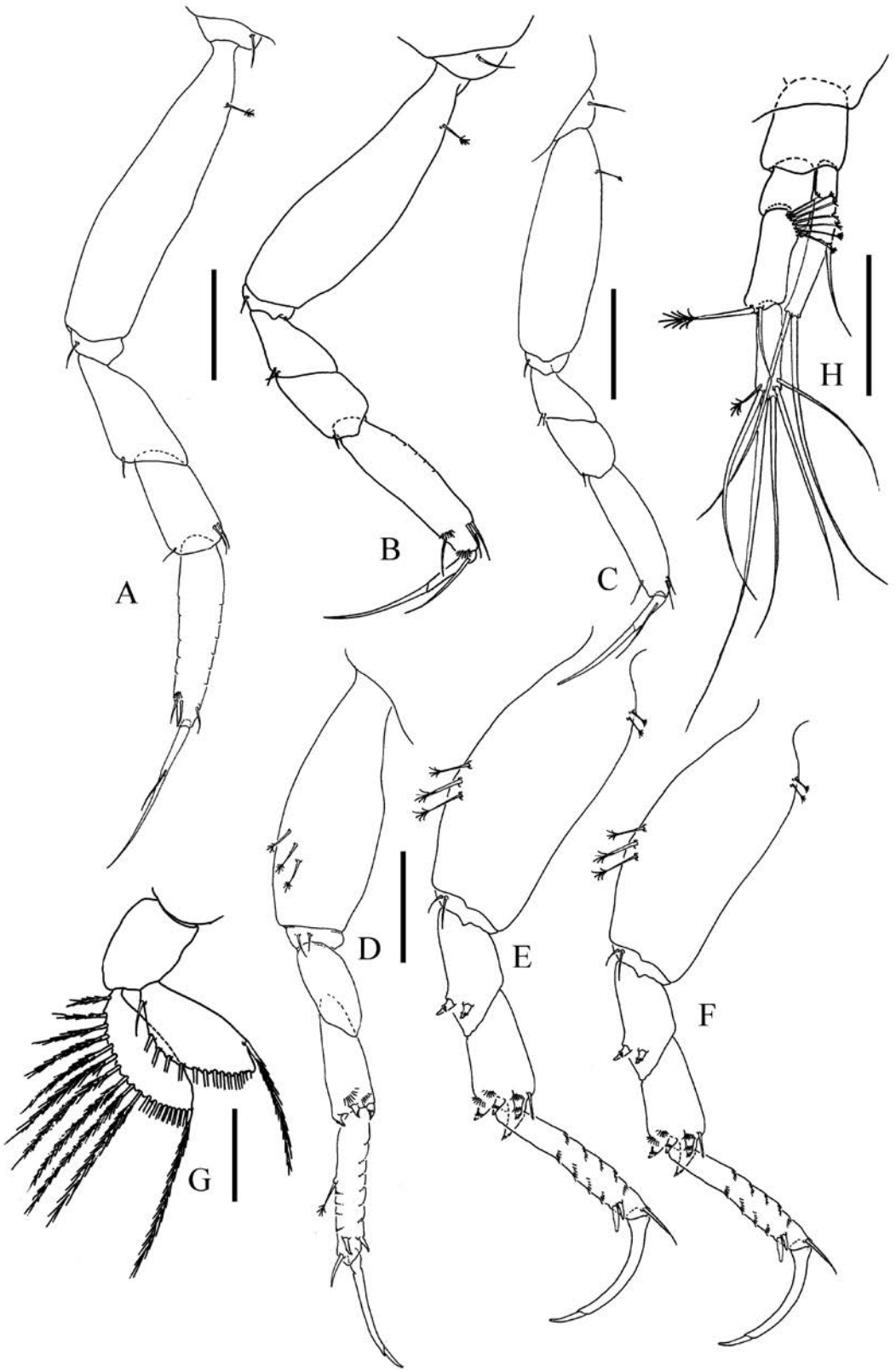

Fig. 67. *Bathytanais bathybrotes*, male. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

Pereopod 1 (Fig. 67A) longer than others, coxa simple with seta; basis slender, 4.25 times as long as wide with dorsoproximal penicillate seta; ischium compact with single seta; merus one-third as long as basis, with fine ventrodistal seta; carpus 0.9 times as long as merus, with fine ventrodistal seta and two dorsodistal setae; propodus 1.8 times as long as carpus, with one dorsal and two ventral subdistal setae, and dorsal and ventral marginal microtrichia; dactylus half as long as slender unguis and with distal seta, dactylus and unguis together 0.9 times as long as propodus. Pereopod 2 (Fig. 67B) similar to pereopod 1, but more compact, basis 3.4 times as long as wide; merus and carpus equal in length, carpus without dorsodistal setae; propodus with two dorsal and one ventral subdistal setae, dactylus with proximal seta. Pereopod 3 (Fig. 67C) similar to pereopod 2.

Pereopod 4 (Fig. 67D) basis stout, 2.6 times as long as wide, with three ventral subdistal penicillate setae; ischium with two ventral setae; merus one-third as long as basis, naked; carpus as long as merus, with two ventrodistal and one dorsodistal tooth-like spines; propodus 1.7 times as long as carpus with dorsodistal seta, two ventrodistal spines, mid-distal penicillate seta and marginal rows of penicillate setae; dactylus long and slender, four times as long as distinct unguis, both together 0.8 times as long as propodus. Pereopod 5 (Fig. 67E) similar to pereopod 4, but basis with dorsoproximal pair of penicillate setae, merus with two ventrodistal tooth-like spines, carpus with additional larger outer distal spine and dorsodistal seta, dactylus and unguis distinctly more curved. Pereopod 6 (Fig. 67F) as pereopod 5.

Pleopods (Fig. 67G) all alike, with naked basis, rami subequal; endopod with inner subdistal plumose seta and 13 plumose setae around outer margin; exopod without setae on inner margin, 19 plumose setae around outer margin.

Uropod (Fig. 67H) basis naked; exopod of two subequal segments, together more than half as long as endopod, first segment with simple outer-distal seta, second segment with two unequal distal simple setae; endopod of three segments, proximal segment short, naked, second segment twice as long as first, with proximal array of seven penicillate setae, distally with one simple and one penicillate setae; third segment as long as second, distally with five simple and one penicillate setae.

Remarks. The history of this species was discussed by Bamber (2008), from which we may disregard the type-locality as being a *lapsus calami*. *Bathytanais bathybrotes* was previously known from New South Wales at depths of 6 to 50 m depth (Beddard, 1886b; Lang, 1972) and from Moreton Bay, Queensland at depths between 8 and 42 m (Bamber, 2008) on clean sand. The present material extends its distribution further west to Victoria.

The *Bathytanais* male is very similar to males of *Paratanais* species, and does not show the expanded antenna peduncle articles of the females, but appears to differ in the presence of a proximal seta on the dactyli of pereopods 2 and 3. Discovery of the males of other species is necessary to confirm this as a generic character.

Bathytanais fragilis Larsen & Heard, 2001

Bathytanais fragilis Larsen & Heard, 2001, 13–16, figs 5–7 (partim: deeper-water specimens only).

Material examined. 1 ♀ (J37854), holotype, Slope 21, 36°57.40'S 150°18.80'E, 220 m depth, muddy shell, 20 July 1986. 3 ♀♀ (J58583), paratypes ("other material" in Larsen & Heard, 2001), same data as holotype. 1 ♀ (J39282), idiotype, Slope 32, 38°21.90'S 149°20.00'E, 1000 m depth, fine mud, 23 July 1986. All coll. G.C. Poore *et al.*, WHOI suprabenthic sled, R.V. *Franklin*.

Remarks. In the light of other *Bathytanais* material found in the collections, the type-material of *B. fragilis* was re-examined, and some specimens (from shallower samples) were separated as belonging to a distinct species, described below. Significantly, we were able to confirm the shape and, in particular, the transparency of the ventral expansion on the second article of the antenna peduncle in *B. fragilis*, as well as other features of its morphology.

Bathytanais fragilis is recorded from the Eastern Bass Strait, from depths between 200 and 1000 m, mainly on muddy substrata.

Bathytanais parageios sp. nov.

Figures 68–70

Bathytanais fragilis Larsen & Heard, 2001 partim (shallow-water specimens only).

Material examined. 1 ♀ (J58584), holotype, MAFRI-H28 GI, Long Island Hastings, 38°19'S 145°14'E, 17 m depth, 4 March 1997; 6 ♀♀ (J66538), paratypes, MAFRI-H27 G4, Crib Point, 38°21'S 145°14'E, 12 m depth, 4 March 1997; 4 ♀♀ (J66579), paratypes, MAFRI-H28 GI, Long Island Hastings, 38°19'S 145°14'E, 17 m depth, 4 March 1997; all coll. DPI Victoria, Smith McIntyre grab. 1 ♀ (J56781), paratype, WBES stn 1723, Western Port, 38°17.07'S 145°14.86'E, 14 m depth, sand, 22 November 1973, coll. Marine Studies group, Smith McIntyre grab. 3 ♀ ♀ (J51621), paratypes, VC-34-C1, 38°32.42'S 146°29.68'E, 40 m depth, fine mud, 11 May 1998, coll. N Coleman, Smith McIntyre grab. 22 specimens (incl. 1 brooding ♀), MSL-EG 70, 37°53.39'S 148°15.40'E, 43 m, coarse sand, 4 June 1991, coll. N Coleman, Smith McIntyre grab (cited as paratypes of *B. fragilis* under a different registration no. in Larsen & Heard, 2001). 1 ♀ (J58465), paratype (dissected and figured), CR 81-T-1 stn 155, 38°55.5'S 145°17.0'E, 70 m depth, fine sand, 12 November 1981, coll. R.S. Wilson, Smith McIntyre grab. 1 ♀ (J55908), paratype, CPBS 31N/3, Crib Point, 38°20.94'S 145°13.62'E, 15 m depth, fine sand and mud, 29 March 1965, coll. Marine Studies group, Smith McIntyre grab. 2 ♀♀ (J56676), paratype, CPBS 31N/4, same data as previous. 3 ♀♀ (J23557), paratypes, MSL-EG 58, Eastern Bass Strait, 37°51.19'S 148°38.53'E, 51 m depth, mud and shell, 29 September 1990, coll. Marine Studies group, Smith McIntyre grab, RV *Sarda*. 1 ♀ (J17283) and 1 ♀ (J17281), paratypes, MSL-EG 16, Eastern Bass Strait, 38°04'S 148°25.7'E, 28 m depth, sand and shell, 12 August 1989, coll. G Parry, Smith McIntyre grab, RV *Sarda*.

Description of female. Body (Fig. 68) elongate, holotype 3.8 mm long, eight times as long as wide. Cephalothorax subrectangular, as long as wide, shorter than pereonites 1 and 2 together, with rounded triangular rostrum, naked; eyes present, pigmented. Pereonites cylindrical; pereonite 1 shortest, half length of cephalothorax; pereonite 2 longer, 0.75 times as long as cephalothorax; pereonite 3 longest, as long as cephalothorax; pereonites 4 and 5 subequal, longer than pereonite 2, pereonite 6 just shorter than pereonite 2 (all pereonites respectively 1.9, 1.1, 0.8, 1.0, 0.9 and 1.1 times as wide as long). Pleon of five free subequal pleonites bearing

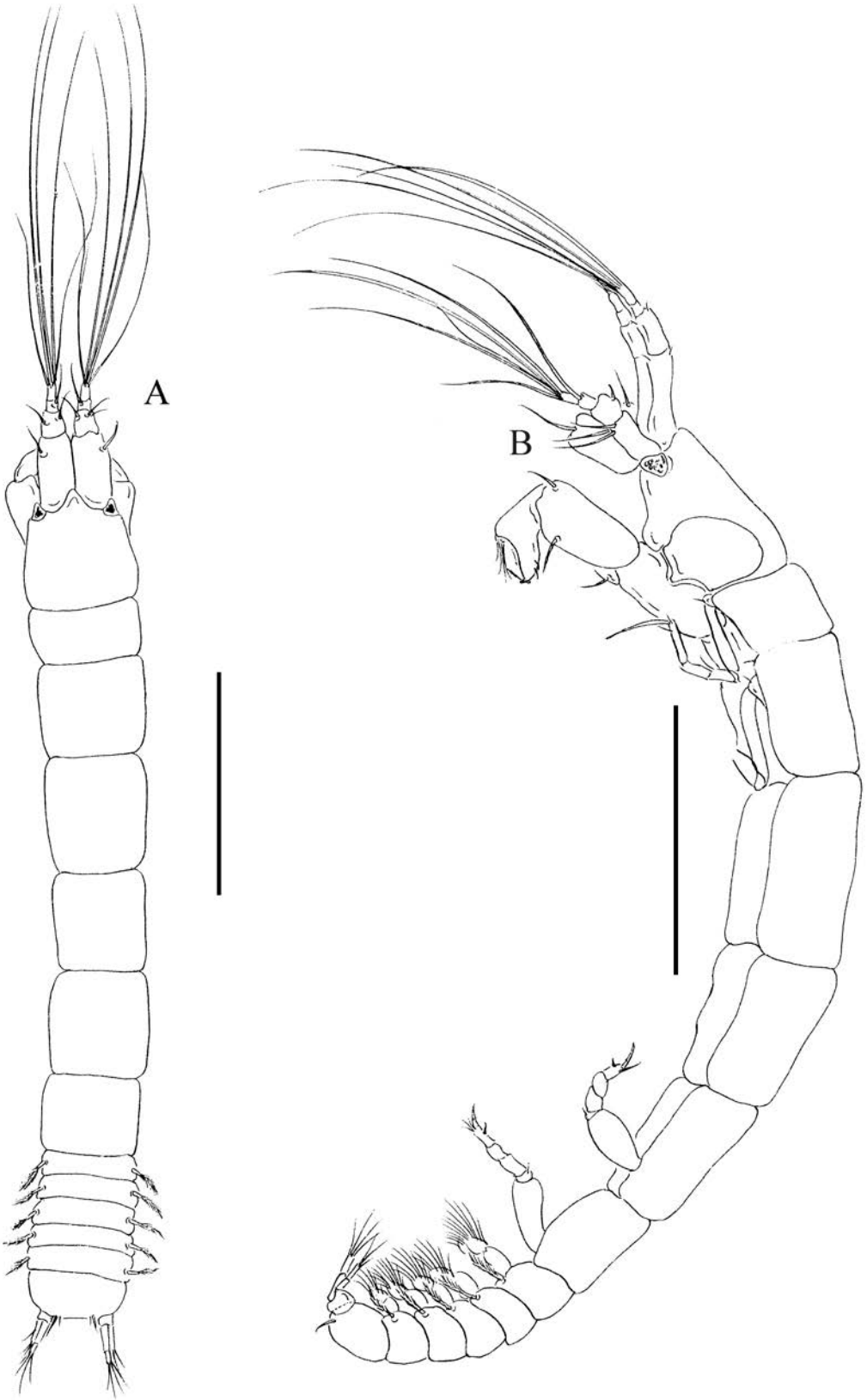

Fig. 68. *Bathytanais parageios* sp. nov., holotype female. A, dorsal view; B, lateral view. Scale = 0.1 mm.

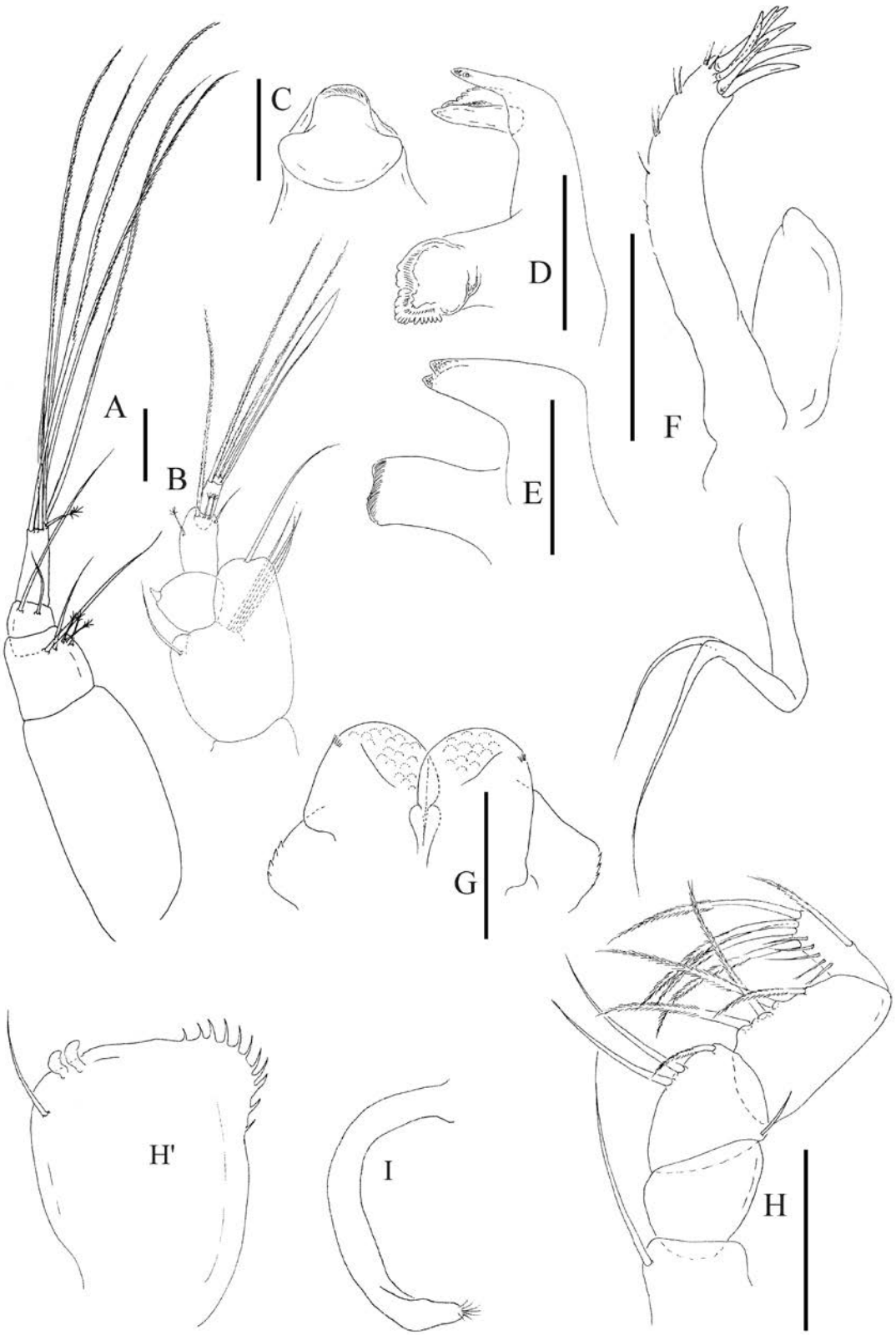

Fig. 69. *Bathytanais parageios* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule and maxilla G, maxilliped; G', maxilliped endite. Scale A-C = 0.1 mm; D-H= 0.01 mm.

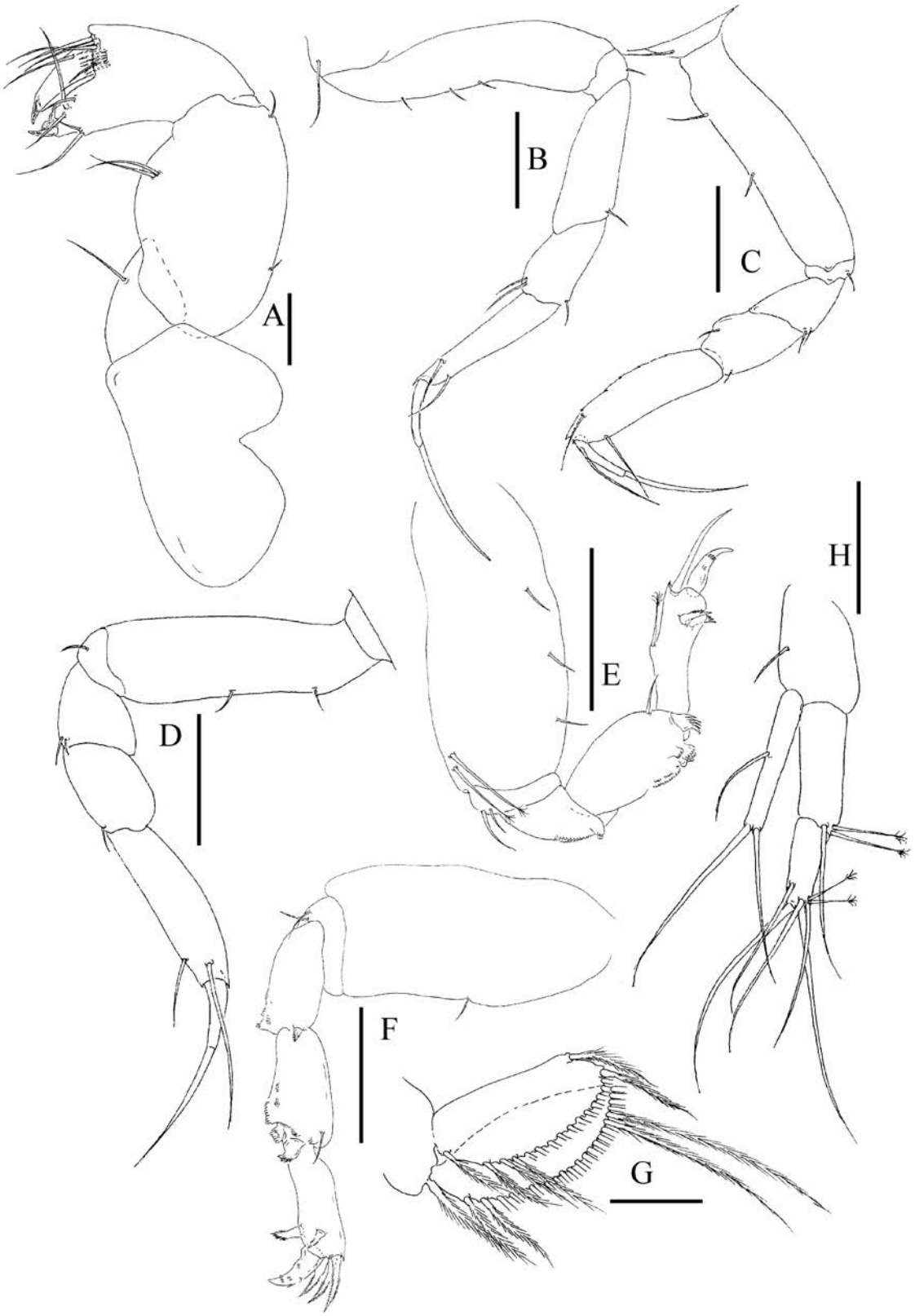

Fig. 70. *Bathytanais parageios* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

pleopods plus pleotelson, the whole shorter than pereonites 5 and 6 together; pleonites 5 times as wide as long; each pleonite with one plumose, articulating lateral seta on each side. Pleotelson semicircular, short, 1.6 times as long as pleonite 5, twice as wide as long, distally with two posterolateral simple setae on each side.

Antennule (Fig. 69A) of four articles, proximal article twice as long as wide, naked; second article as long as wide, about one-third length of first, distally with two simple and three penicillate setae; third article two-thirds length of second with two simple distal setae; fourth article slender, as long as second article, with five setulose distal setae, longest three longer than cephalothorax and antennule together, but without aesthetasc (possibly a generic character: G Bird, pers. comm.).

Antenna (Fig. 69B) of six articles, proximal article compact, naked; second article dorsally with slight flange-like expansion bearing single simple distal seta, ventral margin with three distal setae and laminar apophysis (flange) exceeding distal edge of third peduncle article, distally rounded, not transparent, with long mid-distal seta; third article just shorter than wide, half as long as second article, expanded mid-dorsally with mid-distal spine; fourth article half as long as second, distally with one simple seta, two penicillate setae and long dorsal setulose seta 3.5 times as long as article; fifth article half as long as fourth with two long setulose distal setae; sixth article minute with two long setulose distal setae.

Labrum (Fig. 69C) apically rounded, setose. Left mandible (Fig. 69D) with wide, curved, crenulate lacinia mobilis, right mandible (Fig. 69E) without lacinia mobilis; pars incisiva bilobate, pars molaris robust, distally flat with marginal rugosity extended as short, rounded "teeth" ventrally. Labium (Fig. 47G) rounded, finely setose with microtrichia on inner face, outer margins finely denticulate. Maxillule (Fig. 69F) with seven distal spines and sparse outer setules, palp slender with two distal setae. Maxilla (Fig. 69F) oval, naked. Maxilliped (Fig. 69H) with single inner spine on basis reaching distal margin of second palp article; palp first article naked, second article with two simple setae and shorter denticulate seta on inner margin, outer margin with one simple seta; third article with three denticulate setae on inner margin; fourth article with five submarginal simple ventral setae, four distal denticulate setae and one mid-dorsal denticulate seta; endites (Fig. 69H') characteristic of genus, wider than maxilliped bases, with denticulate outer corner, two elongate ovate spines and single inner slender spine. Epignath (Fig. 69I) slender, curved, distally setose.

Cheliped (Fig. 70A) basis 1.8 times as long as wide, naked; merus with one mid-ventral seta; carpus 1.6 times as long as wide, ventral margin convex with two mid-ventral setae, dorsally with proximal and distal simple setae; propodus longer than wide, distally with comb of five shorter setae on inner face and three longer setulose setae, fixed finger short with lamellate apophyses on cutting edge, one longer and one shorter ventral setae, one longer and two shorter simple setae distally below cutting edge; dactylus with outer margin smooth and bearing one setulose seta.

Pereopod 1 (Fig. 70B) longer than others, coxa simple with seta; basis slender, arcuate, 4.4 times as long as wide with three dorsal setae in proximal half; ischium compact with single seta; merus just over half length of basis, with ventrodistal seta; carpus 0.6 times as long as merus with one ventrodistal and two dorsodistal setae; propodus as long as merus, with two distal setae; dactylus curved, half as long as propodus, unguis slender, twice as long as dactylus. Pereopod 2 (Fig. 70C) more compact, basis 4 times as long as wide; merus 0.8 times as long as basis, with two ventrodistal setae; carpus 1.3 times as long as merus, with slight dorsal expansion and single dorsal and ventral distal setae; propodus twice as long as carpus, with two distal setae; dactylus with long dorsoproximal seta, one-third length of propodus and half length of slender, curved unguis. Pereopod 3 (Fig. 70D) similar to pereopod 2, but dactylus without dorsal seta.

Pereopod 4 (Fig. 70E) coxa not evident; basis stouter, 2.3 times as long as wide, with three simple dorsal setae and two ventrodistal penicillate setae; ischium with two ventrodistal setae; merus half as long as carpus, each with ventrodistal microtrichia and rugosity and molar spines, carpus with dorsodistal seta; propodus as long as carpus, with mid-dorsal penicillate seta, dorsodistal spine exceeding claw, inner and outer ventrodistal molar spines; dactylus and claw fused into unguis, curved, bearing microtrichia, half as long as propodus. Pereopod 5 (not figured) as pereopod 4 but without dorsal penicillate seta on propodus. Pereopod 6 (Fig. 70F) similar to pereopod 4, but basis without penicillate setae, merus with triangular dorsodistal spine, propodus with three distal serrate spines adjacent to unguis.

Pleopods (Fig. 70G) all alike, with naked basis; endopod shorter than exopod, with single inner-subdistal plumose seta, exopod without setae on inner margin; outer margins of endopod and exopod with 16 and 23 plumose setae respectively, on both rami proximal seta on outer margin separated from remaining setae.

Uropod (Fig. 70H) basis with one outer simple seta. Rami slender, exopod of one segment exceeding proximal segment of endopod, with one mesial and two distal simple setae, endopod of two segments, proximal segment with two penicillate and one simple distal setae, distal segment with two penicillate and five simple distal setae.

Male. Unknown.

Etymology. From the Greek *parageios* – pertaining to shallow water.

Remarks. Bathytanais parageios sp. nov. is close in morphology and locality to *B. fragilis*, but there are consistent differences. *B. fragilis* is characterized, *inter alia*, by the expansion on the second peduncle article of the antenna being transparent (confirmed in the examination of the types, see above), and somewhat wider proximally than distally, with two medial setae and no dorsal seta on the article; in the present species, this article has a slight dorsal expansion with a seta, and the ventral expansion is of uniform width throughout, with three medial setae, and quite opaque. The second peduncle article is also subtly different, that of *B. fragilis* having a forward-

pointing spine-like apophysis bearing a seta, while that of *B. parageios* has a stout spine. Further, the third article of the antennule of *B. fragilis* has a seta some five times as long as the fourth antennular article, this seta being less than twice as long in *B. parageios.*

While these differences are sufficiently subtle to suggest variability with depth in one species, other notable differences are found in the uropod segmentation, *B. fragilis* having a one-segmented endopod some three times as long as wide, while that of *B. parageios* is two-segmented, and conspicuously more slender (as is the exopod) at five times as long as wide. Further differences are found in the spination of the posterior pereopods (especially pereopod 6), the setation of the maxilliped basis and endite, the proportionately shorter second and third articles of the antennular peduncle, the proportionately shorter fifth article of the peduncle of the antenna (half as long as the fourth in *B. parageios*, subequal in length in *B. fragilis*), and the more numerous plumose setae on the rami of the pleopods, and the more gracile posterior pereopods in *B. parageios*. No variation between these morphologies was observed within the material examined.

These two taxa are thus considered sibling species, close in morphology but showing a number of distinctions, and separated by depth and habitat (*B. parageios* on shallower sandy sediments, *B. fragilis* on deeper muds), this niche-specificity presumably having lead to allopatric speciation. Their antennal morphology distinguishes them entirely from all other described *Bathytanais* species.

Bathytanais parageios was collected from throughout the Bass Strait, from depths between 12 and 70 m, mainly on sandy substrata.

Family **Leptocheliidae** Lang, 1973

Genus ***Leptochelia*** Dana, 1849

Leptochelia billambi sp. nov.

Figures 71–74

Material examined. 1 ♀ (J58472), holotype, 1 ♂ (J58474), allotype, 162 ♀♀ (J58473), paratypes, sample Stn CPBS 000/4, 38°21.17'S 145°13.15'E, 2 m depth, sandy mud, 6 April 1965, coll. MSG, Smith McIntyre grab.

Portland Exotic Species survey material: 31 ♀♀ (J66139) at 3 m depth, 9 ♀ (J66142) at 0.5 m depth, 16 specimens (J66139) at 7 m depth, paratypes, MAFRI-P17 SCR, Portland No. 6 berth, 38°21'S 147°37'E, 3 May 1996. 2 ♀♀ (J66126) at 7 m depth, 4 ♀♀ (J66123) at 3 m depth, paratypes, MAFRI-P16 SCR, Portland No. 2 berth, 38°20'S 147°37'E, 3 May 1996. 1 ♀ (J66094) at 3 m depth, paratypes, MAFRI-P15 SCR, Portland SL Pattersons Berth, 38°21'S 147°37'E, 2 May 1996. 3 ♀♀ (J66156) at 3 m depth, 2 ♀♀ (J66158) at 0.5 m depth, paratypes, MAFRI-P18 SCR, Portland No. 1 berth, 38°21'S 147°37'E, 4 May 1996. 1 ♂ (J66386), paratype, MAFRI-M47-G47, Port of Melbourne, 37°50'S 144°53'E, 14 m depth, 7 December 1999.

Other material examined. A further 521 idiotypic individuals from the Bass Strait, Western Port and Port Philip Bay, many without registration numbers, and including 303 ♀♀ (9 brooding), 3 ♂♂ and 38 juveniles. Numerous further specimens exist in the collections of Museum Victoria.

Description of female. Body (Fig. 71A, B) slender, holotype 2.4 mm long, 6.4 times as long as wide. Cephalothorax subrectangular, tapering towards anterior, 1.4 times as long as wide, longer than pereonites 1 and 2 together, with slight rostrum, eyelobes rounded, eyes present and black, single setae at posterior of eyelobes and mid-laterally. Pereonites 1 and 6 subequal and shortest, pereonites 2 to 5 subequal, progressively longer, pereonite 5 longest and 1.4 times as long as pereonite 1 (all pereonites respectively 1.9, 1.7, 1.5, 1.5, 1.4 and 1.9 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite about 5.6 times as wide as long, with 2 or 3 lateral setae. Pleotelson pentangular, as long as last two pleonites together, twice as wide as long, with one anterolateral and posterolateral seta on each side and two distal setae.

Antennule (Fig. 72A) of three longer and one minute distal articles, proximal article 4 times as long as wide, 1.6 times as long as distal three articles together, with proximal, mesial and distal inner groups of penicillate setae, inner and outer simple mesial setae and one long inner distal seta longer than second article; second article twice as long as wide, one-third as long as first article, distal seta just longer than article; third article just shorter than second, with one distal seta; fourth article minute, with three distal setae and one aesthetasc.

Antenna (Fig. 72B) of six articles, proximal article compact, with fine distal seta; second article as long as wide, with single inner distal and dorsodistal slender spines; third article just longer than wide, with dorsodistal slender spine; fourth article longest, 3.2 times as long as wide and twice as long as third, with mid-length seta reaching two-thirds of length to distal margin, and distal tufts of penicillate and simple setae; fifth article 0.6 times as long as fourth; sixth article minute, with four simple and one penicillate distal setae.

Labrum (Fig. 72C) hood-shaped, setose, typical of genus. Left mandible (Fig. 72D) with crenulate lacinia mobilis wider than distal end of mandible, distal crenulation on pars incisiva, pars molaris with strong rugosity; right mandible (Fig. 72E) similar but without lacinia mobilis, pars incisiva distally bifurcate. Labium (Fig. 72G) wide, bilobed, distally finely setose, without palp. Maxillule (Fig. 72F) with ten distal spines and setose margins, rows of setules on inner distal face; palp distinct, with two distal setae. Maxilliped (Fig. 72H) palp first article naked, second article with finely setose inner margin, and with one outer, one ventral and three inner setae, distal-most inner seta not reaching distal margin of third palp article; third article with nine inner marginal and one distal submarginal finely denticulate setae; fourth article with nine inner/distal finely denticulate setae and one outer subdistal seta; basis with five long setae extending to third palp article; endites distally with fine outer setules and three robust spatulate spines, inner spine shorter than others.

Cheliped (Fig. 73A) with rounded, comparatively slender basis 2.3 times as long as wide; merus triangular with three ungrouped ventral setae; carpus twice as long as wide, with two midventral setae and two shorter marginal dorsal setae; propodus slightly longer than wide, with inner distal comb of seven setae and longer seta at base of dactylus; fixed finger with four ventral and three inner setae, cutting edge crenulate; dactylus naked.

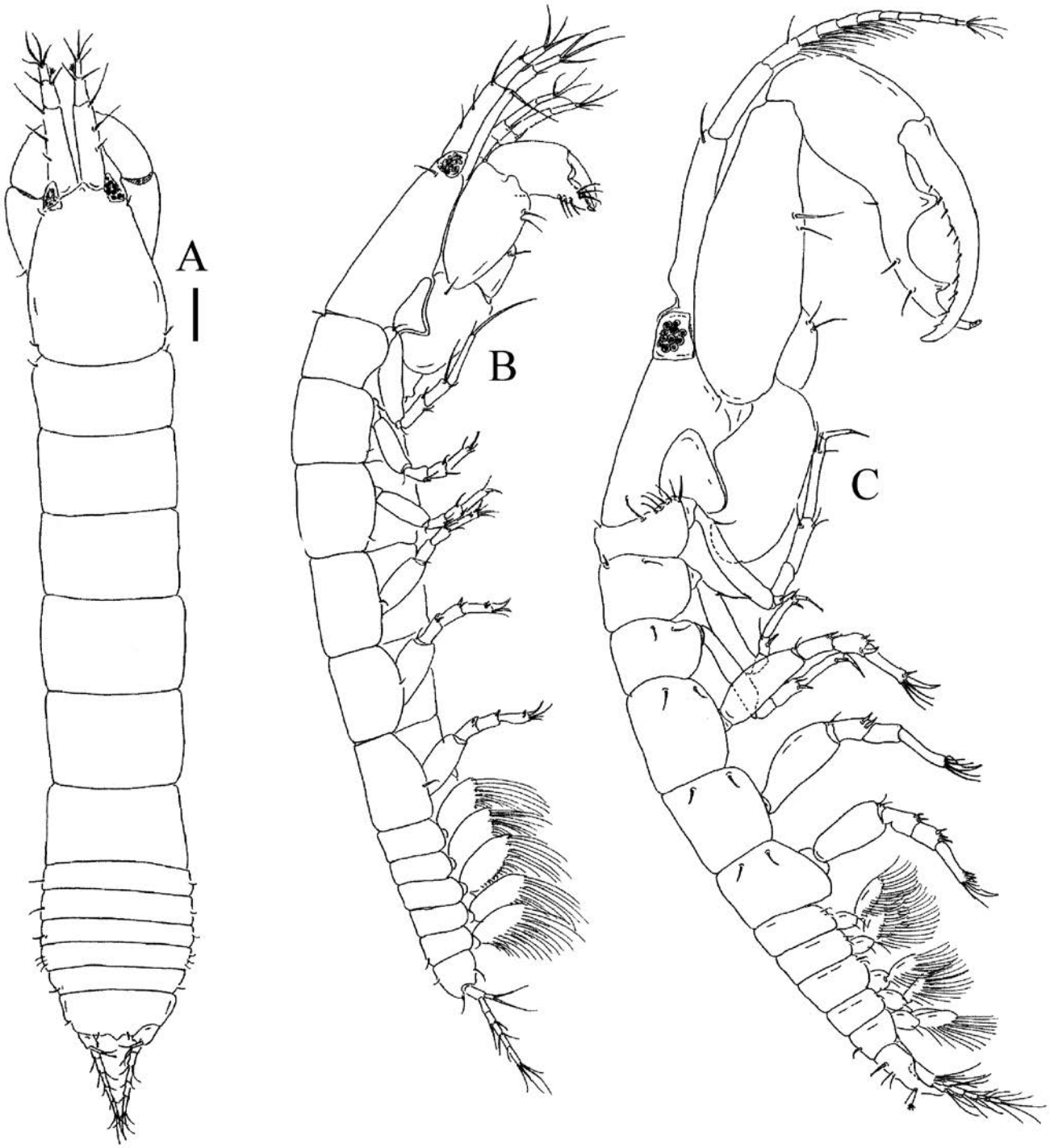

Fig. 71. *Leptochelia billambi* sp. nov., female holotype. A, dorsal view; B, lateral view; C, male lateral view. Scale = 0.2 mm.

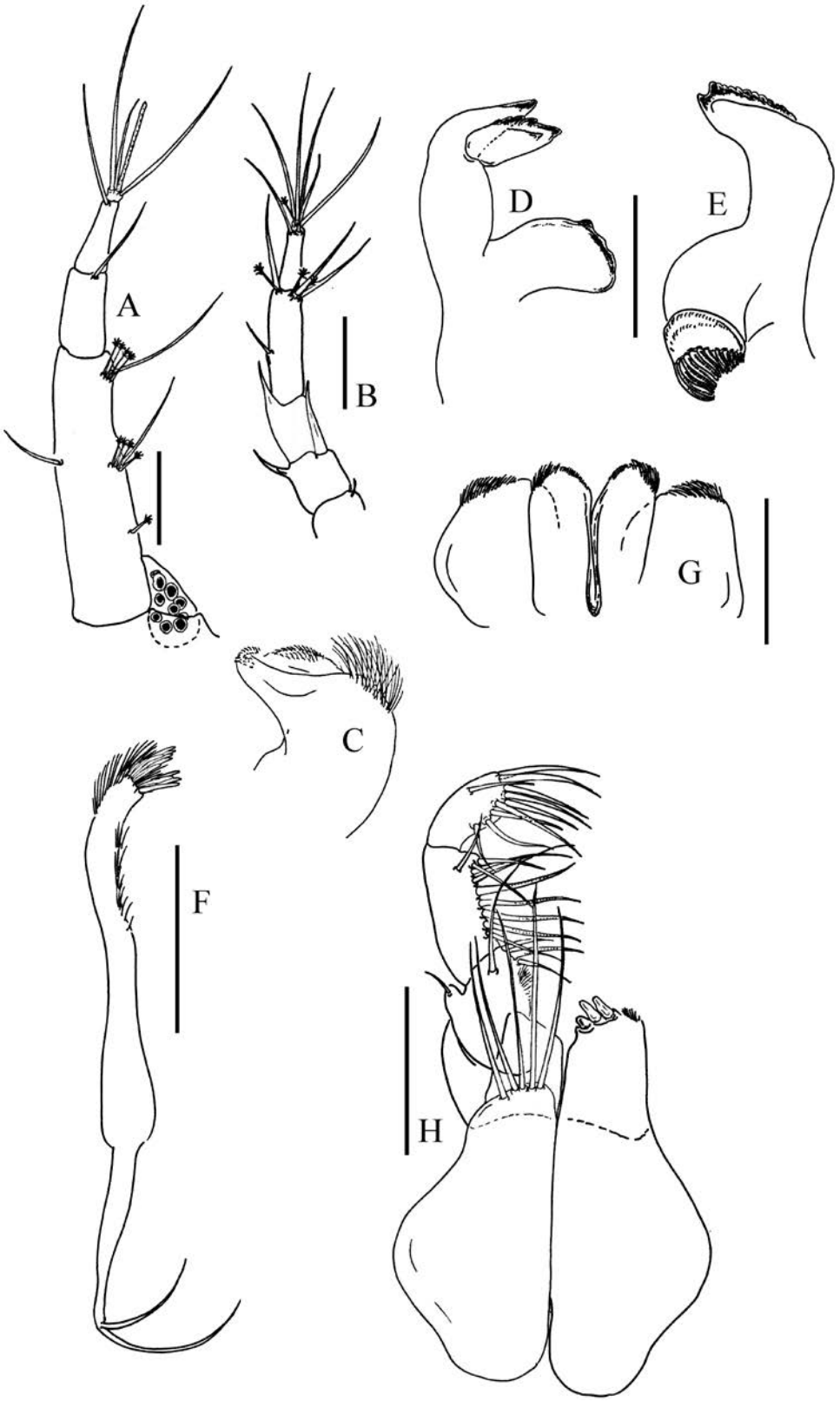

Fig. 72. *Leptochelia billambi* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; G, labium; H, maxilliped. Scale = 0.2 mm.

Fig. 73. *Leptochelia billambi* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.2 mm.

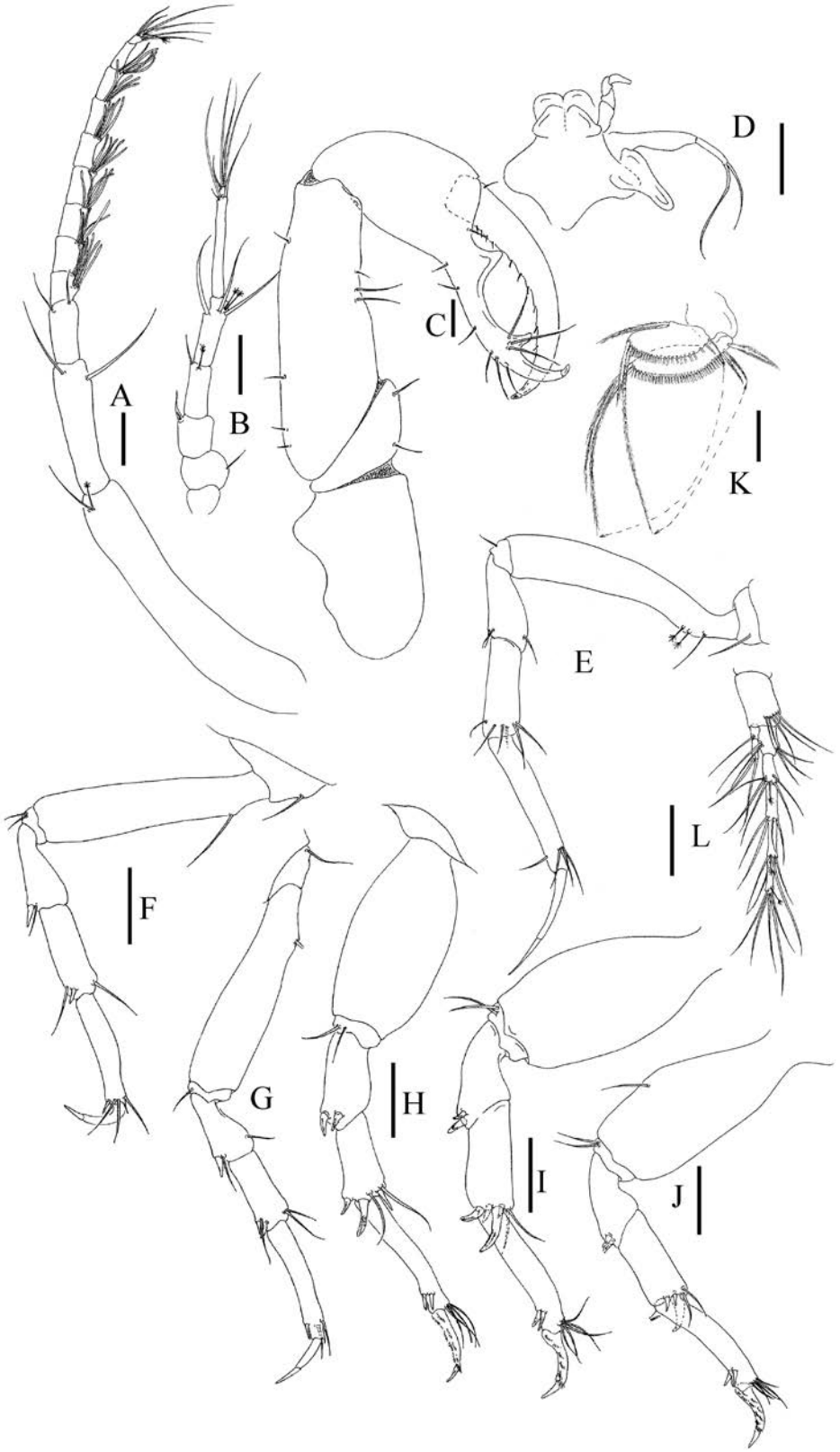

Fig. 74. *Leptochelia billambi* sp. nov., male paratype. A, antennule; B, antenna; C, cheliped; D, mouth parts; E, pereopod 1; F, pereopod 2; G, pereopod 3; H, pereopod 4; I, pereopod 5; J, pereopod 6; K, pleopod; L, uropod. Scale = 0.2 mm.

Pereopod 1 (Fig. 73B) longer than other pereopods, coxa with seta; basis slender, 4.4 times as long as wide, with single dorsoproximal simple and penicillate setae; ischium compact with one ventral seta; merus as long as carpus, with one dorsodistal and two ventrodistal setae; carpus with two ventrodistal setae, one medial distal seta and three dorsodistal setae, longest of which is half length of propodus; propodus 1.8 times as long as carpus, with three setae on subdistal dorsal mound and one subdistal ventral seta; dactylus slender, extending into shorter slender unguis 0.7 times as long as dactylus, the two together as long as propodus. Pereopod 2 (Fig. 73C) more compact than pereopod 1; coxa with longer seta; basis 3.1 times as long as wide; ischium with 2 setae; merus as long as carpus and 1.5 times as long as wide, with strong ventrodistal spine and ventral rows of microtrichia; carpus with single dorsodistal and ventrodistal setae and two ventrodistal spines, and ventral rows of microtrichia; propodus 1.6 times as long as carpus, with three distal setae and ventral rows of microtrichia; dactylus and short unguis curved, together 0.7 times as long as propodus. Pereopod 3 (Fig. 73D) similar to pereopod 2, but carpus shorter than merus and with two dorsodistal setae.

Pereopod 4 (Fig. 73E) basis stout, 2.23 times as long as wide with two ventroproximal penicillate setae; ischium with two ventrodistal setae; merus with paired ventrodistal spines and ventral rows of microtrichia; carpus just shorter than merus, with outer, ventral and inner distal spines each with fine subdistal setules, and ventral rows of microtrichia; propodus 1.2 times as long as carpus, with two ventrodistal spines, five dorsodistal setae mostly as long as dactylus, and ventral rows of microtrichia; dactylus and distinct unguis curved, 0.6 times as long as propodus. Pereopod 5 (Fig. 73F) as pereopod 4, but carpus with additional simple distal seta, propodus as long as carpus. Pereopod 6 (Fig. 73G) as pereopod 5, but propodus with seven finely denticulate and one simple distal setae.

Pleopods (Fig. 73H) all alike, typical for the genus but basis naked, endopod with single inner plumose seta and proximal outer seta separated from remainder.

Uropod (Fig. 73I) biramous, basis naked; exopod of one segment, 0.8 times as long as proximal endopod segment, outer distal seta longer than inner distal seta; endopod of five segments, distal segments slender.

Description of male. Larger than female (allotype length 4.2 mm), body (Fig. 71C) more compact, cephalon as long as pereonites 2 to 4 together, with large eyelobes bearing large black eyes; pereonite 1 shortest, pereonites 2, 3 and 6 subequal, twice as long as pereonite 1, pereonite 4 longest, three times as long as pereonite 1, pereonite 5 just shorter than pereonite 4. Five free pleonites, subequal in length, each as long as pereonite 1, pleotelson as long as pleonites 5 and 6 together.

Antennule (Fig. 74A) elongate, first peduncle article 6.4 times as long as wide, curved, with single dorsodistal penicillate and simple setae; second article 0.43 times as long as first with single ventral and dorsal distal simple setae; third article half as long as second and twice as long as wide with single ventral and dorsal distal simple setae; flagellum of 9 segments, segments 1 to 7 bearing proximal row of 6 or 7 aesthetascs, segment 8 naked, segment 9 minute, distally with six simple and one penicillate setae.

Antenna (Fig. 74B) proximal article compact; second article as long as wide, with single ventrodistal seta; third article longer than second, twice as long as wide, with single simple dorsodistal seta; fourth article 3.3 times as long as third, with incipient secondary articulation at mid-length bearing single simple and penicillate setae, distally ventral pairs of penicillate and simple setae, and stronger dorsal seta reaching half length of fifth article; fifth article 0.9 times as long as fourth with two longer and one shorter distal setae; sixth article minute, with four simple distal setae.

Mouthparts (Fig. 74D) atrophied, naked maxilliped and maxillule palp with two distal setae distinguishable.

Cheliped (Fig. 74C) larger and more slender than that of female; basis 1.7 times as long as wide; merus short, with two ventral setae; carpus three times as long as wide, with three midventral setae and four dorsal marginal setae; propodus 1.4 times as long as wide, fixed finger 1.25 times as long as palm, with six ventral setae, three setae adjacent to cutting edge, two inner tooth-like apophyses on cutting edge; dactylus slender, curved, with proximal seta and row of 13 setae along cutting edge.

Pereopods (Fig. 74E to J) similar to but more slender than those of female, merus shorter than carpus on pereopods 1 to 3; on pereopods 4 to 6 propodus much longer than carpus, distal carpal spines more elongate than those of female, microtrichia restricted to dactylus, dactylus proportionately longer than in female.

Pleopods (Fig. 74K) with longer setae than on those of female. Uropod (Fig. 74L) basis with inner distal row of setae; exopod two-segmented, longer than proximal endopod segment; endopod of five segments, more heavily setose than that of female.

Etymology. Named after William Lamb, 2nd Viscount Melbourne, after whom the city of Melbourne was named in 1837 (the original Melbourne being a village in Derbyshire, England).

Remarks. Bamber (2008) gave an identification key to the species of the Leptocheliidae then known from Australian waters, through which the present species would key out to *Leptochelia opteros* Bamber, 2008, the commonest species in Moreton Bay, Queensland: it is indeed close to that species, and shares with it a distal seta on the proximal article of the antenna; however, *L. billambi* sp. nov. is a larger species, its cheliped and antennule are more elongate than those of *L. opteros*, the fixed finger of the chela has 4, not 3, ventral setae, the chela comb-row has more setae, and the maxilliped basis has 5 distal setae (4 in *L. opteros*). The male appears generally as a larger version of that of *L. opteros*, but that male is characterized by having a dorsodistal flange on the basis of pereopod 6, absent in the present species. Finally, *L. billambi* was recorded on sandy mud substrata, while *L. opteros* lives amongst sublittoral algae and epifaunal communities. The incipient secondary articulation of the fourth antennal peduncle article in the male is so far unique to this species in the Leptocheliidae.

A range of morphometric and meristic characters in females has been analyzed for some 22 taxa attributable to the *Leptochelia savignyi* (Krøyer, 1842)-complex (see Bamber, 2008; Bamber, 2010), with which the present species has been compared. The only other species which has the proximal article of the antennule approaching as slender as 4 times as long as wide is *L. savignyi sensu stricto*, ranging from 3.5 to 3.8 times as long as wide (Bamber, 2010), while in the figure of *L. savignyi sensu* Sars (1886) from the Mediterranean this article is 4 times as long as wide. However, that species has only 4 maxilliped-basis setae (five in *L. billambi*) and a proportionately shorter cheliped basis and carpus in the adult, while the distal seta on article 2 of the antennule is not longer than the article itself (longer in *L. billambi*), the uropod exopod is only just longer than half of the proximal endopod-segment length (0.8 times as long in *L. billambi*), and the dactylus plus unguis of pereopod 1 are shorter than the propodus (equal in length in *L. billambi*); further, the male of *L. savignyi sensu stricto* also has a dorsodistal flange on the basis of pereopod 6 (Bamber, 2010), unlike that of *L. billambi*. Other than the present species, there are only four described species which have the distal seta on article 2 of the antennule as long as or longer than the article itself (*L. itoi* Ishimaru 1985, *L. daggi* Bamber, 2005, *L. opteros* Bamber, 2008 and *L. guduroo* Bamber, 2008), but all of these have the first peduncle article of the antennule less than three times as long as wide.

Leptochelia billambi was recorded commonly at between 0 and 14 m depth in Port Phillip Bay and Western Port, Victoria.

Genus ***Araleptochelia*** gen. nov.

Diagnosis. Female with 4-articled antennule, third article longer than second; antenna 6-articled, articles 2 and 3 with slender distal spines, article 2 without ventral spine; maxilliped basis with four long setae extending to half length of second palp article, endites distally with single seta and three slender spatulate spines; cheliped relatively slender, merus covering less than half of ventral margin of carpus, propodus (palm of chela) nearly twice as long as wide; dactylus plus unguis on first pereopod 1.5 times as long as propodus; merus of pereopods 2 and 3 with ventrodistal spine about two-thirds as long as carpus; pleopod without inner plumose seta on the pleopod endopod; uropod exopod 1-segmented, endopod 5-segmented, with all segments elongate (more than four times as long as wide). Otherwise typical of the family. Male showing dimorphism in the antennule with secondary segmentation of the flagellum to more than 17 segments, proximal flagellum segment bearing large dorsodistal spine almost as long as flagellum; cheliped slender, sinuous; posterior pereopods without flange on basis. Sub-adult male with five-articled antennule.

Type species: Araleptochelia macrostonyx sp. nov. by monotypy,

Etymology. from the Greek *araeos* – thin, as is the chela of the female (and the proximal uropod endopod segments) – and "*Leptochelia*", to which genus it is closest (female).

Remarks. Ostensibly, the species described below has the gross appearance of a typical *Leptochelia*; females of that genus are remarkably conservative in their morphology, a factor which in the past has lead to over-synonymization. The present species has a sufficient number of distinguishing characters, notably the slender chela (somewhat reminiscent of that of a typhlotanaid); the very slender distal spines on the second and third peduncle articles of the antenna; the proportionately very long dactylus and unguis of pereopod 1; the long ventrodistal spines on the merus of pereopods 2 and 3; the lack of an inner plumose seta on the pleopod endopod; and the elongate proximal uropod segments, that it warrants separation into a distinct genus.

The spination/setation of the antennal peduncle articles is more typical of such genera as *Konarus* Bamber, 2006, *Pseudonototanais* Lang, 1973 and *Parakonarus* Bird, 2011 rather than of *Leptochelia*, while the proportions of the dactylus and unguis of pereopod 1 are more typical of *Leptochelia*.

The mouthparts are typical of *Leptochelia, inter alia,* and while the maxilliped basis has four distal setae in the only known species (thus distinguishing it from such other leptocheliid genera as *Heterotanais* and *Pseudoleptochelia*), the number of these setae is known to be variable in, for example, *Leptochelia* (e.g. Bamber, 2008), so cannot as yet be regarded as diagnostic. While the chela of the male may be regarded as somewhat intermediate between that of the *L. savignyi*-type and that of the *L. minuta*-type, the extreme secondary segmentation of the antennule flagellum, with an extraordinarily long spine on the first flagellum segment, reinforces the difference between this taxon and species of *Leptochelia*.

***Araleptochelia macrostonyx* sp. nov.**

Figures 75–78

Material examined. 1 brooding ♀ (J58470), holotype, 11 ♀♀ (J56622), paratypes, Stn 81-HK-1 134, 40º56.0'S 146º05.40'E, 68 m depth, mud, 4 February 1981, coll. MF Gamon *et al*., FRV *Hai Kung*, pipe-dredge. 3 ♀♀ (J56629), paratypes, Stn 80-Sa-1 113, 40º23.8'S 146º32'E, 65 m depth, muddy sand, 3 November 1980, coll. MF Gamon *et al*., FRV *Sarda*. 14 ♀♀ (J56630), paratypes, Stn 83-SG-1 209, 38º18.0'S 147º37.0'E, 55 m depth, muddy fine shell, 31 July 1983, coll. MF Gamon *et al*., FV *Silver Gull.*

13 ♀♀, 2 ♂♂ (J56636), 5 ♀♀, 1 juvenile (J56635), paratypes, Stn 81-T-1 158, 39º49.5'S 146º18.5'E, 82 m depth, sand-silt-mud, 13 November 1981. 1 ♀ (J56634), paratype, Stn 81-HK-1 189, 38º42.8'S 142º35.6'E, 69 m depth, coarse sand, 20 November 1981. 1 ♀ (J56626), paratype, Stn 81-HK-1 201, 39º08.3'S 144º43.9'E, 66 m depth, coarse sand, 23 November 1981. 9 ♀♀, 1 ♂ (J56627), 1 preparatory ♂ (J56639), 8 preparatory ♂♂ (J56640), paratypes, Stn 81-HK-1 159, 39º43.5'S 146º18.8'E, 80 m depth, muddy shell, 13 November 1981. 1 ♀ (J56631), 1 ♀ (J56633), 1 preparatory ♂ (J56638), paratypes, Stn 81-HK-1 161, 39º48.3'S 147º19.2'E, 60 m depth, muddy sand, 14 November 1981. 1 ♀ (J56624), paratype, Stn 81-HK-1 173, 39º26.3'S 147º48.7'E, 49 m depth, medium sand, 17 November 1981. 2 ♀♀ (J56628), paratypes, Stn 81-T-1 169, 39º02.4'S 148º30.6'E, 120 m depth, muddy sand, 15 November 1981. All coll. R.S. Wilson, RV *Tangaroa*.

1 preparatory ♂ (J56637), paratype, Stn 83-SG-1 209, 38º18.0'S 147º37.0'E, 55 m depth, muddy fine shell, 31 July 1983, coll. M.F. Gomon & R.S. Wilson, FV *Silver Gull.*

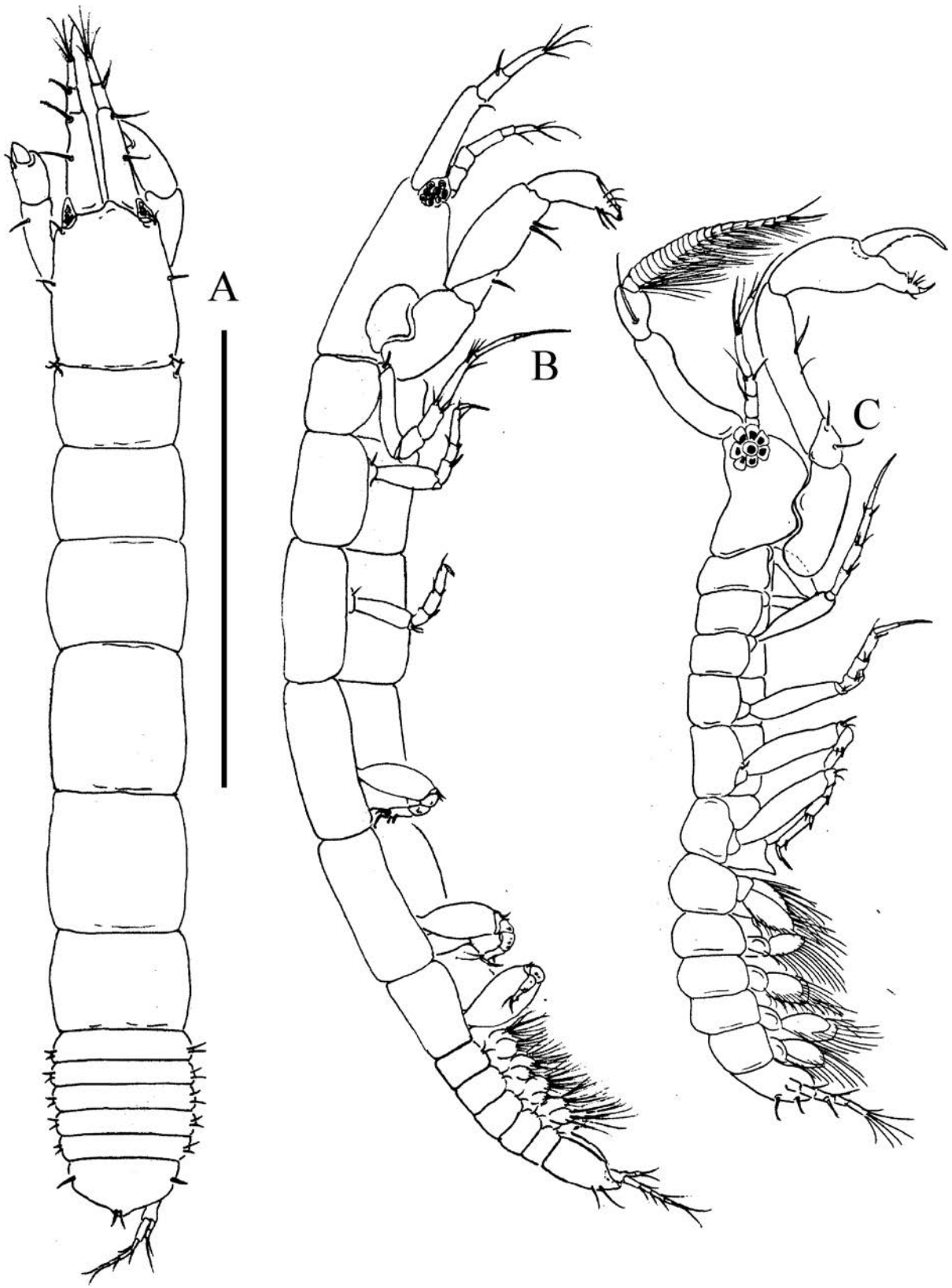

Fig. 75. *Araleptochelia macrostonyx* sp. nov., female holotype. A, dorsal view; B, lateral view; C, male lateral view. Scale = 1 mm.

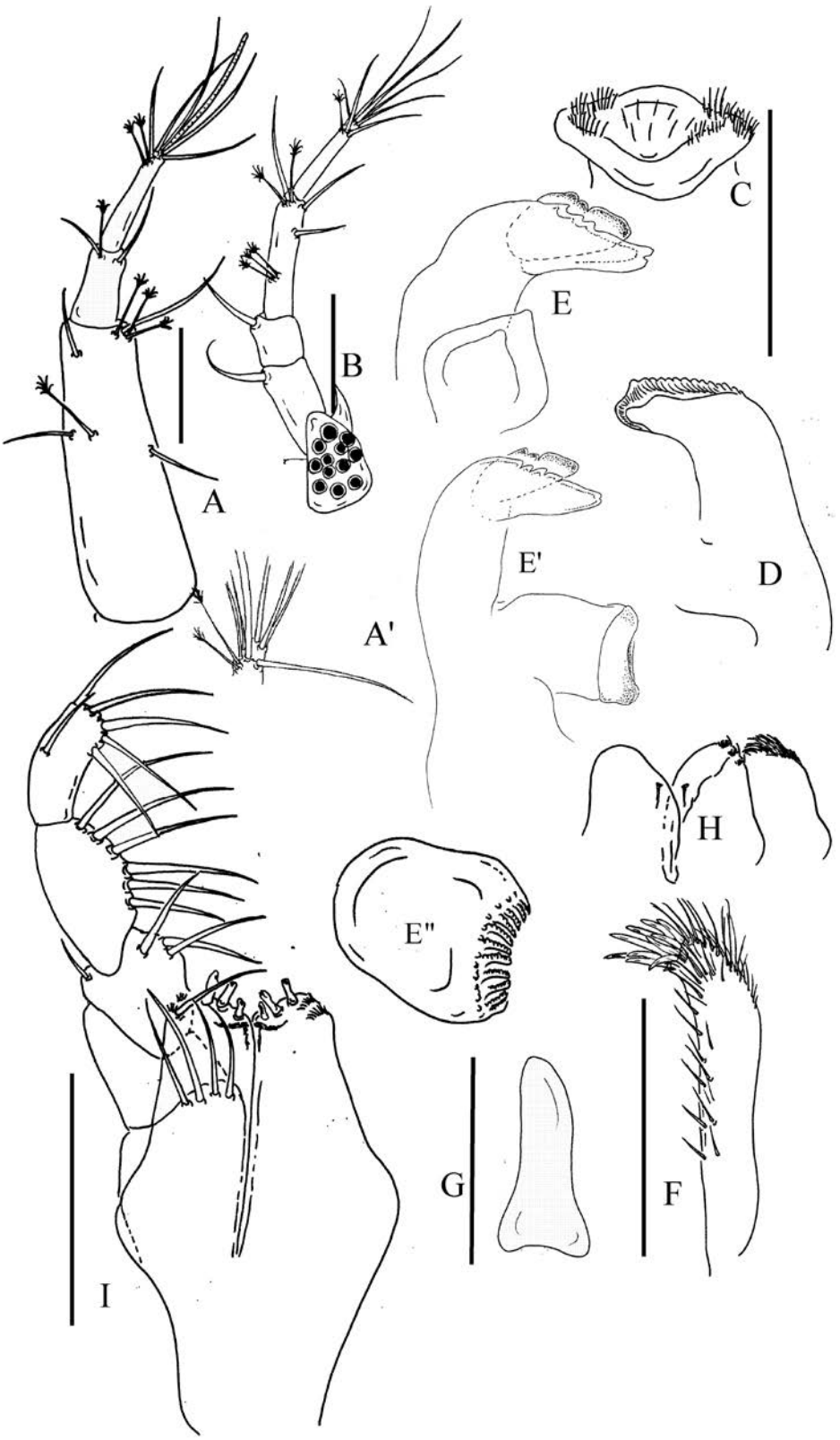

Fig. 76. *Araleptochelia macrostonyx* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, right mandible; E, E' left mandible; F, maxillule endite; G, maxilla; H, labium; I, maxilliped. Scale = 0.1 mm.

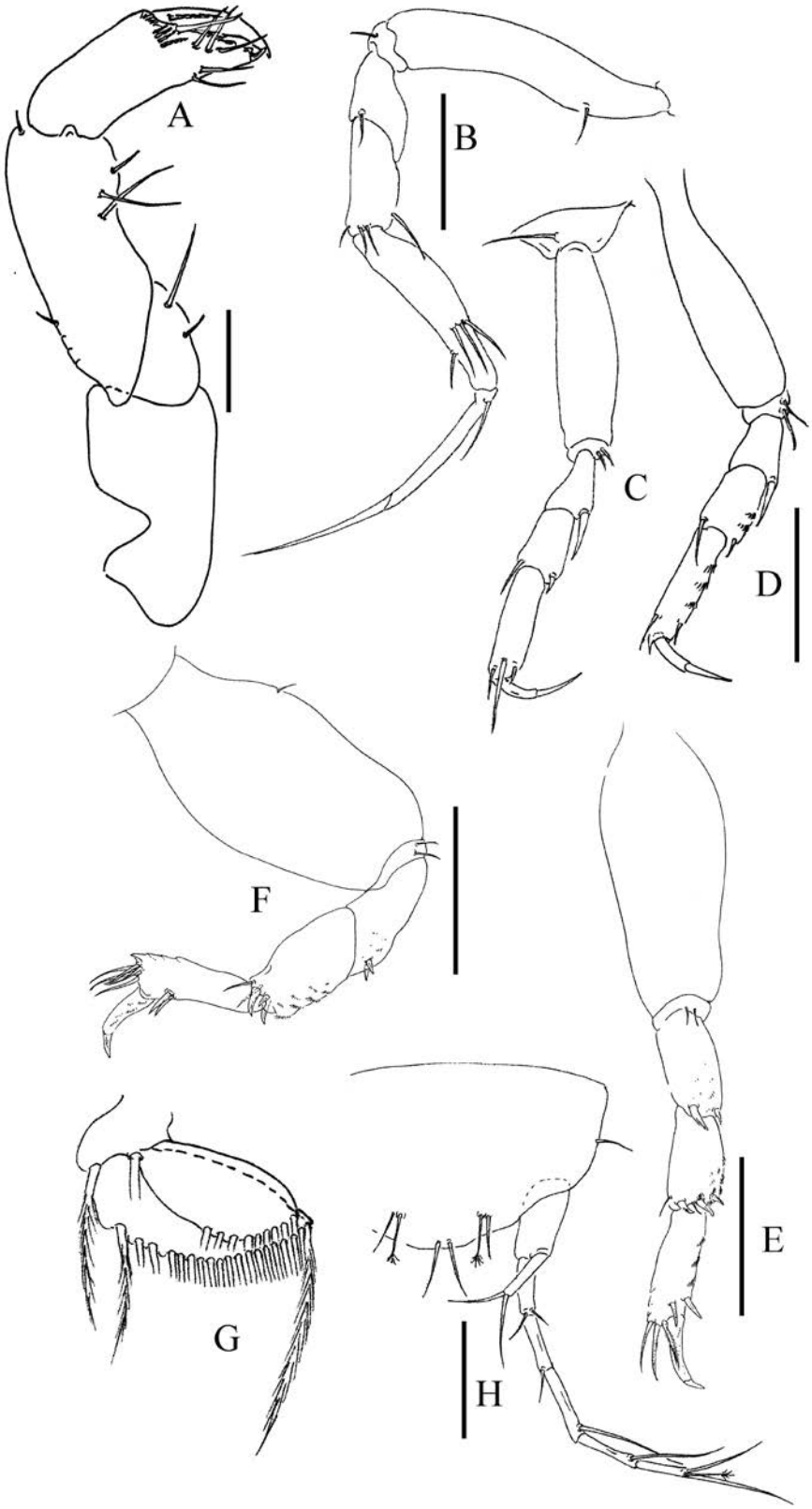

Fig. 77. *Araleptochelia macrostonyx* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

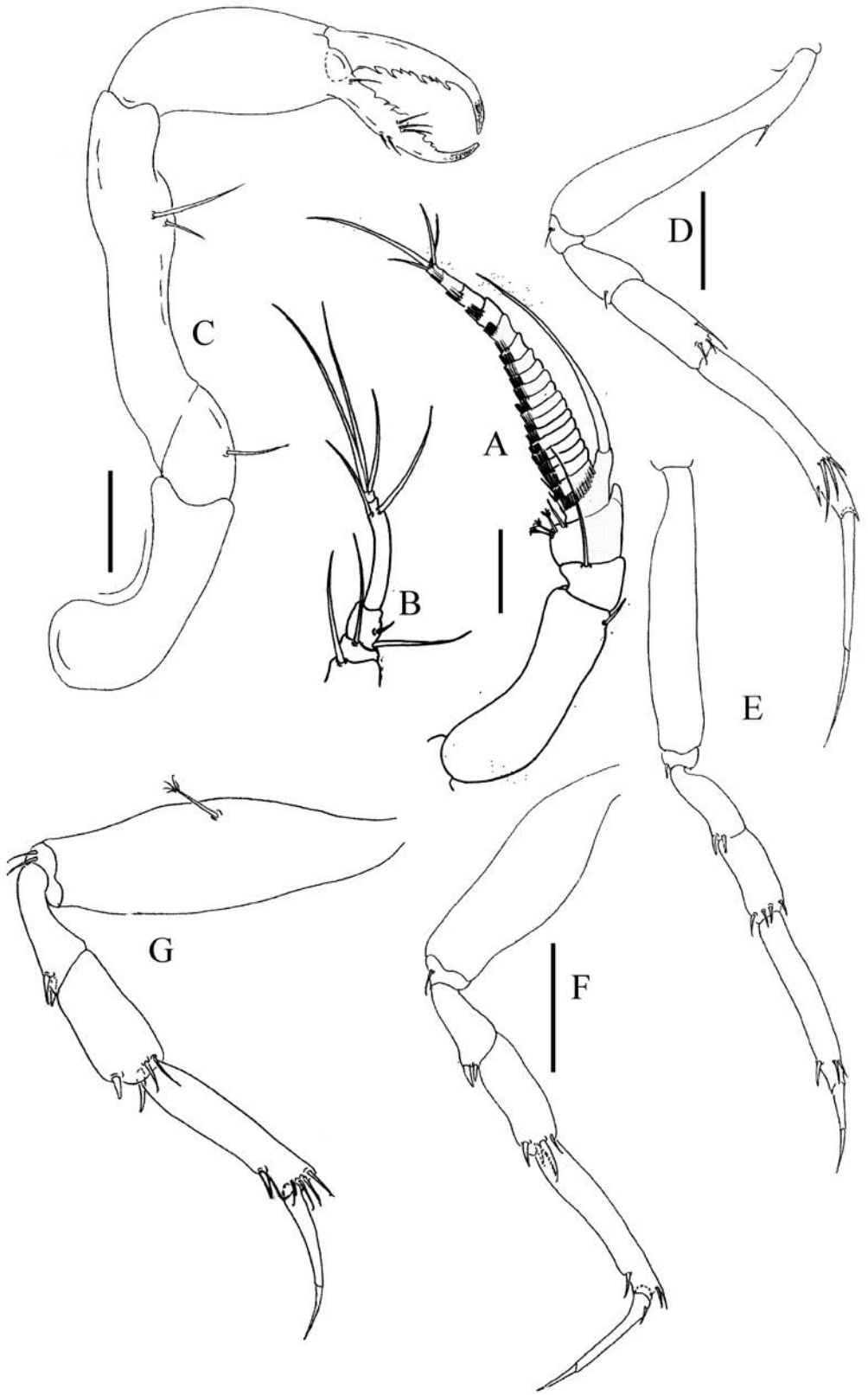

Fig. 78. *Araleptochelia macrostonyx* sp. nov., male. A, antennule; B, antenna; C, cheliped; D, pereopod 1; E, pereopod 2; F, pereopod 3; G, pereopod 6. Scale = 0. 1 mm.

Description of female. Body (Fig. 75A, B) slender, holotype 2.3 mm long, 7.4 times as long as wide. Cephalothorax subrectangular, 1.3 times as long as wide, as long as pereonites 1 and 2 together, with slight rostrum, eyelobes and black eyes present, single setae at posterior of eyelobes, midlaterally and posterolaterally. Pereonites 1 and 2 subequal, shortest; pereonites 3 and 6 subequal, slightly longer than pereonite 1; pereonites 4 and 5 subequal, longest and almost twice as long as pereonite 1 (all pereonites respectively 1.5, 1.6, 1.5, 0.9, 0.9 and 1.4 times as wide as long). Pleon with five free subequal pleonites bearing pleopods, each pleonite about 6 times as wide as long, with paired lateral setae. Pleotelson semicircular, longer than last two pleonites together, 1.7 times as wide as long, on each side bearing one posterolateral seta and a pair of one simple and one penicillate setae posterior to uropod attachment, and two distal setae.

Antennule (Fig. 76A) of four tapering articles, as long as cephalothorax, proximal article 3.1 times as long as wide; second article almost twice as long as wide, one-quarter as long as first article, longest distal outer only just longer than article; third article 1.3 times as long as second; fourth article minute, eccentric, with four distal setae and one aesthetasc.

Antenna (Fig. 76B) of six articles, proximal three articles subequal in length; proximal article naked; second article with single dorsodistal slender spine; third article as long as wide, with slender dorsodistal spine; fourth article longest, 2.7 times as long as third article and nearly 5 times as long as wide; fifth article 0.75 times as long as fourth; sixth article minute.

Labrum (Fig. 76C) hood-shaped, setose, typical of genus. Left mandible (Fig. 35E, E') with crenulate lacinia mobilis narrower than distal end of mandible, proximal crenulation on pars incisiva, pars molaris (Fig. 76E) robust; right mandible (Fig. 76D) similar but without lacinia mobilis. Labium (Fig. 76H) wide, bilobed, distally finely setose, without palp. Maxillule (Fig. 76F) with ten distal spines and setose margins, setules on inner distal face paired. Maxilla (Fig. 76G) simple, linguiform, naked. Maxilliped (Fig. 76I) palp first article naked, second article with one outer and three inner setae in distal half, distal-most inner seta only half as long as third palp article; third and fourth articles with filtering rows of six and five setae respectively, fourth article with outer seta; basis with four long setae extending to half length of second palp article; endites distally with single seta and three slender spatulate spines.

Cheliped (Fig. 77A) basis nearly twice as long as wide; merus subtriangular with two ventral setae; carpus 2.8 times as long as wide, with three ventral setae in distal half, one proximal and one distal dorsal setae; propodus elongate for the genus, palm 1.8 times as long as wide, fixed finger 0.45 times as long as palm with two ventral and three inner setae alongside cutting edge, cutting edge crenulate, comb-row at base of dactylus of four setae with adjacent microtrichia; dactylus with outer proximal seta.

Pereopod 1 (Fig. 77B) longer than other pereopods, coxa with seta; basis slender, five times as long as wide; ischium compact with one ventral seta; merus 0.6 times as long as carpus, with single distal seta; merus-carpus articulation strongly oblique; carpus with one dorsal and three ventral distal setae, longest of which is less than one-third as long as propodus; propodus twice as long as carpus, with three setae on subdistal dorsal mound and one subdistal ventral seta; dactylus slender, with proximal seta, extending into slightly longer slender unguis, the two together 1.5 times as long as propodus. Pereopod 2 (Fig. 77C) more compact than pereopod 1; basis 3.3 times as long as wide; ischium with 2 setae; merus as long as carpus, with slender ventrodistal spine more than half as long as carpus; carpus with dorsodistal seta and short ventrodistal spine; propodus 1.75 times as long as carpus, with two dorsodistal and one ventrodistal setae, and dorsodistal sharp apophysis; curved dactylus and slightly longer unguis together 0.7 times as long as propodus. Pereopod 3 (Fig. 77D) similar to pereopod 2, but dactylus and unguis subequal.

Pereopod 4 (Fig. 77E) basis stouter than those of anterior pereopods, twice as long as wide; ischium with two seta; merus and carpus subequal, merus with two short, ventrodistal spines and microtrichia, carpus with one outer, one ventral and one inner distal spines each with serrate ventral margin, single inner and outer simple dorsodistal setae and ventral microtrichia; propodus 1.2 times as long as carpus, with ventral microtrichia, two ventrodistal serrate spines, and three dorsodistal finely-denticulate setae almost as long as dactylus; dactylus and short unguis distinct, curved, together two-thirds as long as propodus. Pereopod 5 as pereopod 4. Pereopod 6 (Fig. 77F) similar to but stouter than pereopod 4, but distal carpal spines larger, propodus with two pectinate and three finely-denticulate distal setae.

Pleopods (Fig. 77G) all alike, with no inner plumose seta on endopod; proximal outer seta separated from others on both rami.

Uropod (Fig. 77H) biramous, basis naked; exopod of one slender segment as long as proximal endopod segment, outer distal seta longer than inner distal seta; endopod of five elongate segments.

Description of male. Typical primary male, smaller than female (allotype length 1.6 mm), body (Fig. 75C) more compact, cephalon as long as pereonites 1 to 3, with large eyelobes bearing large black eyes; pereonite 5 longest, other pereonites subequal in length. Five free pleonites, subequal in length and about as long as pereonite 1, pleotelson nearly twice as long as pleonite 5. Sexual dimorphism as follows.

Antennule (Fig. 78A) elongate, first peduncle article curved, 2.8 times as long as wide with one dorsodistal seta; second article compact, 0.25 times as long as first with long outer distal seta; third article compact with dorsodistal spine and ventrodistal penicillate and simple setae; flagellum of 19 segments, first 18 each bearing distal row of aesthetascs, proximal flagellum article with extraordinarily-long dorsodistal spine extending almost full length of flagellum; distal article short and with four simple setae. Antenna (Fig. 78B) with slender distal setae rather than spines on articles 2 and 3, articles 4 and 5 apparently fused. Mouthparts atrophied.

Cheliped (Fig. 78C) very slender, three-quarters as long as body; basis arcuate, about 3 times as long as wide; carpus slender and sinuous, about 5 times as long as wide with two ventral setae in proximal half; palm of propodus twice as long as wide, fingers of chela 0.8 times length of palm; fixed finger longer than palm, with two ventral and three inner setae alongside cutting edge,

cutting edge with sharp denticulations but no large tooth-like apophyses, distal spine rugose; dactylus with sharp tooth-like denticulations along cutting edge, unguis rugose.

Pereopods (Fig. 78D to G) more elongate than those of female; unguis of pereopod 1 shorter than dactylus; on pereopods 4 to 6 carpal spines more slender, distal articles without dense fields of microtrichia, unguis longer and more slender, together with dactylus >0.8 times as long as propodus.

Preparatory male. As female, but antennule with four longer articles as well as minute distal article, from division of third peduncle article of neuter.

Etymology. From the Greek *macro* – long and *stonyx* – a sharp point, in reference to both the extremely long dactylus and unguis on pereopod 1, the ventrodistal spine on the merus of pereopods 2 and 3, and the spine on the fourth antennal article of the male, all characterizing features of this species.

Remarks. The numerous distinctions of this species from those most similar, i.e. species of *Leptochelia,* are described under the remarks for the genus. *Araleptochelia macrostonyx* sp. nov. contributes further to the great diversity of the Leptocheliidae in Australian waters and is readily distinguished from other species without dissection owing to its unique cheliped morphology and the extremely long dactylus plus unguis on pereopod 1. The antennular morphology of four longer segments in the subadult male was demonstrated for the related *Leptochelia savignyi* (Krøyer, 1842) by Bamber (2010).

A. macrostonyx was found on muddy to coarse sand substrata at depths from 49 to 120 m right across the northern half of the Bass Strait.

Genus *Pseudoleptochelia* Lang, 1973

Pseudoleptochelia occiporta sp. nov.

Figures 79–82

Material examined. 1 ♀ (J58467), holotype, 1 ♂ (J58468), allotype, 48 ♀♀, 2 juveniles (J55820), paratypes, Stn 81-T-1 162, 40°09.2'S 147°31.9'E, 51 m depth, shelly sand, 14 November 1981, coll. R.S. Wilson, RV *Tangaroa*. 4 ♀♀, 2 juveniles (J50804), paratypes, Stn VC 23 C1, 38°19.18'S 144°37.62E, 40 m deep, reef, 12 May 1998. 10 specimens (J48183), paratypes, CPBS 01S/4, 38°21.73'S 145°13.23'E, 3 m depth, 1 April 1965. 6 specimens, (J48188), paratypes, CPBS 03S/2, 38°21.65'S 145°15.21'E, 2 m depth, sandy-mud, 13 April 1965. 25 specimens, (J48175), paratypes, CPBS 11N/4, 38°23.23'S 145°13.28'E, 5 m depth, fine sand, 21 March 1965. 10 specimens, (J48178), paratypes, CPBS 11S/2, 1 specimen, (J48751), paratypes, CPBS 11S/4, both 38°22.00'S 145°13.38'E, 3 m depth, shelly gravel, 17 March 1965. 5 specimens, (J48755), paratypes, CPBS 22N/4, 38°20.60'S 145°13.46'E, 13 m depth, shelly sand, 18 March 1965. 66 ♀♀, 26 juveniles, (J48967), paratypes, CPBS 32N/367, 38°20.83'S 145°13.49'E, 13 m depth, sandy gravel, 20 March 1967. 1 ♀ (J48972), 3 specimens (J48970), paratypes, CPBS 32N/769, 38°20.83'S 145°13.49'E, 13 m depth, sandy gravel, 15 July 1969. 12 specimens, (J48971), paratypes, CPBS 32N/870, 38°20.83'S 145°13.49'E, 13 m depth, sandy gravel, 12 August 1970. 20 ♀♀, 10 juveniles, (J48980), paratypes, CPBS 32S/770, 38°21.60'S 145°13.67'E, 13 m depth, muddy sand, 6 July 1970. 8 specimens, (J48974), paratypes, CPBS 32S/866, 38°21.60'S 145°13.67'E, 13 m depth, muddy sand, 26 August 1966. 1 ♀, (J48955), paratypes, CPBS 40O/3, 38°21.17'S 145°14.00'E, 15 m depth, sand, 1 April 1965. 3 specimens, (J48958), paratypes, CPBS 41N/2, 38°20.81'S 145°13.85'E, 13 m depth, gravelly sand, 30 March 1965.

Description of female. Body (Fig. 79A, B, C, D) relatively small for the genus, holotype 2.7 mm long, 6.3 times as long as wide. Cephalothorax subrectangular, tapering towards anterior, 1.4 times as long as wide, 1.5 times as long as pereonites 1 and 2 together, with slight rostrum, eyelobes rounded, eyes present and black, paired setae at posterior of eyelobes and single setae midlaterally. Pereonite 1 shortest, pereonite 2 and 6 subequal and 1.5 times as long as pereonite 1, pereonites 3 to 5 subequal and 1.9 times as long as pereonite 1 (all pereonites respectively 2.6, 1.8, 1.4, 1.4, 1.5 and 1.7 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite about 5.3 times as wide as long, with single midlateral setae. Pleotelson pentangular, as long as last two pleonites together, 1.6 times as wide as long, with one anterolateral and two posterolateral setae on each side and two distal setae.

Antennule (Fig. 80A) of three longer and one minute distal articles, proximal article 3.5 times as long as wide, 1.5 times as long as distal three articles together, with proximal, mesial and distal inner groups of penicillate setae, inner simple mesial seta, and one outer and one long inner distal seta longer than second article; second article twice as long as wide, one-third as long as first article, longer distal seta just longer than article; third article just shorter than second, distally with one simple and one penicillate seta; fourth article minute, distally with three simples and two penicillate setae and one aesthetasc.

Antenna (Fig. 80B) of six articles, proximal article compact, naked; second article as long as wide, with single inner distal and dorsodistal slender spines; third article as long as second and just longer than wide, with dorsodistal stouter spine (Fig. 80b'); fourth article longest, 3.8 times as long as wide and twice as long as third, with short mesial setae and distal tufts of penicillate and simple setae; fifth article 0.7 times as long as fourth; sixth article minute with six distal setae.

Labrum (Fig. 80C) hood-shaped, setose. Left mandible (Fig. 80D) with crenulate lacinia mobilis wider than distal end of mandible, distal crenulation on pars incisiva, pars molaris with strong rugosity; right mandible (Fig. 80E) similar but without lacinia mobilis, crenulation of pars incisiva extending down inner margin. Labium (Fig. 80G) wide, bilobed, distally finely setose, without palp. Maxillule (Fig. 80F) with nine distally bifurcate spines and setose margins, rows of setules on inner distal face; palp distinct, with two distal setae. Maxilliped (Fig. 80H) palp first article naked, second article with finely setose inner margin, and with one outer and two inner setae, distal-most inner seta not reaching distal margin of third palp article; third and fourth articles with 11 inner marginal setae in two rows of 7 (dorsal) and 4 (ventrodistal); fourth article with one outer subdistal seta; basis with 4 to 6 long setae (sometimes asymmetrical – Fig. 80H') extending to distal edge of second palp article; endites (Fig. 80H") distally with fine outer setules, long outer seta and three robust spatulate spines, with additional subdistal pair of spatulate spines.

Cheliped (Fig. 81A) with rounded, comparatively stout basis 1.6 times as long as wide, with subdistal dorsal seta; merus triangular with three ventral setae; carpus 1.7 times as

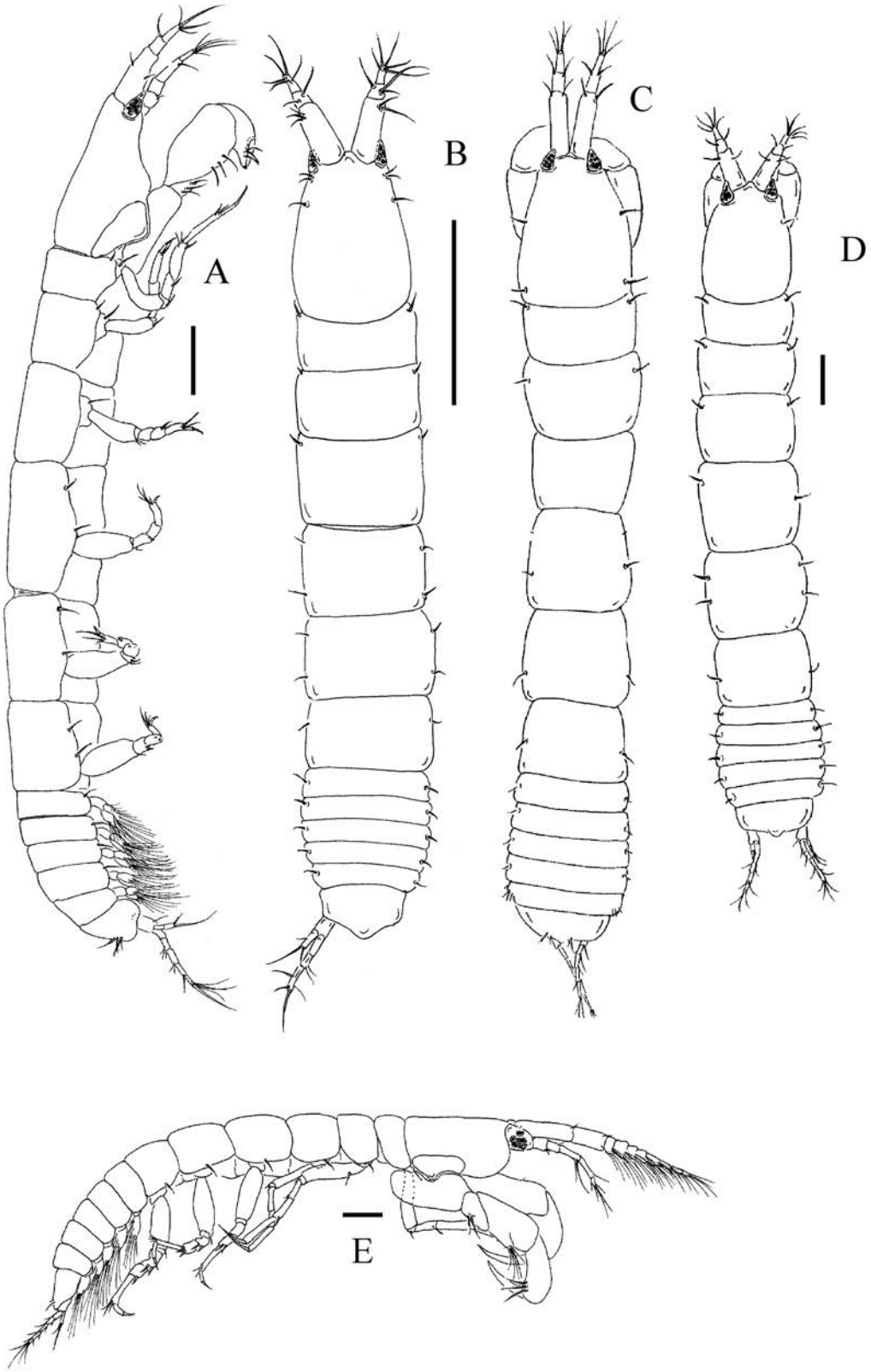

Fig. 79. *Pseudoleptochelia occiporta* sp. nov., holotype female. A, lateral view; B, manca, dorsal view; C, 4 mm female paratype; D, 3 mm female paratype; E, male lateral. Scale: A, B, D = 0.2 mm; E = 0.1 mm (scale for C as for D).

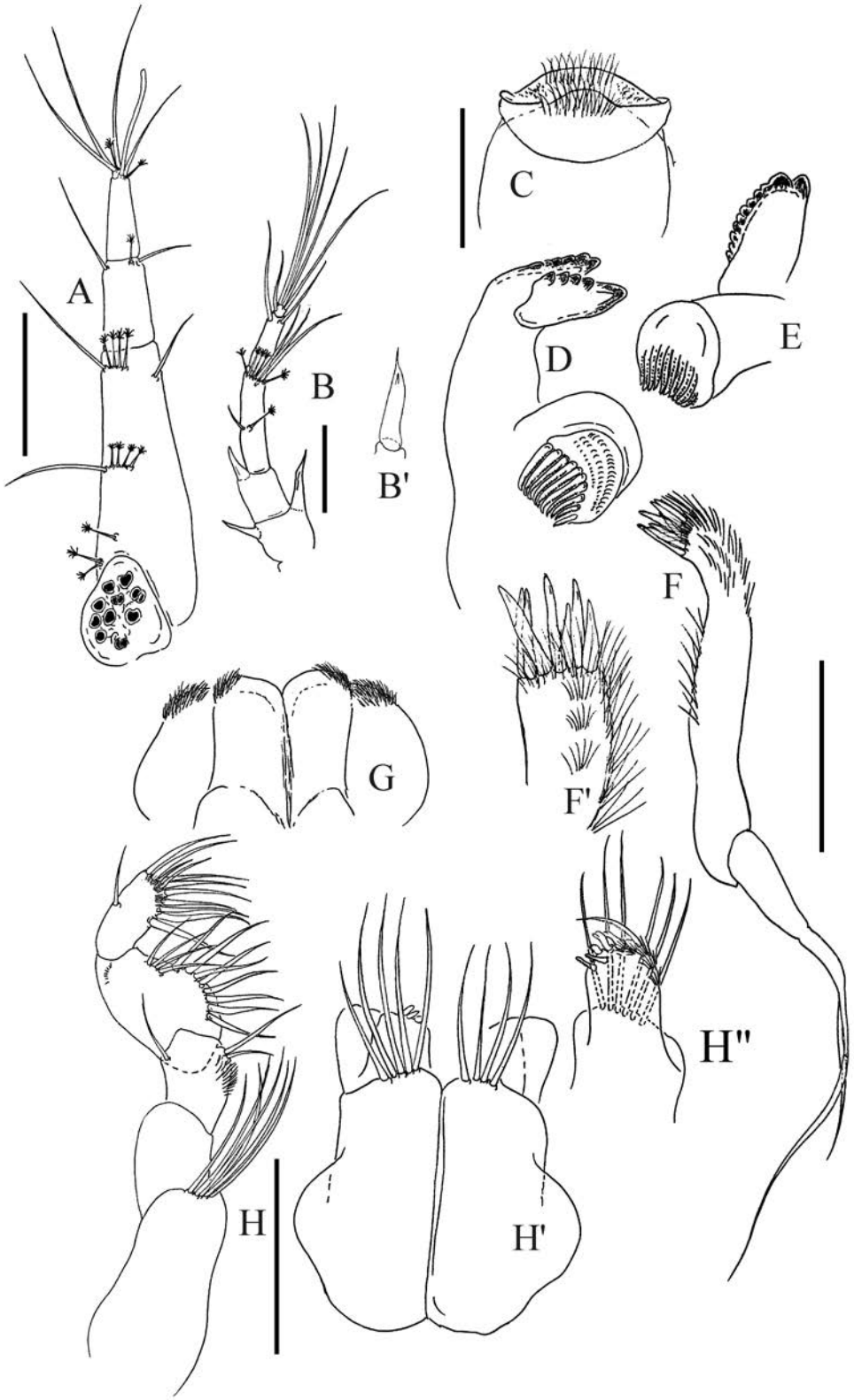

Fig. 80. *Pseudoleptochelia occiporta* sp. nov., female paratype. A, antennule; B, antenna (proximal article not shown); B', spine on antennal article 3; C, labrum; D, left mandible; E, right mandible; F, maxillule; F', maxillule endite details; G, labium; H, maxilliped; H', maxilliped bases of smaller female; H", endite of H. Scale = 0.2 mm.

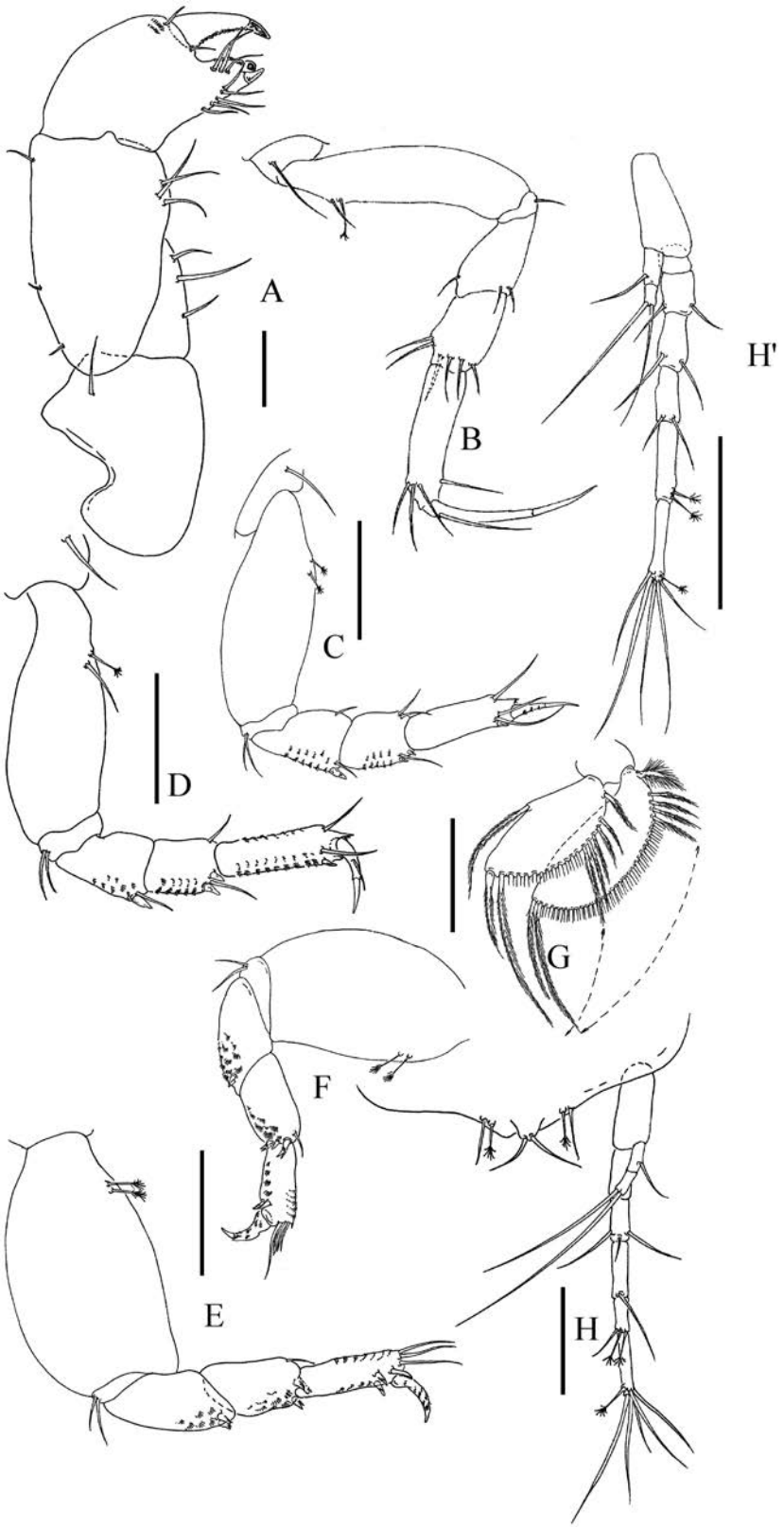

Fig. 81. *Pseudoleptochelia occiporta* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6; G, pleopod; H, uropod H', uropod details. Scale = 0. 2 mm.

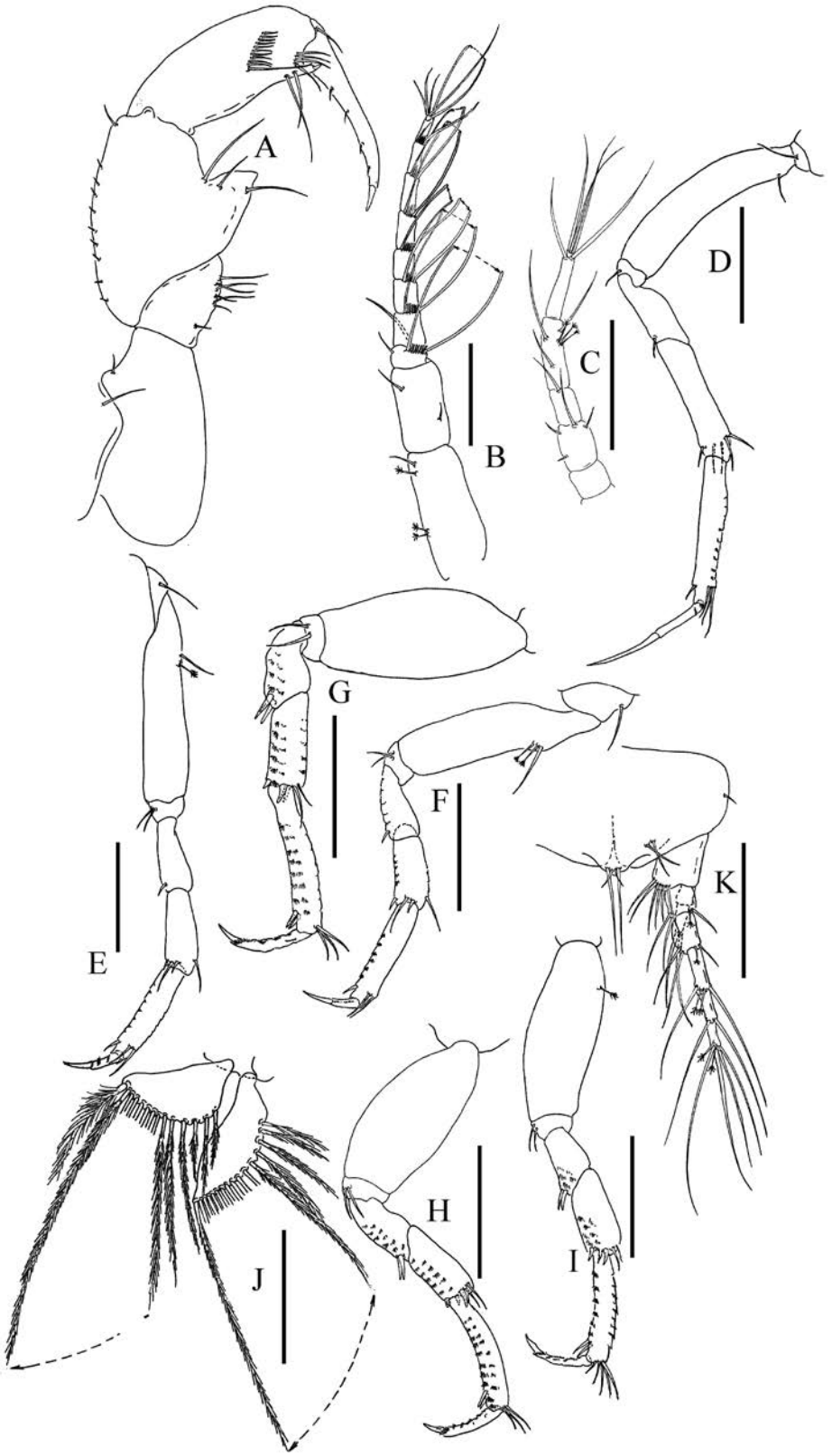

Fig. 82. *Pseudoleptochelia occiporta* sp. nov., male. A, cheliped; B, antennule; C, antenna; D, pereopod 1; E, pereopod 2; F, pereopod 3; G, pereopod 4; H, pereopod 5; I, pereopod 6; J, pleopod; K, uropod. Scale = 0. 1 mm.

long as wide, with three midventral setae and three shorter dorsal marginal setae; propodus as long as wide, with dorsodistal seta and one seta at base of dactylus; fixed finger with five ventral and three inner setae, cutting edge crenulate, subdistal claw; dactylus with finely-crenulate cutting edge.

Pereopod 1 (Fig. 81B) longer than other pereopods, coxa with long seta; basis slender, 4.4 times as long as wide, with single dorsoproximal simple and penicillate setae; ischium compact with one ventral seta; merus 0.9 times as long as carpus, with one dorsodistal and two ventrodistal setae; carpus with distal crown of two dorsodistal, one inner and two outer medial, and one ventrodistal setae, longest of which is much less than half length of propodus; propodus 1.5 times as long as carpus, with three setae on subdistal dorsal mound and one subdistal ventral seta; dactylus slender, curved, extending into shorter slender unguis 0.7 times as long as dactylus, the two together some 1.4 times as long as propodus. Pereopod 2 (Fig. 81C) more compact than pereopod 1; basis 2.45 times as long as wide; ischium with 2 setae; merus just longer than carpus and 1.1 times as long as wide, with single dorsodistal and ventrodistal setae and tooth-like ventrodistal spine and ventral rows of microtrichia; carpus with two dorsodistal and single ventrodistal setae and two small ventrodistal spines, and ventral rows of microtrichia; propodus 1.9 times as long as carpus, with three distal setae and dorsodistal sharp apophysis; dactylus and shorter unguis curved, together 0.6 times as long as propodus. Pereopod 3 (Fig. 81D) similar to pereopod 2, but merus and carpus with no and one dorsodistal setae, propodus with two distal setae.

Pereopod 4 (Fig. 81E) basis stout, 1.7 times as long as wide with two ventroproximal penicillate setae; ischium with two ventrodistal setae; merus with paired ventrodistal spines and ventral rows of microtrichia; carpus just shorter than merus, with one dorsodistal seta, outer, ventral and inner distal spines each with fine subdistal setules, and ventral rows of microtrichia; propodus 1.1 times as long as carpus, with two ventrodistal spines, three dorsodistal setae mostly as long as dactylus, serrated spines adjacent to dactylus articulation, and ventral rows of microtrichia; dactylus and distinct unguis curved, 0.6 times as long as propodus, dactylus with microtrichia. Pereopod 5 as pereopod 4. Pereopod 6 (Fig. 81F) as pereopod 4, but propodus with four shorter and one longer distal setae.

Pleopods (Fig. 81G) all alike, typical for the genus, basis naked, endopod with single inner plumose seta and proximal outer seta separated from remainder.

Uropod (Fig. 81H) biramous, basis naked; exopod of two segments, as long as proximal endopod segment, outer distal seta longer than inner distal seta; endopod of five or six segments, distal segments slender.

Description of male. Smaller than female (allotype length 1.5 mm), body (Fig. 79E) more compact, cephalon 1.25 times as long as pereonites 1 to 3 together, with large eyelobes bearing large black eyes; pereonite 1 shortest, pereonite 2 just longer, pereonites 3 and 6 subequal, 1.8 times as long as pereonite 1, pereonites 4 and 5 twice as long as pereonite 1. Five free pleonites, subequal in length, as long as pereonite 1, pleotelson as long as pleonites 4 and 5 together. Pleotelson with much longer distal setal pair (Fig. 82K).

Antennule (Fig. 82B) first peduncle article 2.4 times as long as wide, with paired dorsomedial penicillate setae and single dorsodistal penicillate and simple setae; second article 0.65 times as long as first with single ventroproximal and dorsal subdistal simple setae; third article 0.3 times as long as second with single ventrodistal simple seta; flagellum of 8 segments, segment 1 with proximal and distal rows of aesthetascs, segments 2 to 7 bearing distal row of 5 or 6 aesthetascs, segment 8 minute, distally with four simple setae.

Antenna (Fig. 82C) of six articles, proximal article compact, naked; second article longer than wide, longer than first article, with single dorsoproximal and three distal seta; third article shorter than second, 1.6 times as long as wide, with single simple distal seta; fourth article nearly twice as long as third, with mesial seta and distal tufts of penicillate and simple setae; fifth article as long as fourth with two long distal setae; sixth article minute, with three simple distal setae.

Mouthparts atrophied.

Cheliped (Fig. 82A) with subchelate chela; basis twice as long as wide; merus short, with seven ventral setae; carpus 1.9 times as long as wide but with large subtriangular ventral apophysis bearing the three midventral setae, dorsal margin with continuous row of nine setae; propodus twice as long as wide with dorsodistal seta, fixed finger reduced to small apophysis with claw, with three ventral setae, three setae adjacent to remains of cutting edge, inner diagonal comb-row of ten shorter and one longer setae; dactylus slender, curved, as long as propodus, with row of four setae along cutting edge.

Pereopods (Fig. 82D to I) similar to but more slender than those of female, with in particular more elongate propodi; merus shorter than carpus on pereopods 1 to 3; on pereopods 4 to 6 propodus much longer than carpus, ventrodistal merus spines more elongate than those of female, dactylus proportionately longer than in female.

Pleopods (Fig. 82J) with longer setae than on those of female. Uropod (Fig. 82K) basis with inner distal row of setae; exopod two-segmented, longer than proximal endopod segment; endopod of five segments, less-elongate and more heavily setose than that of female.

Distinctions of manca. Smaller than female (Fig. 79B), similar in morphology and proportions, uropod exopod of one segment.

Etymology. From the Latin *occidentalis* – western, and *portus* – a port, the species mainly occurring in, and common in, Western Port, Victoria.

Remarks. The genus *Pseudoleptochelia* is in need of review. Bird & Bamber (2000) listed twelve species in the genus, since when three further species have been described, *P. fairgo* Bamber, 2005, and *P. straddi* Bamber, 2008, both from Australia, and *P. bulbus* Bamber, 2006 from New Caledonia. However, the male of *P. bulbus,* and *P. straddi* (known only from the male) are currently suspected to be species of a different genus (Bamber, in prep.). Many of these *Pseudoleptochelia* species are poorly described, particularly their females and their mouthparts, some being known only from males.

Lang (1973) diagnosed the genus *Pseudoleptochelia* as having stout posterior pereopod bases, with spines on the second and third antennal peduncle articles (as in *Leptochelia*), the uropod exopod with one or two segments, the endopod with at least three segments, and the maxilliped bases with two distal setae. Unfortunately, Lang (*ibid*.) based his genus on *Heterotanais anomalus* Sars, 1882, the female of which is not fully described, and on his own new species, *Pseudoleptochelia mortenseni*, which, judging from his figure 16, is clearly a chimaera, as the antennule of "a small female" (Lang, 1873: fig. 16g) is typical of a species of *Konarus* Bamber, 2006 or *Parakonarus* Bird, 2011, and not *Pseudoleptochelia sens. auctt*., casting doubt on with which female his subchelate male should be associated (see Bird, 2011). In practice, the maxilliped-basis setation and female antennal spination are unknown in at least half of the *Pseudoleptochelia* species.

Pseudoleptochelia occiporta sp. nov. is consistent with the generic diagnosis of Lang (loc. cit.) except for its having 4 to 6 maxilliped-basis setae, a feature of three other leptocheliid genera, *Leptochelia, Konarus* and *Parakonarus*. It shares this feature, as well as the five distal spatulate spines on the maxilliped endite, with *P. bulbus* Bamber, 2006 from New Caledonia, a species differing owing to its one-segmented uropod exopod and distinct setation of the pereopod 1 carpus, *inter alia*.

The genera *Konarus* and *Parakonarus* both have setae rather than spines on the second and third antennal peduncle articles, and an unguis distinctly longer than the dactylus on pereopod 1, unlike the present species. We therefore choose to place the present species in *Pseudoleptochelia* until the genus has been properly resolved.

The only currently accepted species of *Pseudoleptochelia* recorded previously from Australia is *P. fairgo*, known from Esperance, Western Australia, and Brisbane, Queensland (Bamber, 2005; 2008). The female of *P. fairgo*, which also has four maxilliped-basis setae, is unique in the genus in having setose tubercles on the merus of pereopods 4 to 6, and a tuft of elongate setae on the cheliped carpus pointing proximally in life, neither feature being present in *P. occiporta*.

The male of the present species has a rounded apophysis on the carpus of the cheliped like *Pseudoleptochelia fairgo,* but differs from that species in that *P. fairgo* has a ventrodistal apophysis on the propodus of the cheliped which is wider and rounded (slender and pointed in *P. occiporta*) and a strong dorsodistal seta on the third antennular peduncle article as long as the proximal four flagellum segments (only a very small dorsodistal seta in *P. occiporta*). In *P. occiporta* the uropod exopod is two-segmented in both sexes, but the exopod in *P. fairgo* is one-segmented with only an incipient fusion line. Of the four *Pseudoleptochelia* species having a two-segmented uropod exopod, none have a ventral carpal apophysis on the male cheliped as found in *P. occiporta*.

Pseudoleptochelia occiporta was taken at depths between 3 and 51 m, on gravelly to muddy sands, mainly in Western Port.

Genus ***Bassoleptochelia*** gen. nov.

Diagnosis. Female with 4-articled antennule, third article longer than second; antenna with setae rather than spines on articles 2 and 3; mandibles with relatively simple lacinia mobilis and pars molaris, maxilliped with three basal setae, elongate distal spatulate spines on endites, setae on palp article 2 simple; cheliped very slender, merus covering less than half of ventral margin of carpus and with ventral tuft of numerous long setae, propodus (palm of chela) longer than wide, fixed finger with two ventral setae; pereopod 1 with elongate merus and distal crown of setae on carpus, dactylus longer than unguis; merus, carpus, propodus and dactylus of pereopods 4 to 6 with fields of microtrichia, carpus of pereopod 6 with dense brush of microtrichia (prickly tubercle); uropod exopod 1-segmented, endopod 4-segmented. Otherwise typical of the family. Male showing dimorphism in the antennule with secondary segmentation of the flagellum to more than 5 segments; cheliped slender, chela almost subchelate, fixed finger one-third as long as dactylus, distal edge of propodus with triangular tooth-like apophysis, comb-row vertical; pereopods more slender than those of female, posterior pereopods ambulatory.

Type species. Bassoleptochelia verro sp. nov. by monotypy.

Etymology. Named for the Bass Strait, plus –*Leptochelia* (female).

Remarks. The species described below has the gross appearance of a typical leptocheliid, but the tufts of microtrichia on the posterior pereopods are not found in any other species of the family (being more like those found on some typhlotanaid species – see Błażewicz-Paszkowycz, 2007). Among Australian leptocheliids, the "brush" of long setae on the cheliped merus is also found in *Pseudoleptochelia fairgo*, although in that species they point proximally in life. Equally, the male is unusual for the family in having ambulatory posterior pereopods, which must develop secondarily from those of the subadult form which are like those of the female, and in the unique cheliped chela, which falls somewhere between the normal chelate form of most genera and the subchelate form found in some species of *Pseudoleptochelia* and *Parakonarus*. The mouthparts are also atypical of the family, in having simple inner setae on the second palp article of the maxilliped, while the mandibular lacinia mobilis and pars molaris are both simple, rather than crenulate or rugose, respectively.

Bassoleptochelia verro sp. nov.

Figures 83–86

Material examined. 1 ♀ (J58469), holotype, 5 ♀♀ (J55822), paratypes, Stn 81-T-1 177, 38°53.7'S 147°06.5'E, 58 m depth, coarse shell, 18 November 1981. 1 ♂ (J58471), allotype, 1 ♀ (J56650), paratype, Stn 81-T-1 199, 40°19.5'S 143°48.8'E, 71 m depth, sandy shell, 22 November 1981. 4 ♀♀ (J56657), 1 ♀ (J56652), paratypes, Stn 81-T-1 203, 39°22.0'S 144°18.3'E, 60 m depth, coarse sand, 23 November 1981. 13 ♀♀ (J56646), paratypes, Stn 81-T-1 180, 39°12.9'S 146°27.3'E, 65 m depth, medium sand, 18 November 1981. 1 ♀ (J56643), paratype, Stn 81-T-1 187, 38°32.0'S 147°28.6'E, 52 m depth, medium sand, 20 November 1981. All coll. R.S. Wilson, RV *Tangaroa*. 8 ♀♀, 1 ♂ (J56651), paratypes, Stn 81-Sa-1 116, 40°32.0'S 145°23'E, 43 m depth, muddy shell and grit, 4 November 1980, coll. M.F. Gomon & G.C.B. Poore, FRV *Sarda*.

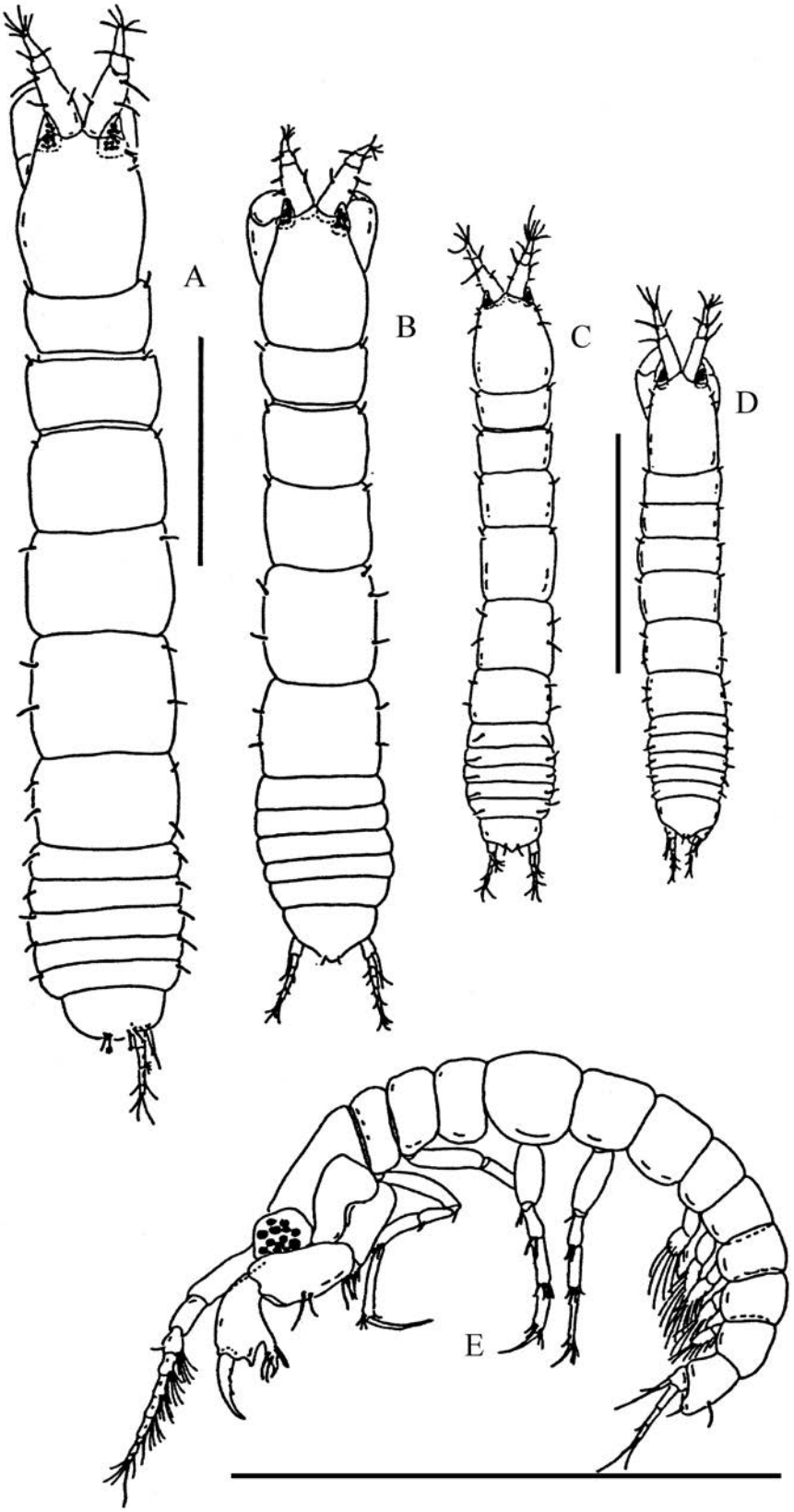

Fig. 83. *Bassoleptochelia verro* sp. nov. A, female holotype, dorsal; B, neuter; C, juvenile; D, manca II; E, male, lateral. Scale = 1mm.

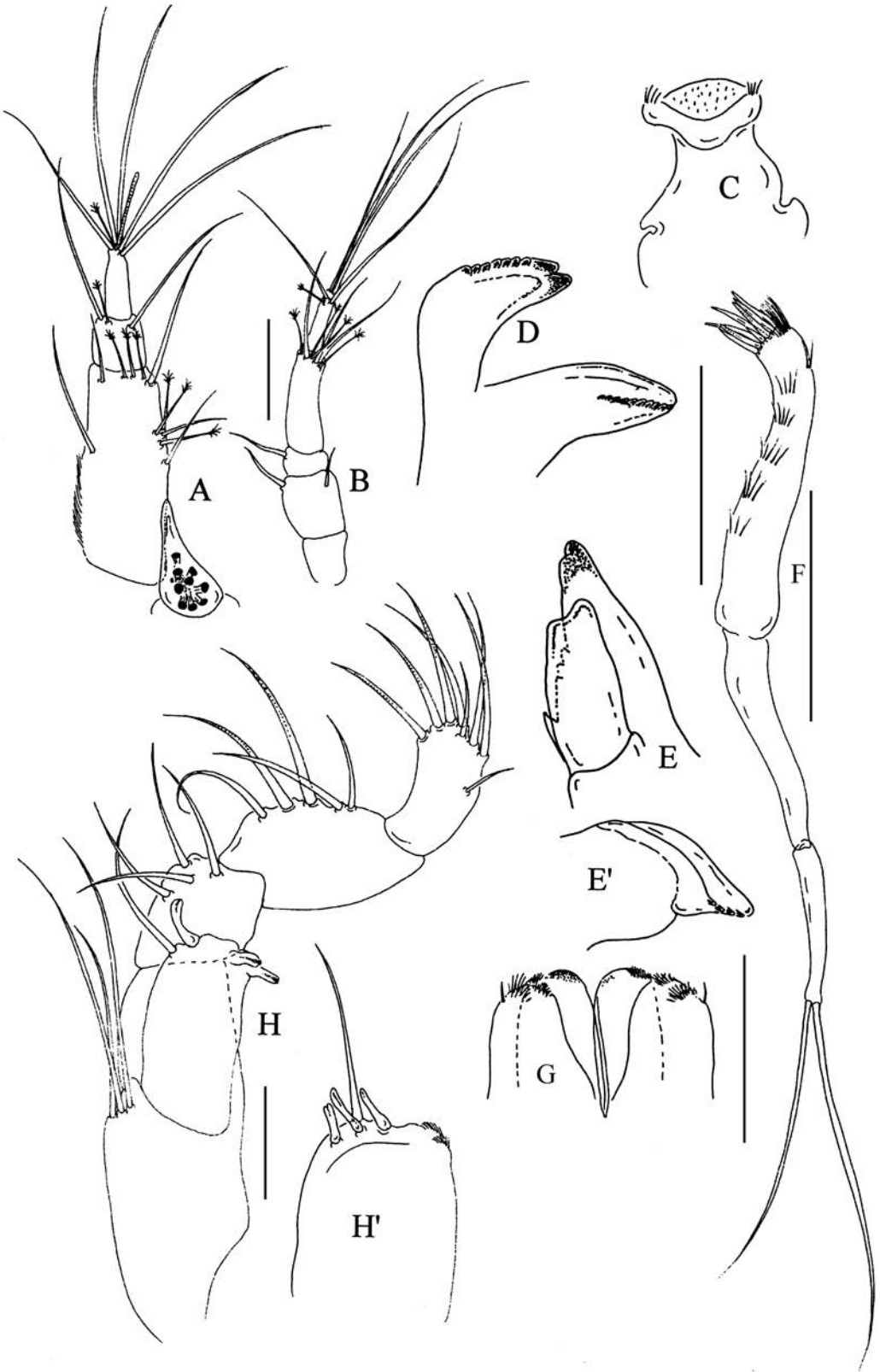

Fig. 84. *Bassoleptochelia verro* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, right mandible; E, incisor and E', molar of left mandible; F, maxillule; G, labium; H, maxilliped and H' endite. Scale = 0.1mm.

Fig. 85. *Bassoleptochelia verro* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6 with F' distal detail; G, pleopod; H, uropod. Scale = 0.1mm.

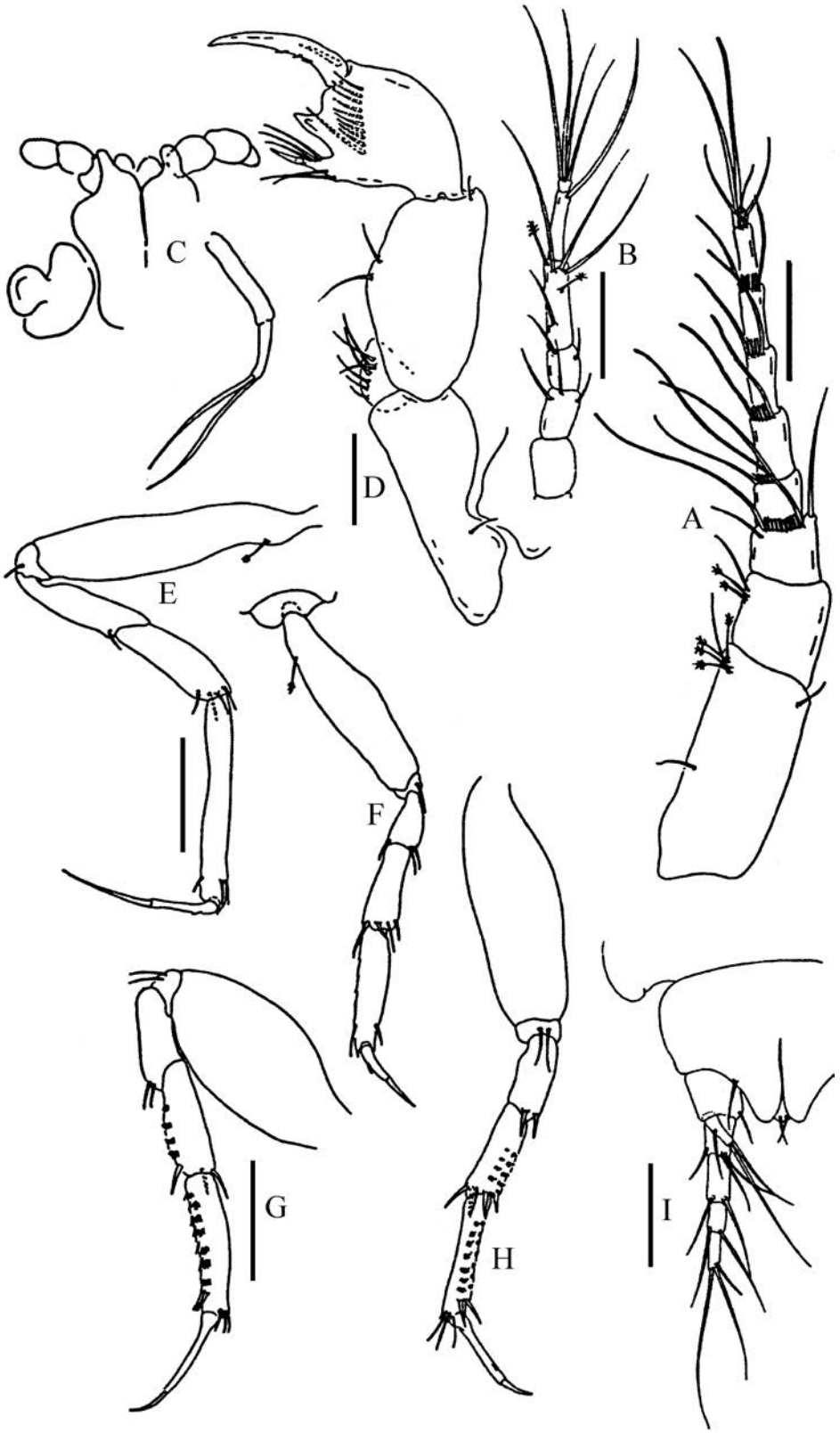

Fig. 86. *Bassoleptochelia verro* sp. nov., male. A, antennule; B, antenna; C, mouthparts; D, cheliped; E, pereopod 1; F, pereopod 2; G, pereopod 4; H, pereopod 5; I, uropod. Scale = 0.1mm.

Description of female. Body (Fig. 83A) narrowing anteriorly, holotype 3.8 mm long, 6.4 times as long as wide. Cephalothorax subrectangular, laterally convex, tapering towards anterior, 1.4 times as long as wide, longer than pereonites 1 and 2 together, with slight triangular rostrum, eyelobes extended into spine-like apophysis (Fig. 84A), eyes present and black, single setae at posterior of eyelobes. Pereonites 1 to 4 with single anterolateral setae, pereonites 5 and 6 with paired lateral setae on each side; pereonites 1 and 2 subequal and shortest, pereonites 3, 4 and 6 subequal, 1.6 times as long as pereonite 1, pereonite 5 longest and twice as long as pereonite 1 (all pereonites respectively 2.0, 2.0, 1.3, 1.5, 1.2 and 1.5 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite about 5.3 times as wide as long, with single midlateral seta. Pleotelson pentangular, as long as last two pleonites together, twice as wide as long, with one simple and one penicillate posterolateral seta on each side and two distal setae.

Antennule (Fig. 84A) of three longer and one minute distal articles, proximal article 2.4 times as long as wide, 1.6 times as long as distal three articles together, with mesial and distal inner groups of penicillate setae, inner and outer simple mesial setae, outer distal seta and one long inner distal seta longer than tip of antennule, outer margin of article finely setulose in proximal half; second article as long as wide, one-quarter as long as first article, inner and outer distal setae three times as long as article; third article 1.3 times as long as second, with two distal setae; fourth article minute, distally with three simple setae, one penicillate seta and one aesthetasc.

Antenna (Fig. 84B) of six articles, proximal article longer than wide, naked; second article as long as wide, with single inner distal and dorsodistal strong setae; third article half as long as wide, one-third as long as second article, with dorsodistal slender seta; fourth article longest, 3.2 times as long as wide and 4.5 times as long as third, with distal crown of penicillate and simple setae; fifth article 0.6 times as long as fourth; sixth article minute, with three simple distal setae.

Labrum (Fig. 84C) hood-shaped, finely setose. Left mandible (Fig. 84E) with simple subrectangular lacinia mobilis, pars incisiva distally bilobed with crenulation on proximal inner margin, pars molaris narrow with slight marginal crenulation distally; right mandible (Fig. 84D) similar but without lacinia mobilis, pars incisiva distally crenulate. Labium (Fig. 84G) wide, bilobed, distally finely setose, outer lobe with single outer distal seta, without palp. Maxillule (Fig. 84F) with eight distal spines, outer distal tuft of setules, rows of setules on inner face; palp with distinct articulation, with two distal setae. Maxilla not recovered. Maxilliped (Fig. 84H) palp first article elongate, naked; second article with four simple inner setae; third article with five inner marginal finely-denticulate setae; fourth article with six longer and one shorter distal finely denticulate setae and one outer subdistal seta; basis with three long setae extending to third palp article; endites distally with fine outer setules and three elongate spatulate spines and long inner simple seta. Epignath not recovered.

Cheliped (Fig. 85A) with elongate slender basis 3.5 times as long as wide; merus subtriangular with brush of nine ventral setae and one outer dorsoproximal seta; carpus twice as long as wide, with three midventral setae on slightly flattened edge and four shorter dorsal marginal setae, dorsoproximal margin of carpus slightly crenulate; propodus relatively slender, 1.3 times as long as wide, with inner distal comb of three setae and longer seta at base of dactylus; fixed finger with two ventral and three inner setae, cutting edge crenulate; dactylus with proximal seta, cutting edge simple.

Pereopod 1 (Fig. 85B) slender, longer than other pereopods, coxa with seta; basis 3.5 times as long as wide, with single dorsoproximal simple seta; ischium compact with one ventral seta; merus slender, six times as long as wide and as long as carpus, with one dorsodistal seta; carpus widening distally, with single ventrodistal, inner and outer distal and dorsodistal setae, longest of which is less than half length of propodus; propodus 1.5 times as long as carpus, with three setae on subdistal dorsal mound and one subdistal ventral seta; dactylus slender, extending into longer slender unguis 1.4 times as long as dactylus, the two together 0.85 times as long as propodus. Pereopod 2 (Fig. 85C) more compact than pereopod 1; basis 2.2 times as long as wide, with dorsoproximal penicillate seta; ischium with two ventral setae; merus as long as carpus and as long as wide, with small ventrodistal spine, ventrodistal seta and ventral rows of microtrichia; carpus with single dorsodistal and two ventrodistal setae and ventral rows of microtrichia; propodus 1.6 times as long as carpus, with two distal setae, dorsodistal sharp apophysis and ventral rows of microtrichia; dactylus and subequal unguis only slightly curved, together 0.9 times as long as propodus, proximal seta on dactylus. Pereopod 3 (Fig. 85D) similar to pereopod 2, but basis with fields of microtrichia, merus without ventrodistal spine.

Pereopod 4 (Fig. 85E) basis stout, twice as long as wide with midventral penicillate seta; ischium with two ventrodistal setae; merus with paired ventrodistal slender spines and ventral rows of microtrichia; carpus just longer than merus, with dorsodistal seta and ventral rows of microtrichia; propodus as long as carpus, with two ventrodistal spines, three dorsodistal setae longer than dactylus, and ventral rows of microtrichia; dactylus and distinct, short unguis curved, 0.9 times as long as propodus, with lateral rows of microtrichia. Pereopod 5 as pereopod 4. Pereopod 6 (Fig. 85F) as pereopod 4, but carpus with dense field of microtrichia, propodus with four distal setae.

Pleopods (Fig. 85G) all alike, typical for the genus, basis naked, endopod with single inner plumose seta and proximal outer seta separated from remainder.

Uropod (Fig. 85H) biramous, basis with outer distal seta; exopod of one segment, as long as proximal endopod segment, outer distal seta longer than inner distal seta; endopod of four segments, distal segment slender.

Subadults. Neuter, juvenile and manca essentially smaller versions of adult female (Figs 83B, C, D).

Description of male. Smaller than female (allotype length 1.5 mm), body (Fig. 83E) more compact, cephalon as long as pereonites 1 to 3 together, with large eyelobes bearing large black eyes; pereonite 1 shortest, pereonites 2 and 3 respectively 1.3 and 1.5 times as long as pereonite 1, pereonite 4 longest, 2.7 times as long as pereonite 1, pereonites 5 and 6 progressively

shorter, respectively 2.2 and 1.8 times as long as pereonite 1. Five free pleonites, subequal in length, each as long as pereonite 2, pleotelson 1.4 times as long as pleonite 5.

Antennule (Fig. 86A) peduncle compact, first peduncle article twice as long as wide, with ventrodistal tuft of penicillate and simple setae; second article 0.4 times as long as first and as long as wide, with ventrodistal tuft of penicillate and simple setae; third article 0.25 times as long as first and slightly shorter than wide with single ventral and long dorsal distal simple setae; flagellum of 6 segments, segment 1 with proximal and distal rows of aesthetascs, segments 2 to 5 bearing distal row of 3 to 5 aesthetascs, segment 6 with four distal setae.

Antenna (Fig. 86B) of six articles, proximal article longer than wide, naked; second article as long as first, with three distal setae; third article shorter than second, with two distal setae; fourth article longest, 1.6 times as long as second and 4 times as long as wide, with mesial simple and penicillate setae and distally one penicillate and three long simple setae; fifth article 0.8 times as long as fourth; sixth article minute, with four simple distal setae.

Mouthparts (Fig. 86C) atrophied, naked maxilliped and maxillule palp with two distal setae distinguishable.

Cheliped (Fig. 86D) proportionately larger than that of female; basis three times as long as wide; merus short, with brush of seven ventral setae; carpus 1.8 times as long as wide, with twp midventral setae. Propodus almost square, 1.3 times as long as wide, fixed finger short with slender distal claw, with two ventral setae and three setae adjacent to naked, simple cutting edge; large, triangular tooth-like apophyses on distal face of propodus, and inner vertical comb-row of 8 shorter and one longer setae; dactylus slender, curved, nearly three times as long as propodal fixed finger, with proximal seta and three spinules on cutting edge, articulation of unguis obscure.

Pereopod 1 (Fig. 86E) similar to that of female but propodus proportionately longer (1.8 times as long as carpus) and more elongate; pereopods 2 (Fig. 86F) and 3 similar to but shorter than pereopod 1, carpus with distal crown of setae. Pereopods 4 to 6 (e.g. Fig. 86G, H) ambulatory, merus, carpus and propodus slender, all distal spines more elongate than those of female but distal setae proportionately shorter, microtrichia restricted to carpus and propodus without dense brush on pereopod 6, dactylus long and slender, naked, 0.7 times as long as propodus, unguis just less than half as long as dactylus.

Pleopods with longer setae than on those of female. Uropod (Fig. 86I) similar to that of female.

Etymology. From the Latin – *verro* – a brush, in reference to the tuft of setae on the cheliped merus and the dense fields of microtrichia on the posterior pereopods, especially the carpus of pereopod 6, analogous to the "prickly tubercles" found in some typhlotanaids (noun in apposition).

Remarks. The numerous distinctions of this species from other leptocheliids are described under the remarks for the genus, and again it contributes to the great diversity of the Leptocheliidae in Australian waters. *Bassoleptochelia verro* sp. nov. was found on coarser sandy substrata at depths from 43 to 71 m right across the Bass Strait.

Family **Tanaellidae** Larsen & Wilson, 2002

Remarks. The family Tanaellidae was erected to include four genera, *Araphura* Bird & Holdich, 1984; *Araphuroides* Sieg, 1986(a); *Arthrura* Kudinova-Pasternak, 1966, and *Tanaella* Norman & Stebbing, 1886.

In particular, *Araphuroides* was split from *Araphura* by Sieg (1096a) for two species, *Araphura brevispina* Bird & Holdich, 1984 and *Araphuroides parabreviremis* Sieg, 1986. Features distinguishing these two genera have been discussed subsequently and inconsistently (e.g. Sieg & Dojiri, 1989; Larsen, 2005; Larsen et al., 2009). The tanaellid taxa described herein confound this issue further, and their generic attribution is discussed below after their description.

Genus ***Araphura*** Bird & Holdich, 1984

Araphura pygmothymos sp. nov.

Figures 87–89

Material examined. 1 ♀ (J58833), holotype, Central Bass Strait, 66 km S of Rodondo Island, Stn BSS 158, 39°48.6'S 146°18.8'E, 82 m depth, sand with silt and mud, 13 November 1981; 1 ♀ (J58834), paratype, same data as holotype; 1 ♀ (J56692), paratype, Central Bass Strait, 100 km SSE of Cape Liptrap, Victoria, Stn BSS 156, 39°45.90'S 145°33.3'E, 74 m depth, muddy fine sand, 13 November 1981; 1 ♀ (J58835), paratype, Central Bass Strait, 38 km SW of Cape Paterson, Stn BSS 155, 38°55.5'S 145°17.00'E, 70 m depth, fine sand, 12 November 1981; all coll. R.S. Wilson.

Description of female. Body (Fig. 87A, B) slender, holotype 2 mm long, 9.7 times as long as wide. Cephalothorax subrectangular, narrowing anteriorly with slight triangular rostrum, 1.6 times as long as wide, twice as long as pereonite 1, naked, eyes absent. Pereonites all naked and rectangular; pereonites 1 and 5 subequal in length; pereonites 2 to 4 subequal, 1.2 times as long as pereonite 1; pereonite 6 shortest, 0.8 times as long as pereonite 5 (all pereonites respectively 1.3, 0.9, 0.9, 0.9, 1.0 and 1.3 times as wide as long). Pleon of five free subequal pleonites bearing pleopods plus pleotelson; each pleonite 4.2 times as wide as long. Pleotelson subrectangular, as long as all pleonites together, 1.25 times as long as wide.

Antennule (Fig. 88A) of four articles, proximal article nearly 2.6 times as long as wide, as long as distal three articles together, with single outer distal simple seta surrounded by four penicillate setae; second article longer than wide, 0.43 times as long as first article, with three outer distal penicillate setae; third article compact, 0.6 times as long as second article, naked; fourth article tapering, with six simple and one penicillate distal setae, and one aesthetasc.

Antenna (Fig. 88B) of six articles, proximal article compact, fused to cephalothorax; second article 1.3 times as long as wide, with dorsodistal seta; third article as long as wide, 0.8 times as long as second article, with dorsodistal seta; fourth article longest, 4.5 times as long as wide, nearly three times as long as second article, with penicillate seta in proximal half and crown of one simple and four penicillate distal setae; fifth article half as long as second, with one distal simple seta; sixth article minute with four distal setae.

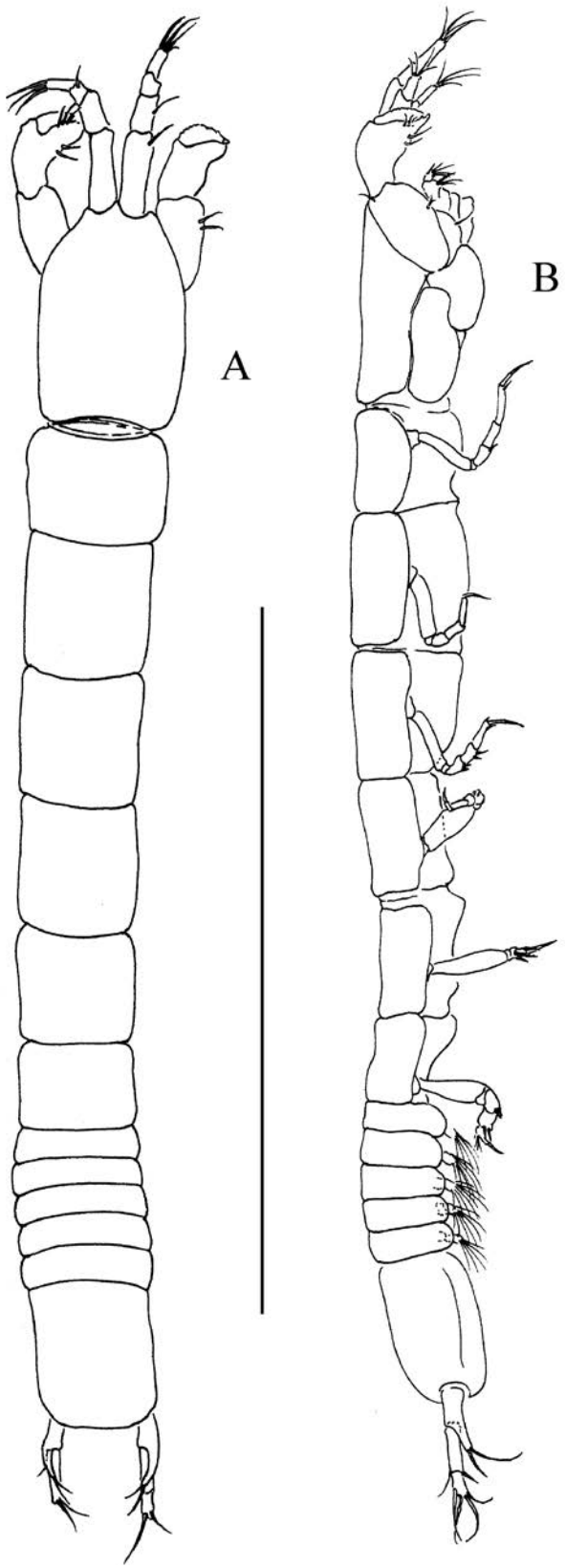

Fig. 87. *Araphura pygmothymos* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1.0 mm.

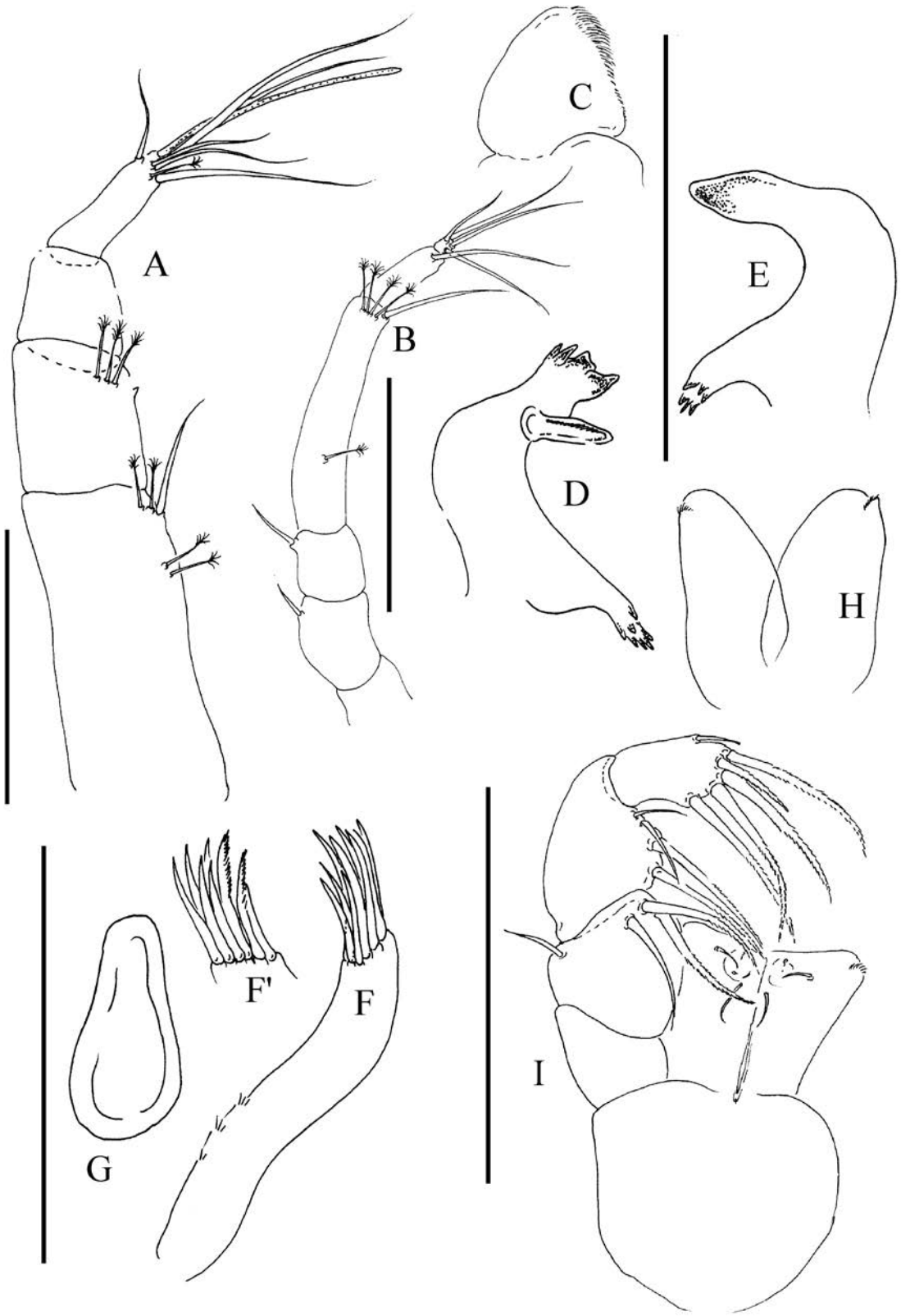

Fig. 88. *Araphura pygmothymos* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; F' maxillule endite spines; G, maxilla; H, labium; I, maxilliped. Scale = 0.1 mm.

Fig. 89. *Araphura pygmothymos* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

Labrum (Fig. 88C) rounded, hood-shaped, setose. Left mandible (Fig. 88D) with wide, spade-like crenulate pars incisiva and linguiform lacinia mobilis, right mandible (Fig. 88E) with lanceolate pars incisiva and without lacinia mobilis; pars molaris of both mandibles tapering, with fine distal denticulations. Labium (Fig. 88H) simple, outer distal corner with unarticulated setose palp-like projection. Maxillule (Fig. 88F) with nine finely-denticulate distal spines. Maxilla (Fig. 88G) simple, linguiform, naked. Maxilliped (Fig. 88I) palp first article naked, second article with one outer and three distal inner setae, third article with two longer mesial and two shorter distal inner setae, fourth article with four longer and one shorter distal setae and one small subdistal outer seta; basis naked; endites distally naked, with outer-distal microtrichia and paired inner setae.

Cheliped (Fig. 89A) with rounded, naked basis 1.5 times as long as wide, merus subtriangular with single ventral seta shorter than width of merus, and covering about half of ventral margin of carpus; carpus 1.7 times as long as wide, with two midventral setae, one dorsodistal seta; propodus 1.2 times as long as wide, with two ventral setae, outer face with curving ridge of rounded tubercles from mid proximal to dorsodistal, inner comb-row of two setae; fixed finger with three setae below cutting edge; dactylus with dorsal rounded tubercles in proximal half.

Pereopod 1 (Fig. 89B) longer than others, coxa without apophysis, with seta; basis slender, 4.2 times as long as wide; ischium compact, with one ventrodistal seta; merus just shorter than carpus, ventrodistally with seta and longer distally-denticulate spine exceeding half length of carpus; carpus distally with ventral seta and single distally-denticulate spines dorsally and ventrally; propodus 1.5 times as long as carpus, with ventrodistal spine and dorsodistal spinous apophysis; dactylus with proximal seta, unguis 1.4 times as long as dactylus, both together 0.9 times as long as propodus. Pereopod 2 (Fig. 89C) similar to pereopod 1, basis 3.5 times as long as wide with dorsal penicillate seta; merus longer than carpus; propodus 1.8 times as long as carpus and with ventral fields of microtrichia; dactylus and unguis together 0.8 times as long as propodus. Pereopod 3 (Fig. 89D) similar to pereopod 2.

Pereopod 4 (Fig. 89E) somewhat more compact, basis 3.25 times as long as wide; ischium with two ventrodistal setae; merus 0.7 times as long as carpus, with two ventrodistal spines; carpus with four ventrodistal spines; propodus just longer than carpus, with ventral fields of microtrichia, two ventrodistal spines and one dorsodistal spine; dactylus about twice as long as unguis, and with fields of microtrichia, dactylus and unguis not fused into a claw, the two together 1.2 times as long as propodus. Pereopod 5 (Fig. 89F) as pereopod 4, but with ventral penicillate seta on basis, carpus with dorsodistal seta. Pereopod 6 (Fig. 89G) as pereopod 5, but propodus with two ventral and three dorsal distal spines.

Pleopods (Fig. 89H) all alike, with naked basis, endopod and exopod without setae on inner margin, outer margins with respectively 8 and 12 plumose setae.

Uropod (Fig. 89I) basis naked, exopod 0.6 times as long as proximal endopod segment, with one mesial and two distal setae; endopod of two segments, distal segment 0.6 times as long as proximal segment, setose as figured.

Male. Unknown.

Etymology. From the Greek *pygme* – a fist, and *thymos* – a warty excrescence, referring to the tubercles on the chela (noun in apposition).

Remarks. The characteristics of the genus *Araphura* and its distinctions from the closely related genera *Araphuroides* Sieg, 1886 and *Tanaella* Norman & Stebbing, 1886 are discussed by Sieg (1986a) and Larsen *et al*. (2009) (but see below): the latter give a key to the genus *Araphura*, in which the present species keys out to *A. parabrevimanus*. That species, found at >3200 m off Panama (the record from 720 m in the Subantarctic by Kudinova-Pasternak, 1975, is highly unlikely), is well figured by Lang (1968), from which the distinctions of the present shallow-water Antipodean species, although subtle, can be seen clearly.

In particular, in *A. parabrevimanus* the dorsal surfaces of the propodus and dactylus of the chela are smooth, ornamented with rows of microtrichia, while in *A. pygmothymos* sp. nov. these surfaces are highly tuberculate, the line of tubercles on the propodus extending across the dorsal outer face. Recently, Bird (2011) has described *Araphura whakarakaia* from New Zealand. Also a species with tubercles on the cheliped propodus and dactylus; as well as the different orientation of this tuberculation, *A. pygmothymos* differs from the New Zealand species in lacking a crenulate cheliped carpus, in its more elongate pleotelson, and in having stout spines on the merus of pereopods 1 to 3, *inter alia*. Other differences characterizing the present species are the more compact antennule peduncle articles, the lack of a pseudoarticulation-line on the fourth article of the antenna, the stronger distal spines on the merus and carpus of the pereopods, and the less-elongate uropodal exopod-process.

Araphura pygmothymos was found in the Central Bass Strait at depths of 70 to 82 m on fine to muddy sands.

Araphura yarra sp. nov.

Figures 90–92

Material examined. 1 ♀ (J58836), holotype, Stn BSS 155, Central Bass Strait, 38 km SW of Cape Paterson, 38°55.5'S 145°17.00'E, 70 m depth, fine sand, 12 November 1981; coll. R.S. Wilson; 1 ♀ (J58845), paratype, Stn VC 31 C1, Central Bass Strait, 38°02.52'S 146°10.47'E, 40 m depth, 14 May 1999; coll. N. Coleman; 1 ♀ (J56681), paratype, Stn VC 18 C2, Central Bass Strait, 38°30.2'S 144°15.00'E, 40 m depth, 13 May 1998; coll. N. Coleman. 1 ♀ (J28487), paratype, Stn MSL-EG 118, Eastern Bass Strait, 10.8 km E of eastern edge of Lake Tyers, 37°50.92'S 148°12.83'E, 25 September 1990, coll. N. Coleman (depth not available). 1 ♀ (J58837), paratype, Stn BSS 197, Western Bass Strait, 4 km SSW of Currie, King Island, 40°00.7'S 143°49.9'E, 46 m, 21 November 1981, coll. R.S. Wilson,Smith-McIntyre Grab.

Description of female. Body (Fig. 90A, B) slender, holotype 1.9 mm long, 8.8 times as long as wide. Cephalothorax subrectangular, narrowing anteriorly with slight rounded rostrum, 1.6 times as long as wide, 2.5 times as long as pereonite 1, naked, eyes absent. Pereonites all naked and rectangular; pereonites 1 and 6 subequal in length; pereonites 2 to 5 subequal, 1.5 times as long as pereonite 1 (all pereonites respectively 1.6, 1.0, 1.2, 1.0, 0.9 and 1.3 times as wide as long).

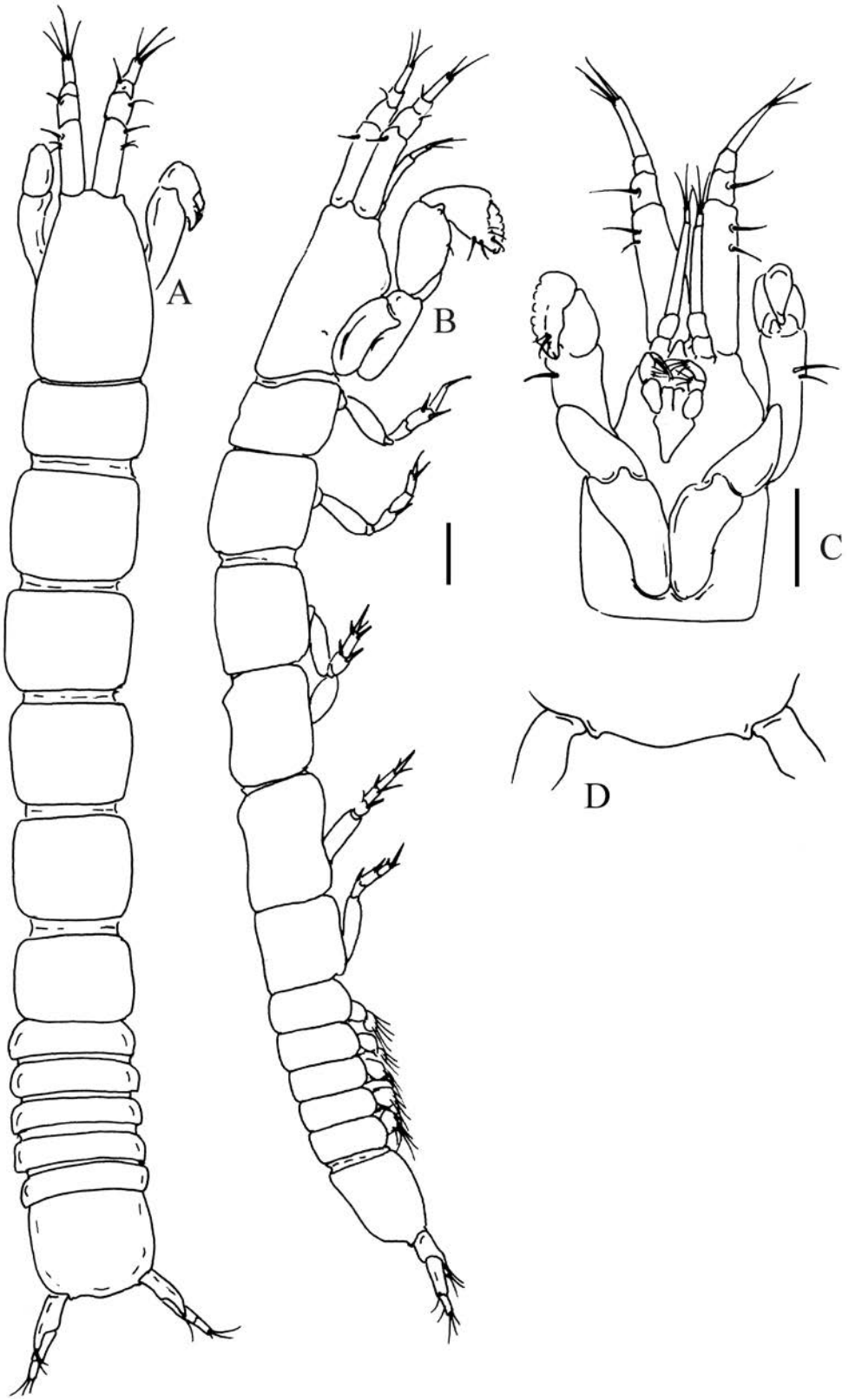

Fig. 90. *Araphura yarra* sp. nov., female holotype. A, dorsal; B, lateral; C, cephalothorax, ventral; D, posterior of pleotelson with attachment of uropods, ventral, showing adjacent tubercles. Scale = 0.1 mm.

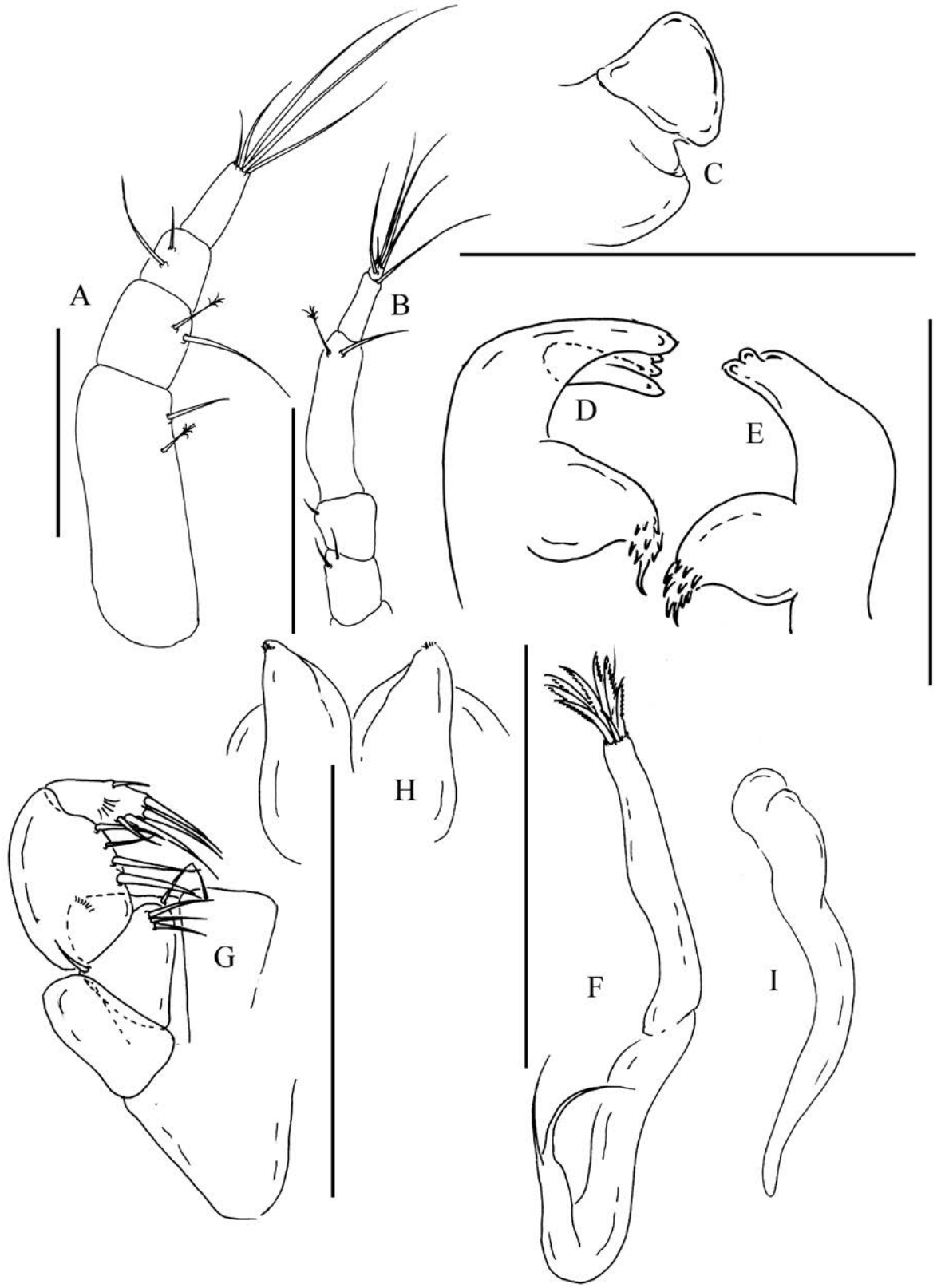

Fig. 91. *Araphura yarra* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; G, maxilliped; H, labium; I, epignath. Scale = 0.1 mm.

Fig. 92. *Araphura yarra* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

Pleon of five free subequal pleonites bearing pleopods, plus pleotelson; each pleonite 3.6 times as wide as long. Pleotelson subrectangular, as long as last three pleonites together, 1.2 times as wide as long, without mid-distal process, but with disto-marginal tubercle adjacent to attachment of each uropod (Fig. 90D).

Antennule (Fig. 91A) of four articles, proximal article 2.8 times as long as wide, longer than distal three articles together, with single outer distal simple and penicillate setae; second article longer than wide, 0.35 times as long as first article, outer distal margin with one penicillate and one longer simple setae, latter longer than article; third article as long as wide, 0.6 times as long as second article, with two simple mesial setae; fourth article tapering, 1.3 times as long as third, with five simple distal setae.

Antenna (Fig. 91B) of six articles, proximal article compact, fused to cephalothorax; second article 1.3 times as long as wide, with two dorsodistal setae; third article as long as wide, just shorter than second article, with single simple dorsodistal seta; fourth article longest, 3.6 times as long as wide, nearly three times as long as third article, with single distal simple and penicillate seta setae; fifth article as long as second, with one distal simple seta; sixth article minute with five distal setae.

Labrum (Fig. 91C) rounded, hood-shaped, naked. Left mandible (Fig. 91D) with bilobed pars incisiva and tridentate linguiform lacinia mobilis, right mandible (Fig. 91E) with tridentate pars incisiva and without lacinia mobilis; pars molaris of both mandibles stout, with fine distal denticulations, ventralmost longest. Labium (Fig. 91H) simple, outer distal corner slightly setose. Maxillule (Fig. 91F) with eight finely-denticulate distal spines, palp with two relatively short distal setae. Maxilla not recovered. Maxilliped (Fig. 91G) palp first article naked, second article with one outer and three distal inner setae, third article with two longer mesial and two shorter distal inner setae, fourth article with four distal setae and one small subdistal outer seta, ventral microtrichia; basis naked; endites distally with single inner setae but no tubercles. Epignath (Fig. 91I) ribbon-like, naked.

Cheliped (Fig. 92A) sclerite with triangular insertion into basis; rounded, naked basis 2.2 times as long as wide, with conspicuous proximal extension but not reaching to pereonite 1 ventrally (Fig. 90C); merus subtriangular with single ventral seta shorter than width of merus, and covering about one-third of ventral margin of carpus; carpus nearly twice as long as wide, dorsal margin convoluted, with one longer and one shorter midventral setae, one dorsodistal seta and one dorsoproximal seta; propodus 1.2 times as long as wide, with two ventral setae, outer face with two submarginal tooth-like tubercles, inner comb-row of three setae; fixed finger with three setae below cutting edge, cutting edge with rounded crenulations; dactylus with dorsal rounded tubercles.

Pereopod 1 (Fig. 92B) not longer than others, coxa without apophysis, with seta; basis 3.4 times as long as wide, naked; ischium compact, without seta; merus 1.4 times as long as carpus, ventrodistally with distally-denticulate spine exceeding half length of carpus; carpus distally with single distally-denticulate spines dorsally, mesially and ventrally; propodus 1.4 times as long as carpus, with subdistal seta, ventrodistal spine, distal microtrichia and dorsodistal spinous apophysis; dactylus naked, unguis 1.8 times as long as dactylus, both together as long as propodus. Pereopod 2 (Fig. 92C) similar to pereopod 1, basis 3.8 times as long as wide; ischium with seta; merus 1.2 times as long as carpus; propodus 1.5 times as long as carpus and with ventral fields of microtrichia; dactylus and unguis together 0.9 times as long as propodus. Pereopod 3 (not figured) similar to pereopod 2.

Pereopod 4 (Fig. 92D) coxa naked, basis 3.6 times as long as wide with midventral penicillate seta; ischium with ventral seta; merus as long as carpus, with two ventrodistal distally-denticulate spines; carpus with three distal distally-denticulate spines; propodus 1.3 times as long as carpus, with ventral fields of microtrichia, three distal distally-denticulate spines, distal microtrichia and dorsodistal spinous apophysis; dactylus 0.8 times as long as unguis, dactylus and unguis not fused into a claw, the two together 1.2 times as long as propodus. Pereopod 5 (Fig. 92E) as pereopod 4, but basis somewhat stouter, propodus only just longer than carpus. Pereopod 6 (Fig. 92F) as pereopod 5, but basis without penicillate seta, propodus with two ventral and three dorsal distal spines.

Pleopods (Fig. 92G) all alike, with naked basis, endopod and exopod without setae on inner margin, outer-distal margins with respectively 7 and 9 plumose setae, exopod with additional separated proximal plumose seta.

Uropod (Fig. 92H) basis naked, exopod process half as long as proximal endopod segment, with three distal setae; endopod of two segments, distal segment half as long as proximal segment, setose as figured.

Male .Unknown.

Etymology. Named after the Yarra River which runs through Melbourne (noun in apposition).

Remarks. Like *Araphura pygmothymos* (se above), *Araphura yarra* sp. nov. keys out to *A. brevimanus* in the key presented by Larsen *et al*. (2009), but is distinguished from that species for similar reasons, such as the tuberculate dorsal margin of the cheliped dactylus, the more compact antennule peduncle articles, the lack of a line of pseudoarticulation on the fourth article of the antenna, and the stronger distal spines on the merus and carpus of the pereopods. The present species is distinguished from the New Zealand species *A. whakarakaia* by its different tuberculation of the cheliped, and distinct spinulation of the pereopods (as in *A. pygmothymos*). It is distinguished from *A. pygmothymos* by the shorter pereonites, the more slender cephalothorax, the absence of outer rows of tubercles on the cheliped propodus, the absence of a seta on the ischium of pereopod 1, in having only three (rather than four) spines on the carpi of pereopods 4 to 6, and in the setation of the uropodal exopod process, *inter alia*.

Araphura yarra was found in the Central Bass Strait at depths of 40 to 70 m on fine sand.

Araphura doutagalla sp. nov.

Figures 93–95

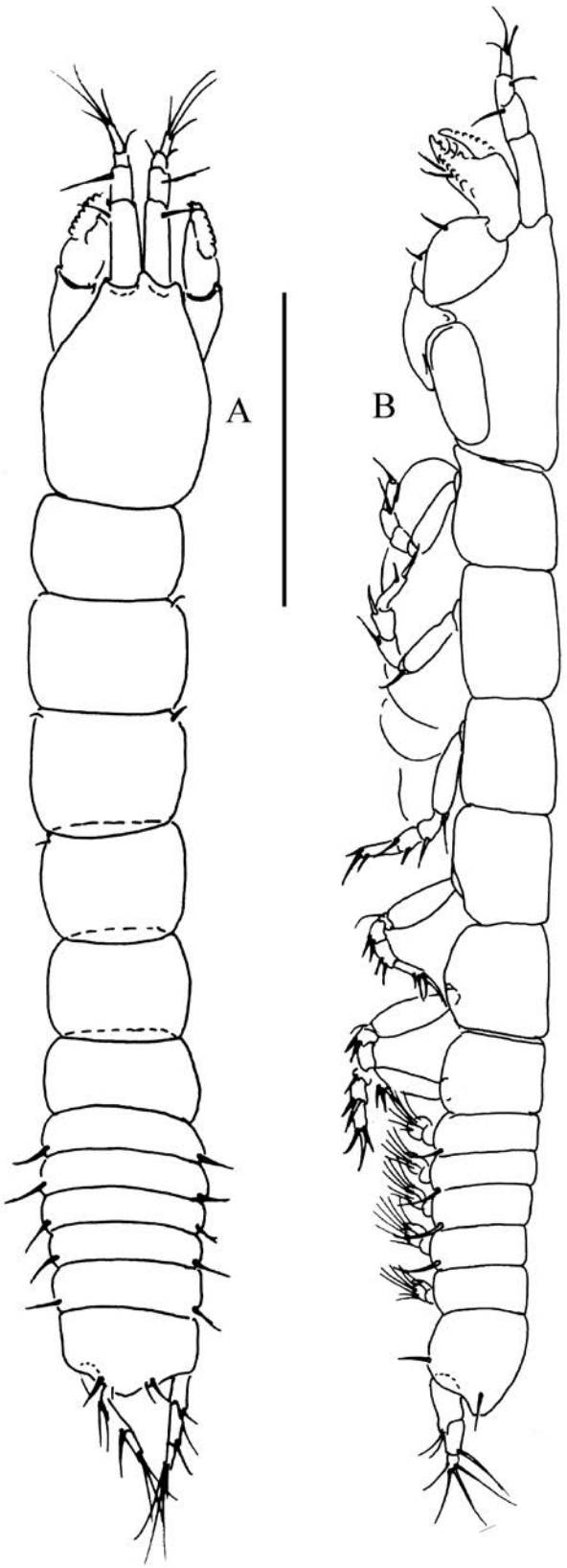

Fig. 93. *Araphura doutagalla* sp. nov., female holotype. A, dorsal; B, lateral. Scale = 0.5 mm.

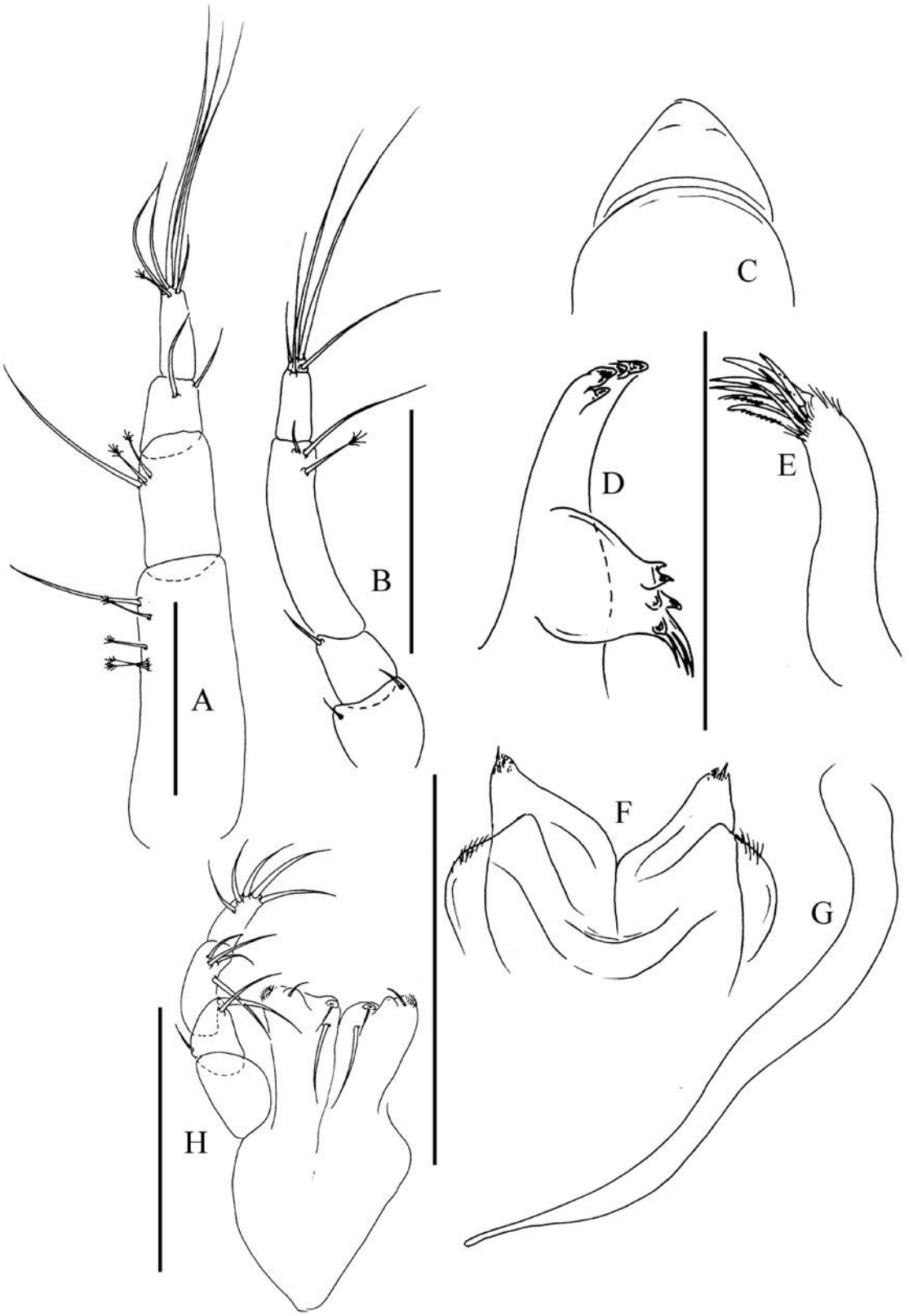

Fig. 94. *Araphura doutagalla* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, right mandible; E, maxillule; F, labium; G, epignath; H, maxilliped. Scale = 0.1 mm.

Fig. 95. *Araphura doutagalla* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

Material examined. 1 ♀ (J58838), holotype, 1 ♀ (J58848), paratype, Central Bass Strait, 28 km E of Cape Farewell, King Island, Stn BSS 107, 39°32.8'S 144°16.00'E, 18 m depth, fine sand, 1 November 1980; coll. M.F. Gomon & G.C.B. Poore.

Description of female. Body (Fig. 93A, B) slender, holotype 1.8 mm long, 7.4 times as long as wide. Cephalothorax pear-shaped, widest centrally, with distinct rounded rostrum, 1.4 times as long as wide, 2.6 times as long as pereonite 1, naked, eyes absent. Pereonites rectangular, although pereonites 1, 5 and 6 with convex lateral margins, bearing single anterolateral setae; pereonite 1 short; pereonites 2 to 4 subequal in length, 1.2 times as long as pereonite 1; pereonite 5 shorter, 1.1 times as long as pereonite 1; pereonite 6 shortest, 0.7 times as long as pereonite 1 (all pereonites respectively 1.6, 1.4, 1.3, 1.3, 1.4 and 2.3 times as wide as long). Pleon of five free subequal pleonites bearing pleopods plus pleotelson; each pleonite four times as wide as long, with single epimeral seta on each side. Pleotelson subpentangular, twice as long as each pleonite, 1.6 times as wide as long, with two laterodistal simple and one penicillate setae on each side of slight rounded mid-distal process (Fig. 95I).

Antennule (Fig. 94A) of four articles, proximal article 2.9 times as long as wide, as long as distal three articles together, with single outer distal simple seta preceded by four penicillate setae; second article longer than wide, half as long as first article, with two outer distal penicillate setae and adjacent simple seta 1.4 times as long as article; third article compact, half as long as second article, with two simple distal setae; fourth article tapering, with six simple and one penicillate distal setae.

Antenna (Fig. 94B) of six articles, proximal article compact, fused to cephalothorax; second article as long as wide, with single dorsodistal and ventrodistal setae; third article as long as wide, 0.85 times as long as second article, with dorsodistal seta; fourth article longest, 4.4 times as long as wide, three times as long as third article, with penicillate seta and two simple setae distally; fifth article as long as third, with one distal simple seta; sixth article minute with four distal setae.

Labrum (Fig. 94C) rounded, hood-shaped, naked. Left mandible not recovered; right mandible (Fig. 94D) with four rounded "teeth" on pars incisiva, pars molaris stout with fine distal denticulations, ventral ones elongate. Labium (Fig. 94F) simple, outer distal corner of both lobes setulate. Maxillule (Fig. 94E) with eight finely-denticulate distal spines and distal setules, palp not recovered. Maxilla not recovered. Maxilliped (Fig. 94H) palp first article naked, second article with one outer and two distal inner setae, third article with one longer mesial and three shorter distal inner setae, fourth article with five distal setae; basis naked; endites distally each with rounded tubercle and two fine setae, and with outer-distal microtrichia and longer inner seta. Epignath (Fig. 94G) long, tapering, ribbon-shaped, naked.

Cheliped (Fig. 95A) sclerite with triangular insertion into basis, rounded basis 1.6 times as long as wide, with simple dorsal seta, and with conspicuous proximal extension but not reaching to pereonite 1 ventrally; merus subtriangular with single ventral seta longer than width of merus, and covering about half of ventral margin of carpus; carpus 1.5 times as long as wide, with two midventral setae, one dorsodistal seta and one dorsoproximal seta, dorsal margin smooth; propodus 1.2 times as long as wide, with two ventral setae, outer face with curving ridge of rounded tubercles along fixed finger and three such tubercles dorsodistally, inner comb-row of three setae; fixed finger with three setae below cutting edge, cutting edge with three "teeth"; dactylus with dorsal rounded tubercles and two fine spinules on cutting edge.

Pereopod 1 (Fig. 95B) not longer than others, coxa without apophysis, with seta; basis three times as long as wide; ischium compact, with one ventrodistal seta; merus as long as carpus, ventrodistally with seta as long as carpus and shorter distally-denticulate spine exceeding half length of carpus; carpus distally with mesial seta, distally-denticulate dorsodistal spine as long as carpus, and shorter simple ventrodistal spine; propodus 1.3 times as long as carpus, with simple ventrodistal spine; dactylus naked, unguis 1.8 times as long as dactylus, both together 1.2 times as long as propodus. Pereopod 2 (Fig. 95C) similar to pereopod 1, basis 3.5 times as long as wide; carpus with additional distally-denticulate ventrodistal spine; dactylus and unguis together 0.9 times as long as propodus. Pereopod 3 (Fig. 95D) similar to pereopod 2.

Pereopod 4 (Fig. 95E) slightly more compact, basis 2.7 times as long as wide; ischium with two ventrodistal setae; merus as long as carpus, with two ventrodistal distally-denticulate spines; carpus with four distally-denticulate distal spines; propodus 1.4 times as long as carpus, with ventral fields of microtrichia, two ventrodistal distally-denticulate spines and one dorsodistal distally-denticulate spine; dactylus 1.3 times as long as unguis, dactylus and unguis not fused into a claw, the two together just shorter than propodus. Pereopod 5 (Fig. 95F) as pereopod 4, but carpus with additional dorsodistal simple seta, ventrodistal microtrichia evident on merus and carpus. Pereopod 6 (Fig. 95G) as pereopod 5, but propodus distally with two ventral and two dorsal distally-denticulate spines.

Pleopods (Fig. 95H) all alike, with naked basis, endopod and exopod without setae on inner margin, outer-distal margins with respectively 7 and 8 plumose setae, exopod with additional separated proximal plumose seta.

Uropod (Fig. 95I) longer than pleotelson, basis naked, exopod process 0.4 times as long as proximal endopod segment, with two distal setae; endopod of two segments, distal segment 0.6 times as long as proximal segment, setose as figured.

Male. Unknown.

Etymology. "Doutagalla" was used by the European settlers at Melbourne as one of the early names for the colony: it may have been a mistranslation of the name of a prominent tribal elder, but is also said to translate as "treeless plain" (noun in apposition).

Remarks. Araphura doutagalla sp. nov., like the previous two species, is generally of the *A. brevimanus* form, but is also distinguished from that species and from *A. whakarakaia* as are those two taxa, and again has tuberculation on the chela. The patterns of this tuberculation are distinct from those of both *A. pygmothymos* and *A. yarra*; in addition, *A. doutagalla* has a more robust body form (7.4 times as long as wide, compared with 9.7 or 8.8 times in the other two respectively), and

conspicuously the uropodal exopod process is less than half the length of the proximal segment of the endopod (longer than or as long as half the length respectively). Its relatively stout mandibular molar process is similar to that of *A. yarra* (and not those of *A, pygmothymos*), while the proportions of the merus and carpus of pereopod 1 are like those of *A. pygmothymos* (and not those of *A, yarra*).

Araphura doutagalla was found in the Central Bass Strait north of Tasmania at a depth of 18 m on fine sand.

Genus ***Araphuroides*** Sieg, 1886

Araphuroides stabastris sp. nov.

Figures 96–99

Material examined. 1 ♀ (J58536), holotype, Central Bass Strait, 33 km S of Deal Island, Stn BSS 161, 39°48.3'S 147°19.2'E, 60 m depth, muddy sand, 14 November 1981; coll. R.S. Wilson; 1 ♂ (J58544), allotype, Central Bass Strait, 35 km NNE of Cape Wickham, King Island, Tasmania, Stn BSS 204 DRC, 39°16.0'S 144°05.4'E, 82 m depth, sandy shell, 23 November 1981; coll. R.S. Wilson; 2 ♀♀ (J58537), paratypes, Central Bass Strait, 33 km S of Deal Island, Stn BSS 161, 39°48.3'S 147°19.2'E, 60 m depth, muddy sand, 14 November 1981; coll. R.S. Wilson; 5 ♀♀ (J58538), paratypes, Central Bass Strait, 44 km NE of Cape Wickham, King Island, Stn BSS 203, 39°22.0'S 144°18.3'E, 60 m depth, coarse sand, 23 November 1981; coll. R.S. Wilson; 1 ♀ (J58541), paratype, Central Bass Strait, 38 km SW of Cape Paterson, Stn BSS 155, 38°55.5'S 145°17.00'E, 70 m depth, fine sand, 12 November 1981; coll. R.S. Wilson; 1 ♀ (J58540), paratype, Eastern Bass Strait, 24 km NNE of Eddystone Point, Stn BSS 163G, 40°43.9'S 148°32.5'E, 56 m depth, muddy sand, 14 November 1981; coll. R.S. Wilson; 2 ♀♀ (J58543), paratypes, Central Bass Strait, 65 km ENE of Cape Rochon, Three Hummock Island, Stn BSS 157, 40°10.9'S 145°44.3'E, 75 m depth, shelly sand, 13 November 1981; coll. R.S. Wilson; 1 ♀ (J58546), paratype, Eastern Bass Strait, 100 km NE of North Point, Flinders Island, Stn BSS 170, 38°52.6'S 148°25.2'E, 130 m depth, fine sand, 15 November 1981; coll. R.S. Wilson; 1 ♀ (J58548), paratype, Eastern Bass Strait, 28 km SSW of Marlo, Stn BSS 207, 37°59.0'S 148°27.0'E, 51 m depth, muddy sand and fine shell, 30 July 1983; coll. M.F. Gomon; 1 ♀ (J58539), paratype, Central Bass Strait, 25 km SW of Cape Frankland, Flinders Island, Stn BSS 162, 40°09.4'S 147°32.7'E, 51 m depth, shelly sand, 14 November 1981; coll. R.S. Wilson; 2 ♀♀ (J58542), paratypes, Western Bass Strait, 40 km SSW of Warrnambool, Victoria, Stn BSS 189, 38°42.8'S 142°35.6'E, 69 m depth, coarse sand, 20 November 1981; coll. R.S. Wilson; 2 ♀♀ (J58561), paratypes, Central Bass Strait, 99 km WSW of Cape Liptrap, Stn BSS 131T, 39°45.55'S 145°33.82'E to 39°48.03'S 145°32.58'E, 78.7 m depth, very fine sand, 03 February 1981; coll. M.F. Gomon, G.C.B. Poore & C.-C. Lu.

Description of female. Body (Fig. 96A, B) slender, holotype 2.35 mm long, 7 times as long as wide. Cephalothorax subrectangular, tapering anteriorly with slight triangular rostrum, 1.3 times as long as wide, longer than pereonites 1 and 2 together, naked, eyes absent. Pereonite 1 shortest, 0.4 times as long as cephalothorax; pereonites 2 to 6 subequal, half as long as cephalothorax, with rounded lateral margins and wider than long (all pereonites respectively 2.0, 1.6, 1.4, 1.3, 1.3 and 1.4 times as wide as long). Pleon of five free subequal pleonites without pleopods plus pleotelson; each pleonite 3.2 times as wide as long. Pleotelson pentangular, as long as last pereonite, with paired posterior setae on each side.

Antennule (Fig. 97A) of four articles, proximal article 1.6 times as long as wide, 1.3 times as long as distal three articles together, with single outer distal simple seta surrounded by four penicillate setae; second article just longer than wide, 0.3 times as long as first article, with outer distal tuft of one simple and two penicillate setae; third article two-thirds as long as second, distally with outer simple seta and inner pair of one simple and one penicillate setae; fourth article tapering, just longer than second article, with six distal setae and one aesthetasc.

Antenna (Fig. 97B) of six articles, proximal article compact, fused to cephalothorax; second and third articles as long as wide, each with dorsodistal seta; fourth article longest, as long as three proximal articles together and 4.3 times as long as wide, with two simple and two penicillate distal setae; fifth article as long as third, with one distal seta; sixth article minute with four distal setae.

Labrum (Fig. 97C) rounded, hood-shaped, setose. Left mandible (Fig. 97D) with irregularly denticulate pars incisiva and triangular, crenulate lacinia mobilis, right mandible (Fig. 97E) with bilobed pars incisiva and without lacinia mobilis; pars molaris apically tuberculate. Labium (Fig. 97G) simple, finely setose at outer distal corners, without palp. Maxillule (Fig. 97F) with eight distal spines, each distally finely-denticulate, palp (Fig. 97F') with two distal setae. Maxilla (Fig. 97H) simple, naked. Maxilliped palp (Fig. 97I) first article with single outer distal seta; second article with three inner setae, two of these distally finely serrated; third article with two longer and two shorter inner setae; fourth article with five distal setae, each distally finely serrated, and one outer subdistal seta; basis with single, long seta almost reaching distal margin of endites; endites distally with two setae and rounded tubercle.

Cheliped (Fig. 98A) with rounded, naked basis about twice as long as wide; merus subtriangular with single ventral seta and covering more than half of ventral margin of carpus; carpus 1.5 times as long as wide, with two midventral setae, one dorsodistal seta; propodus as long as wide, comb-row of three setae, fixed finger with two ventral and three setae below cutting edge; dactylus naked.

Pereopod 1 (Fig. 98B) coxa without apophysis, with seta; basis slender, five times as long as wide, naked; ischium compact with one ventral seta; merus one-quarter as long as basis, with slender ventrodistal spine; carpus 1.75 times as long as merus, distally with inner seta and single distally-denticulate spine dorsally and two ventrally; propodus 1.25 times as long as carpus, with ventrodistal seta and distal tuft of setules; dactylus 0.42 times as long as unguis, both together 1.3 times as long as propodus. Pereopod 2 (Fig. 98C) similar to pereopod 1 although articles proportionately shorter, basis four times as long as wide with two mid-dorsal penicillate setae. Pereopod 3 (Fig. 98D) similar to pereopod 2.

Pereopod 4 (Fig. 98E) basis stouter, 3.6 times as long as wide, with two mid-ventral penicillate setae; ischium with two ventral setae; merus two-thirds as long as carpus and with two ventrodistal spines; carpus with three distal spines; propodus 1.14 times as long as carpus, with dorsal penicillate seta and three distal spines, each with fine serrations; dactylus longer than distinct unguis, both together just longer than propodus.

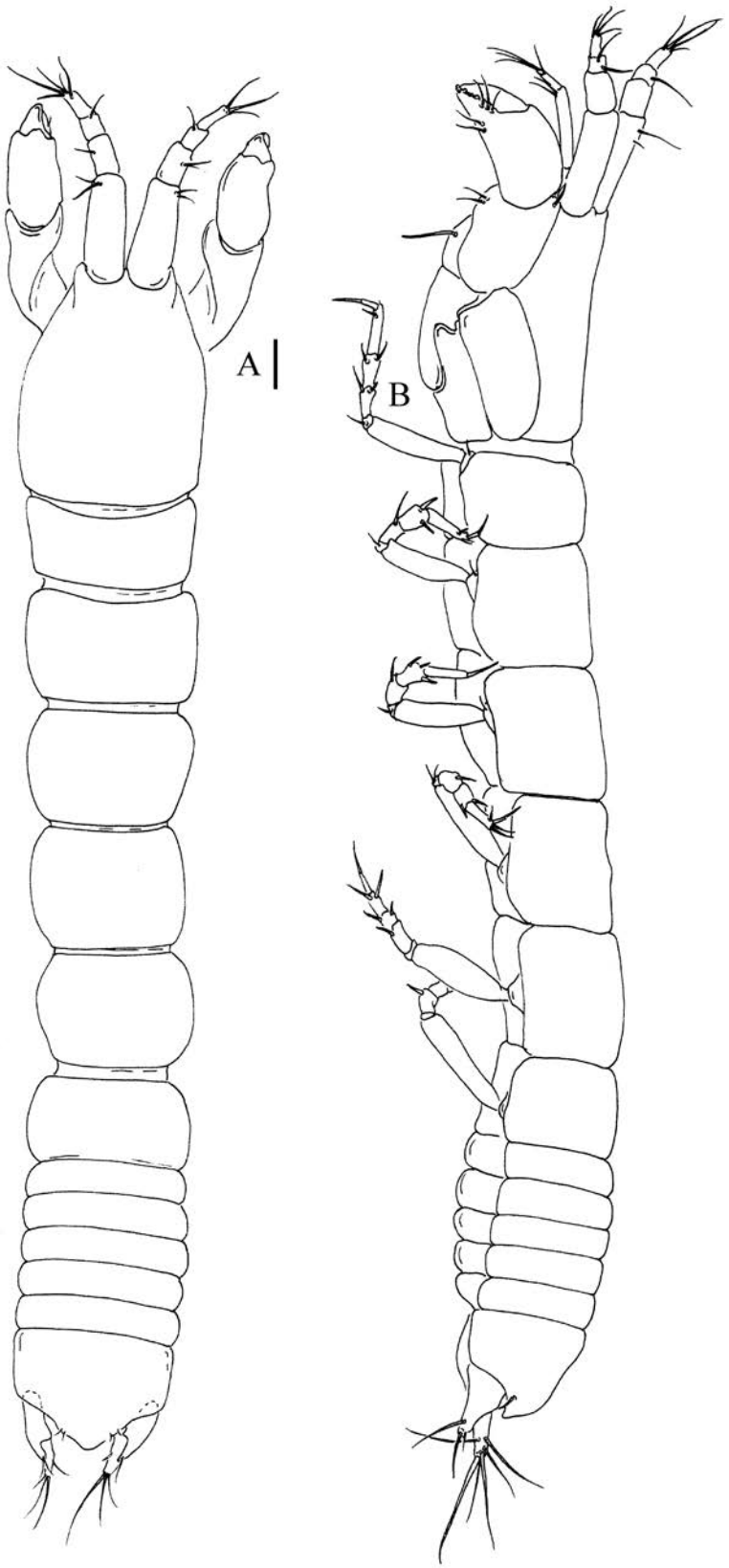

Fig. 96. *Araphuroides stabastris* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 0.1 mm.

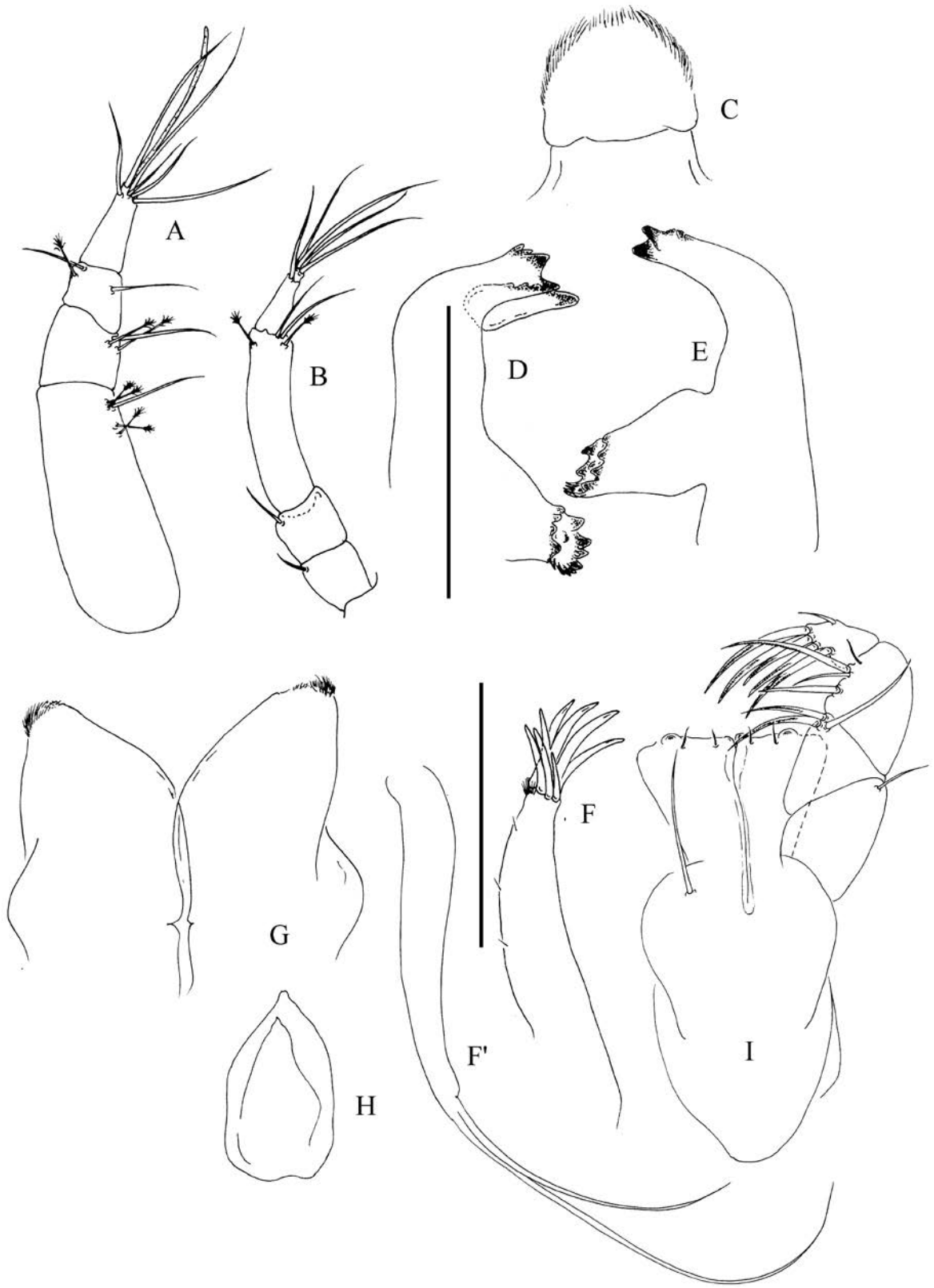

Fig. 97. *Araphuroides stabastris* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; F' maxillule palp; G, labium; H, maxilla; I, maxilliped. Scale = 0.2 mm.

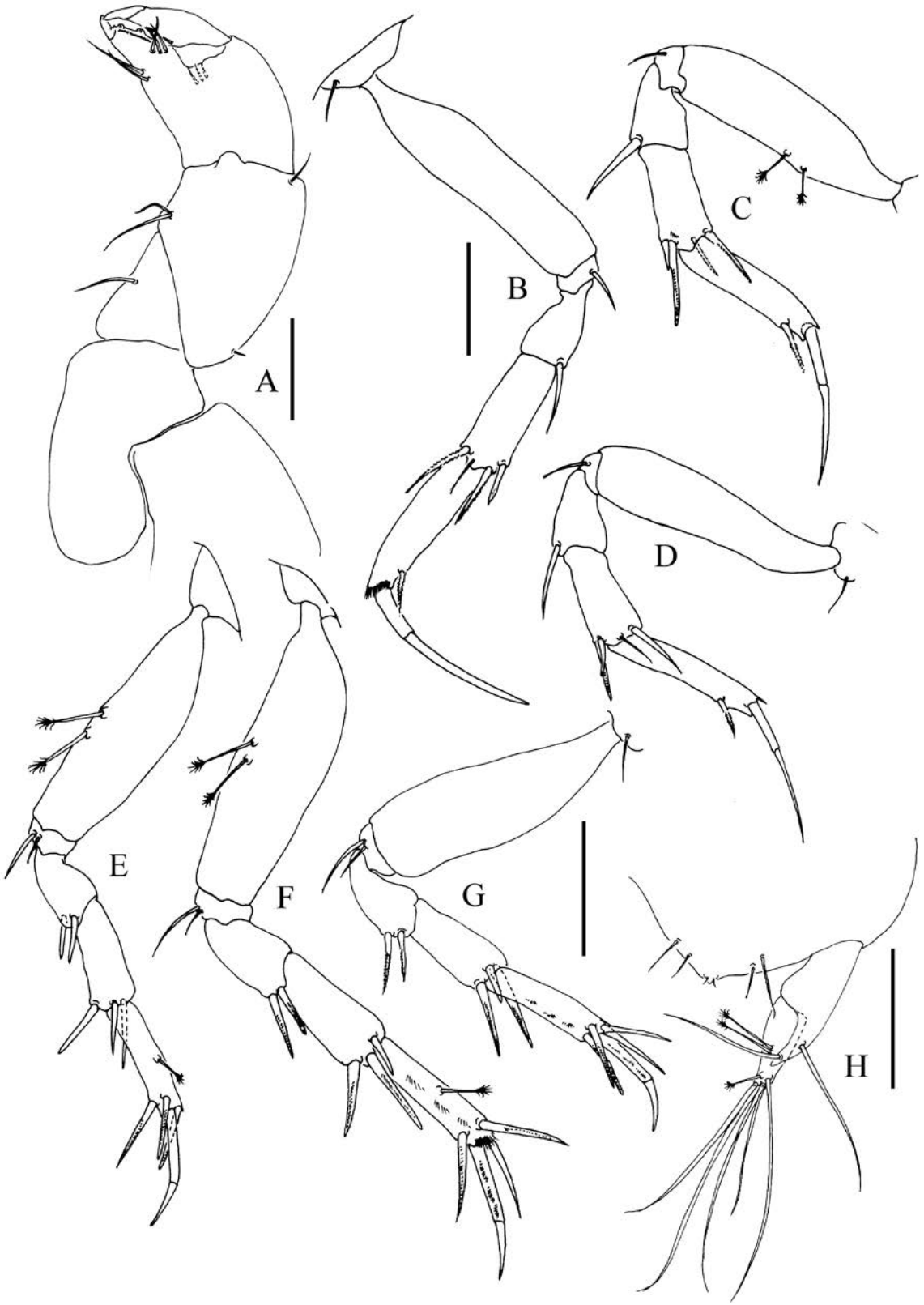

Fig. 98. *Araphuroides stabastris* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, uropod. Scale = 0.2 mm.

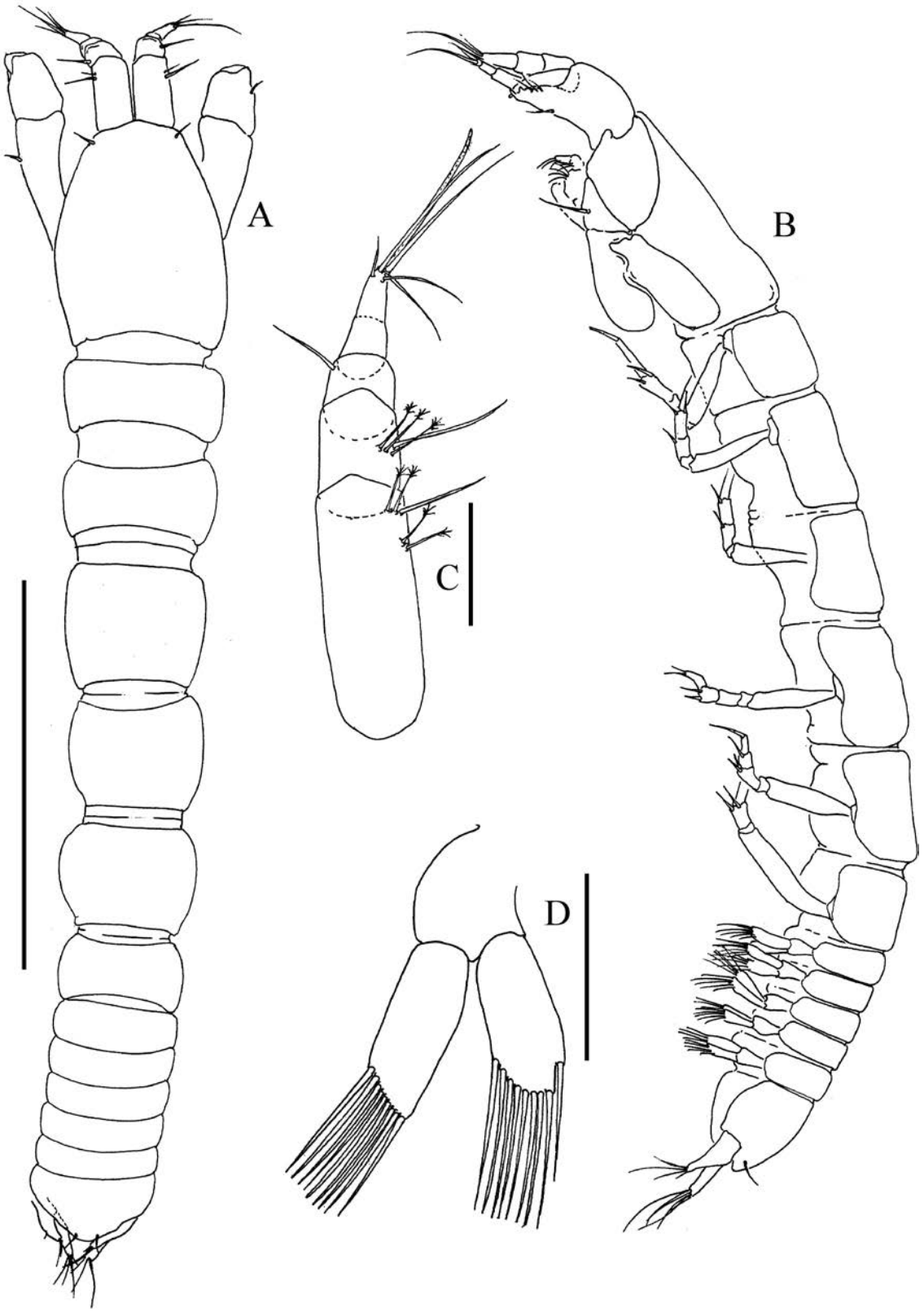

Fig. 99. *Araphuroides stabastris* sp. nov., male allotype. A, dorsal view ; B, lateral view ; C, antennule ; D, pleopod. Scale = 1 mm for A (and B), 0.1 mm for C and D.

Pereopod 5 (Fig. 98F) as pereopod 4, but all spines showing fine serrations, microtrichia present on propodus and dactylus. Pereopod 6 (Fig. 98G) as pereopod 5, but propodus with four distal spines, and basis without penicillate setae.

Pleopods absent.

Uropod (Fig. 98H) basis naked, exopod process 0.7 times as long as endopod, with one mesial and one distal setae; endopod of one segment, with subdistal tuft of two penicillate setae and distal group of five simple and one penicillate setae.

Distinctions of male (Fig. 99). Generally similar to female, allotype body length 2.9 mm; pereonite 2 only half as long as wide. Antennule with incipient articulation of distal article. Five pairs of pleopods present, rami subequal in length, exopod with nine distal setae, endopod with eight distal and one inner subdistal setae.

Etymology. Stabastris is an anagram of Bass Strait.

Remarks. The genus *Araphuroides* is distinguished from *Araphura* and *Tanaella* in having pereonites laterally rounded and wider than long (unlike *Araphura*), with a distinct uropodal exopod-process (unlike *Tanaella*), but see discussion below. Larsen (2005) re-diagnosed the genus and gave a key to the four species then known, in which *A. stabastris* sp. nov. is not resolved. Since that paper, *A. io* (Bamber, 2005) was transferred to this genus from *Araphura* by Larsen *et al*. (2009), and the present species is indeed closest to *A. io,* a species recorded from south-western Western Australia at depths from 23 to 40 m.

Araphuroides stabastris is distinguished from *A. io* in having a shorter cephalothorax; a cheliped with two ventral carpal setae, and only three setae in the chela comb-row; pereopod 1 with a more elongate basis (five times as long as wide, only three times in *A. io*), a carpus approaching twice as long as the merus (subequal in *A. io*), and a proportionately longer unguis (2.4 times as long as dactylus, only 1.3 times in *A. io*); all pereopods with a proportionately longer dactylus plus unguis, proportionately longer carpus, and longer distal spines on the merus and carpus. In addition, *A. io* has pleopods in the female. Both species are without a line of pseudo-articulation on the fourth antennal article found in all other species apart from *A. bombus* Larsen, 2005.

Araphuroides stabastris was found at 31 to 71 m depth on muddy to shelly sands throughout the Bass Strait.

Araphuroides batmania sp. nov.

Figures 100–101

Material examined. 1 ♀ (J58572), holotype, 4 ♀♀ (J58904), paratypes, Central Bass Strait, 28 km E of Cape Farewell, King Island, Stn BSS 107S, 39°32.8'S 144°16.0'E, 18 m depth, fine sand, 1 November 1980; 25 ♀♀ (J58571), paratypes, Central Bass Strait, 35 km E of Cape Farewell, King Island, Stn BSS 108G, 39°32.8'S 144°21.0'E, 27 m depth, fine sand, 01 November 1980; all coll. M.F. Gomon & G.C.B. Poore.

Description of female. Body (Fig. 100A, B) slender, holotype 3.2 mm long, 6.6 times as long as wide. Cephalothorax subrectangular, 1.3 times as long as wide, shorter than pereonites 1 and 2 together, with single anterolateral seta on each side, eyes absent. Pereonites rectangular, mostly with convex lateral margins; pereonite 1 longest, 0.6 times as long as cephalothorax; pereonites 2 to 5 subequal, half as long as cephalothorax; pereonite 6 shortest, half as long as pereonite 1 (all pereonites respectively 1.25, 1.5, 1.6, 1.5, 1.5 and 2.4 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite 4.8 times as wide as long. Pleotelson semicircular, as long as last two pleonites together, with one posterolateral seta on each side.

Antennule (Fig. 100C) of four articles, proximal article 2.7 times as long as wide, just longer than distal three articles together; second article 1.5 times as long as wide, 0.4 times as long as first article; third article shorter than wide, 0.4 times as long as second article; fourth article tapering, twice as long as third article, with four distal setae and one aesthetasc.

Antenna (Fig. 100D) of six articles, proximal article compact, fused to cephalothorax; second article longer than wide, with dorsodistal seta; third article as long as wide, with dorsodistal seta; fourth article longest, 4.7 times as long as wide, with midventral and ventrodistal penicillate setae and ventrodistal simple seta; fifth article 0.4 times as long as fourth with one distal seta; sixth article minute with four distal setae.

Labrum (Fig. 100E) hood-shaped, naked. Left mandible (Fig. 100F) with narrow, crenulate lacinia mobilis, cutting-edge angled; pars incisiva truncate with prominent crenulations. Right mandible (Fig. 100G) without lacinia mobilis, pars incisiva pointed with inner crenulations; pars molaris of both mandibles distally with strong, rounded tooth-like protrusions. Labium not recovered. Maxillule (Fig. 100H, H') with nine distal spines, at least some of these finely denticulate, and fine distal setules, palp with two distal setae. Maxilla (Fig. 100H) ovoid, simple, naked. Maxilliped palp (Fig. 100I) first article with simple outer seta, second and third articles with three inner setae, fourth article with four distal, finely denticulate spines and one outer subdistal seta; basis naked; endites distally with single seta, outer group of setules and slight inner tubercle.

Cheliped (Fig. 101A) naked basis attached to substantial sclerite; merus subtriangular with single ventral seta; carpus 1.5 times as long as wide, with two midventral and one dorsodistal setae; propodus with row of rounded tubercles along outer ventral margin including fixed finger, with two ventral setae, three setae on crenulate cutting edge; dactylus dorsal margin with rounded tuberculation.

Pereopod 1 (Fig. 101B) coxa with seta; basis 3.9 times as long as wide, naked; ischium compact with ventral seta as long as merus; merus just longer than carpus, with fine dorsodistal seta, ventrodistally with slender spine denticulate in distal two-thirds and simple seta; carpus distally with strong dorsodistal spine, smaller ventrodistal spine and mid-distal seta; propodus 1.4 times as long as carpus, with short ventrodistal spine; dactylus half as long as slender unguis, both together as long as propodus. Pereopod 2 (Fig. 101C) similar to pereopod 1, but basis with proximal seta, merus with stouter ventrodistal spine but without dorsodistal seta, carpus with longer ventrodistal spine, propodus with dorsodistal seta. Pereopod 3 (Fig. 101D) similar to pereopod 2, but basis naked.

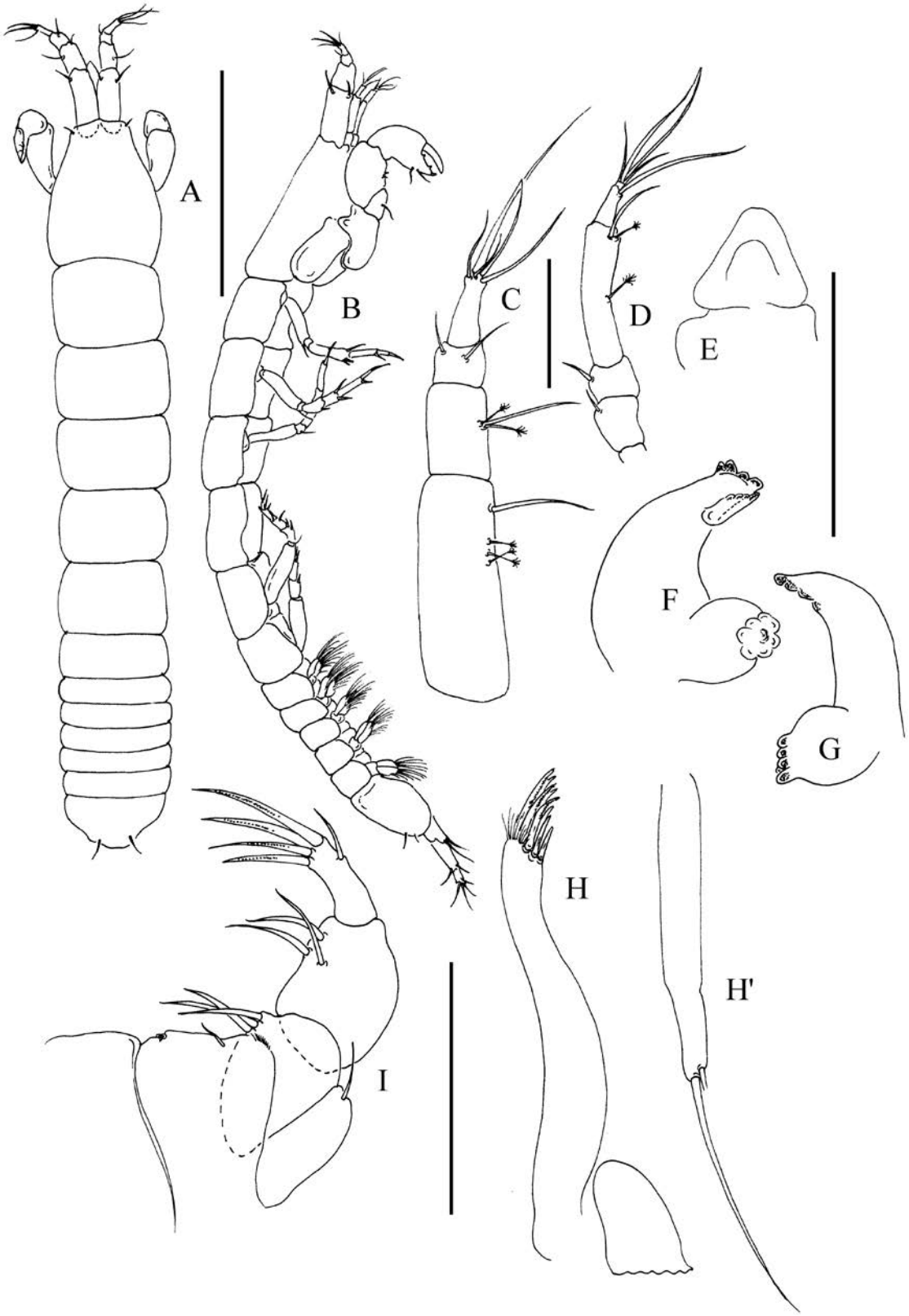

Fig. 100. *Araphuroides batmania* sp. nov. A, holotype female dorsal; B, holotype female lateral; C, antennule; D, antenna; E, labrum; F, left mandible; G, right mandible; H, maxillule and maxilla; H', maxillule palp; I, maxilliped. Scale: A-B = 1 mm, C-H = 0.1 mm.

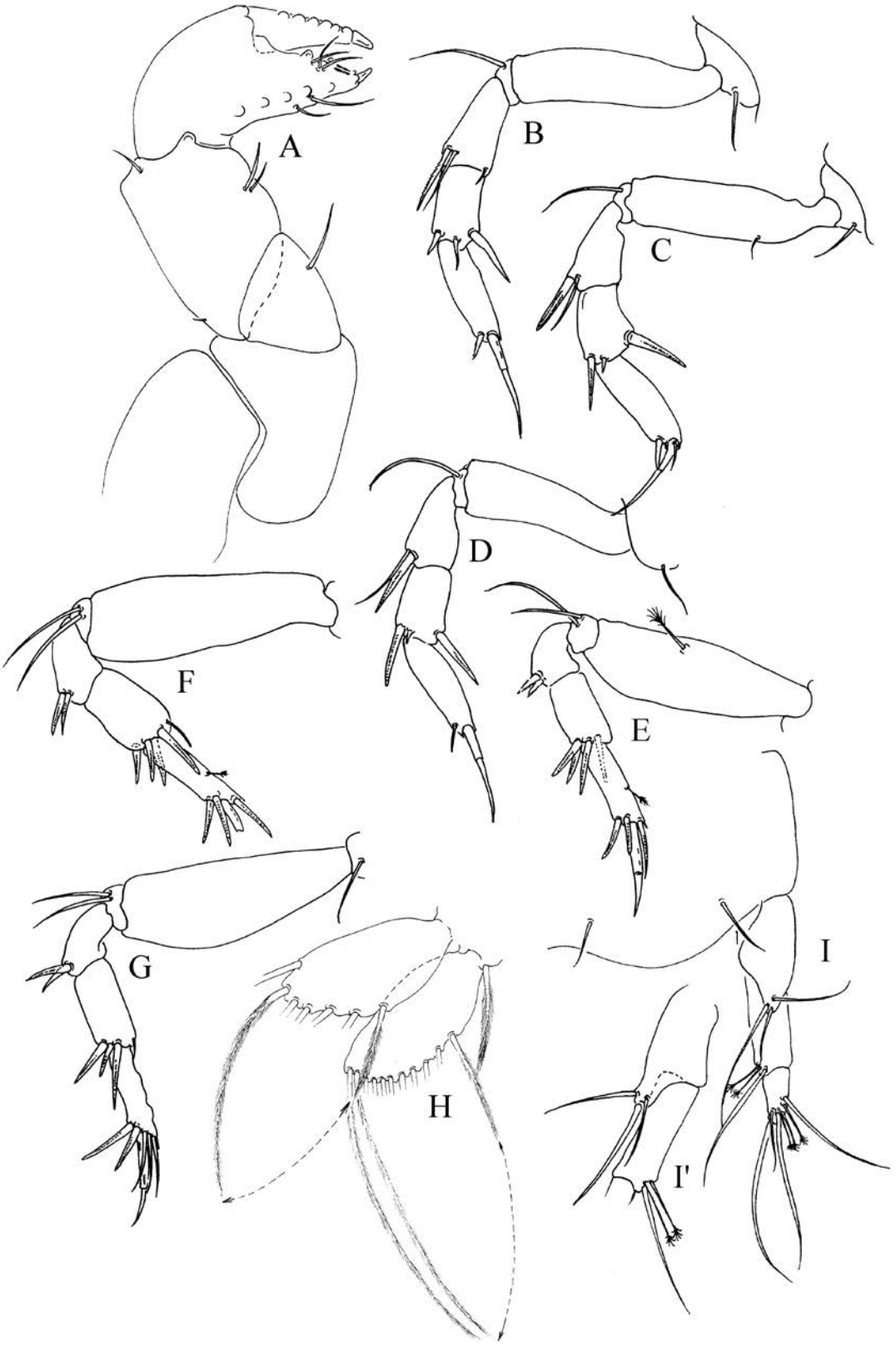

Fig. 101. *Araphuroides batmania* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod; I', uropod basis, lateral.

Pereopod 4 (Fig. 101E) basis stouter than those of anterior pereopods, 3.2 times as long as wide, with ventral penicillate seta; ischium with two ventral setae; merus and carpus subequal, merus 0.6 times as long as carpus and with two ventrodistal spines, carpus with distal crown of four denticulate spines; propodus 1.3 times as long as carpus, with mid-dorsal penicillate seta, one dorsodistal and two ventrodistal spines; dactylus longer than unguis. Pereopod 5 (Fig. 101F) as pereopod 4, but basis naked. Pereopod 6 (Fig. 101G) as pereopod 5, but propodus with three dorsodistal setae.

Pleopods (Fig. 101H) all alike, with naked basis, endopod and exopod without setae on inner margin, outer distal margins with respectively 7 and 12 plumose setae, additional proximal exopod seta separated from others.

Uropod (Fig. 101I) exopod process 0.4 times as long as proximal endopod segment, with three distal setae; endopod of two segments, proximal segment with one simple and two penicillate distal setae, distal segment half as long as proximal segment and with four simple and three penicillate distal setae.

Male. Unknown.

Etymology. Batmania was one of the names of the early settlement at Melbourne (ca. 1835), named after John Batman, a leading member of the Tasmanian Port Phillip Association.

Remarks. For reasons given above under *Araphuroides stabastris,* the present species is again closest only to *A. io;* unlike the previous species, *A. batmania* sp. nov. also has on pereopod 1 the shorter carpus, shorter distal merus and carpus setae, and proportionately shorter dactylus plus claw of *A. io,* and again shares the absence of a line of pseudo-articulation on the fourth antennal article. Like *A. io,* but unlike *A. stabastris,* the female of the present species has pleopods.

Araphuroides batmania is distinguished from *A. io* by its longer first pereonite on a generally stouter body, fewer setae on the maxilliped palp, and a mandible with more complex crenulation on the pars incisiva and rounded distal tubercles on the pars molaris, and is distinguished from *A. io,* and all other described species in the genus, in having rounded tubercles on both fingers of the chela.

Araphuroides batmania was taken in the Central Bass strait east of Cape Farewell, King Island at depths of 18 to 27 m in fine sand.

Araphuroides sala sp. nov.

Figures 102–104

Material examined. 1 ♀ (J58841), holotype, Western Port, off Crib Point, Stn CPBS-N 52/272, 38°19.92'S 145°13.95'E, 19 m depth, sand and gravel, 31 March 1965; coll. A.J. Gilmour. 1 ♀ (J58843), paratype, Western Port, off Crib Point, Stn CPBS-N 25/1, 38°20.25'S 145°14.68'E, 11 m depth, sand, 10 March 1965; coll. A.J. Gilmour. 1 ♀ (J58839), Stn CPBS-N 32/1, 1 ♀ (J58840), Stn CPBS-N 32/2, and 4 ♀♀ (J58842), Stn CPBS-N 32/3, paratypes, all Western Port, off Crib Point, 38°20.83'S 145°13.48'E, 13 m depth, sandy gravel, 23 March 1965; coll. A.J. Gilmour. 2 ♀♀ (J58534, J58535), paratypes, Eastern Bass Strait, 63 km E of North Point, Flinders Island, Stn BSS 167, 39°44.8'S 148°40.6'E, 124 m depth, muddy sand, 14 November 1981, coll. R.S. Wilson.

Description of female. Body (Fig. 102A, B) slender, holotype 1.4 mm long, 8.1 times as long as wide. Cephalothorax pear-shaped, widest centrally, with distinct rounded rostrum, 1.6 times as long as wide, 2.7 times as long as pereonite 1, naked, eyes absent. Pereonites all naked, lateral margins convex; pereonite 1 short, 0.4 times as long as cephalothorax; pereonites 2 to 5 subequal, 1.25 times as long as pereonite 1; pereonite 6 shortest, 0.8 times as long as pereonite 1 (all pereonites respectively 1.5, 1.25, 1.25, 1.5, 1.3 and 2.0 times as wide as long). Pleon of five free subequal pleonites bearing pleopods plus pleotelson; each pleonite 4.4 times as wide as long, with single lateral epimeral seta on each side. Pleotelson subpentangular, 0.4 times as long as whole pleon, as long as wide, paired laterodistal setae either side of rounded mid-distal margin.

Antennule (Fig. 103A) of four articles, proximal article 3.6 times as long as wide, longer than distal three articles together, distally with two tufts of penicillate setae and single outer simple seta; second article longer than wide, 0.4 times as long as first article, with four inner distal penicillate setae and one outer simple seta; third article compact, half as long as second article, with two simple distal setae; fourth article tapering, 1.4 times as long as third article, with six simple and one penicillate distal setae.

Antenna (Fig. 103B) of six articles, proximal article compact, shorter than wide, fused to cephalothorax; second article as long as wide, with two distal setae; third article shorter than wide, 0.7 times as long as second article, with dorsodistal seta; fourth article longest, five times as long as wide, more than three times as long as second article, with penicillate seta in proximal half, crown of one simple and five penicillate distal setae and dorsal rows of microtrichia; fifth article as long as second, with one distal simple seta; sixth article minute with four distal setae.

Labrum (Fig. 103C) rounded, hood-shaped, distally setose. Left mandible (Fig. 103D) with wide, spade-like crenulate pars incisiva and triangular, crenulate lacinia mobilis, right mandible (Fig. 103E) with crenulate and distally bifid pars incisiva and without lacinia mobilis; pars molaris of both mandibles stout, with fine, elongate distal denticulations. Labium (Fig. 103H) simple, outer distal corner of both lobes setulose. Maxillule (Fig. 103F) with nine finely-denticulate distal spines and few distal setules, palp with two distal setae. Maxilla (Fig. 103G) simple, triangular, naked. Maxilliped (Fig. 103I) palp first article naked, second article with one outer and three distal inner setae, two of these finely denticulate; third article with two longer mesial and two shorter distal inner setae, one of each of these finely denticulate; fourth article with four longer and one shorter distal finely-denticulate setae and one small subdistal outer seta; basis naked; endites distally each with two rounded tubercles, with outer-distal microtrichia and inner seta. Epignath (Fig. 103J) slender, ribbon-like, distally pointed, naked.

Cheliped (Fig. 103K) with rounded, naked basis 2.3 times as long as wide, merus subtriangular with single ventral seta, and covering about half of ventral margin of carpus; carpus 1.5 times as long as wide, with one longer and one much shorter midventral setae, one dorsodistal seta and one dorsoproximal seta, dorsal margin smooth; propodus just longer than wide,

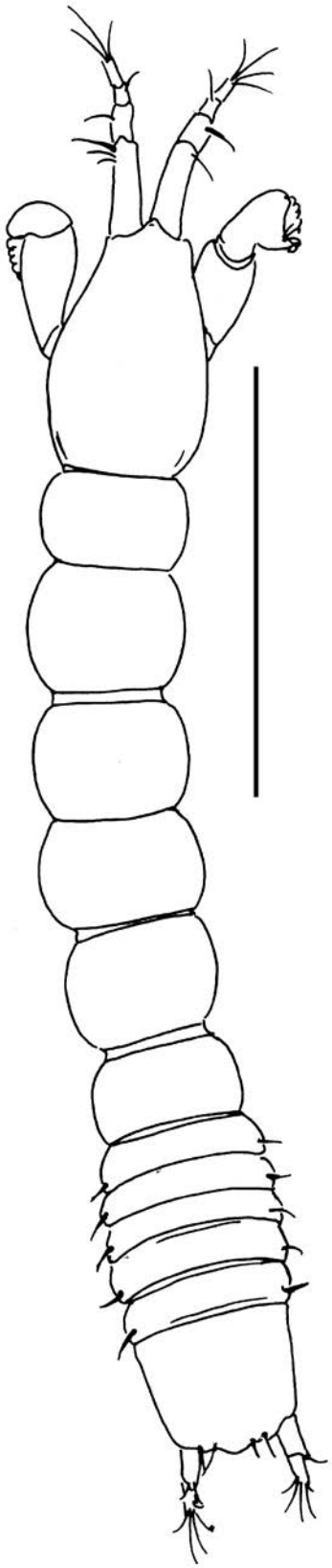

Fig. 102. *Araphuroides sala* sp. nov., female holotype, dorsal. Scale = 0.5 mm.

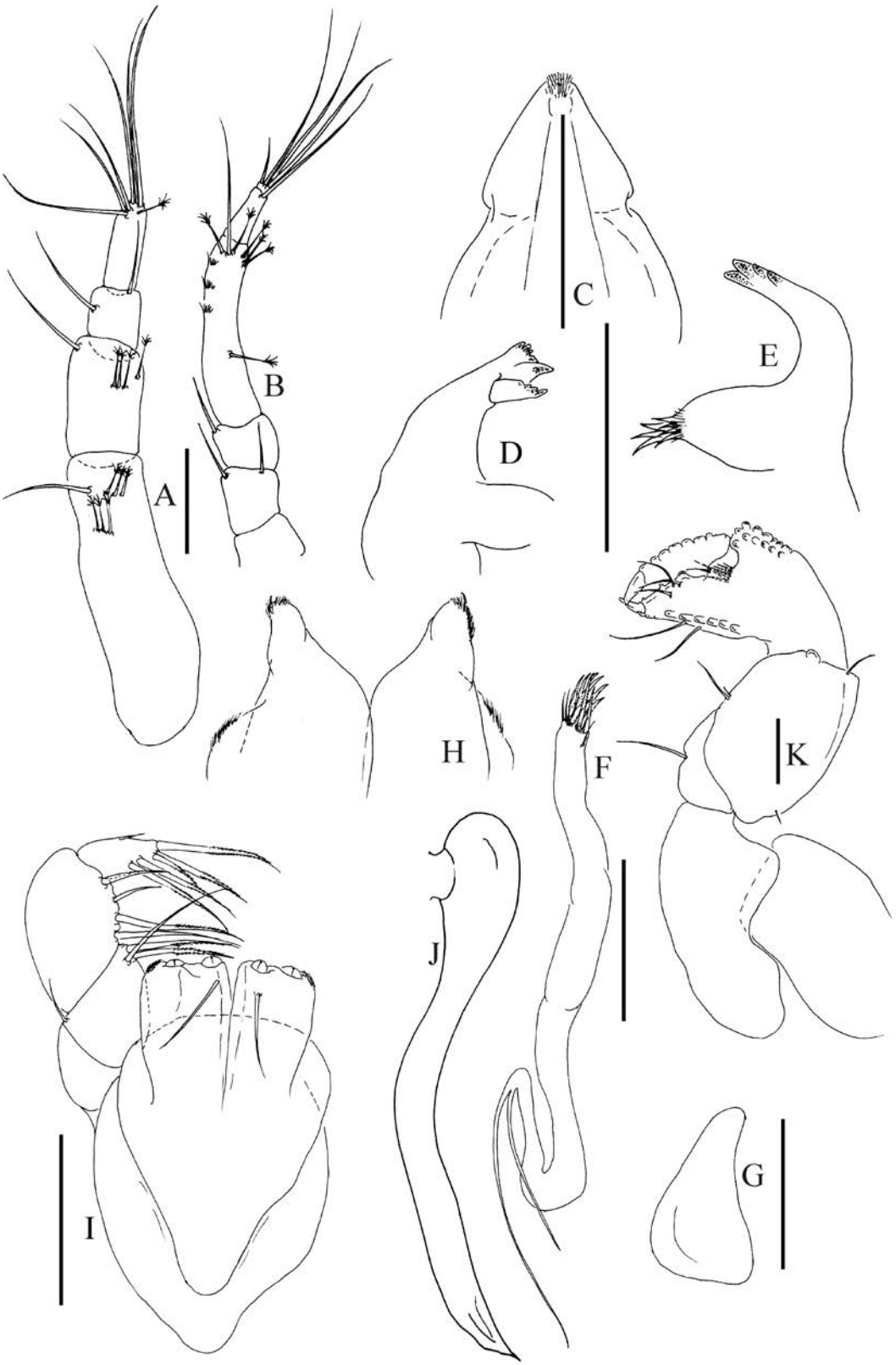

Fig. 103. *Araphuroides sala* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; G, maxilla; H, labium; I, maxilliped; J, epignath; K, cheliped. Scale = 0.1 mm.

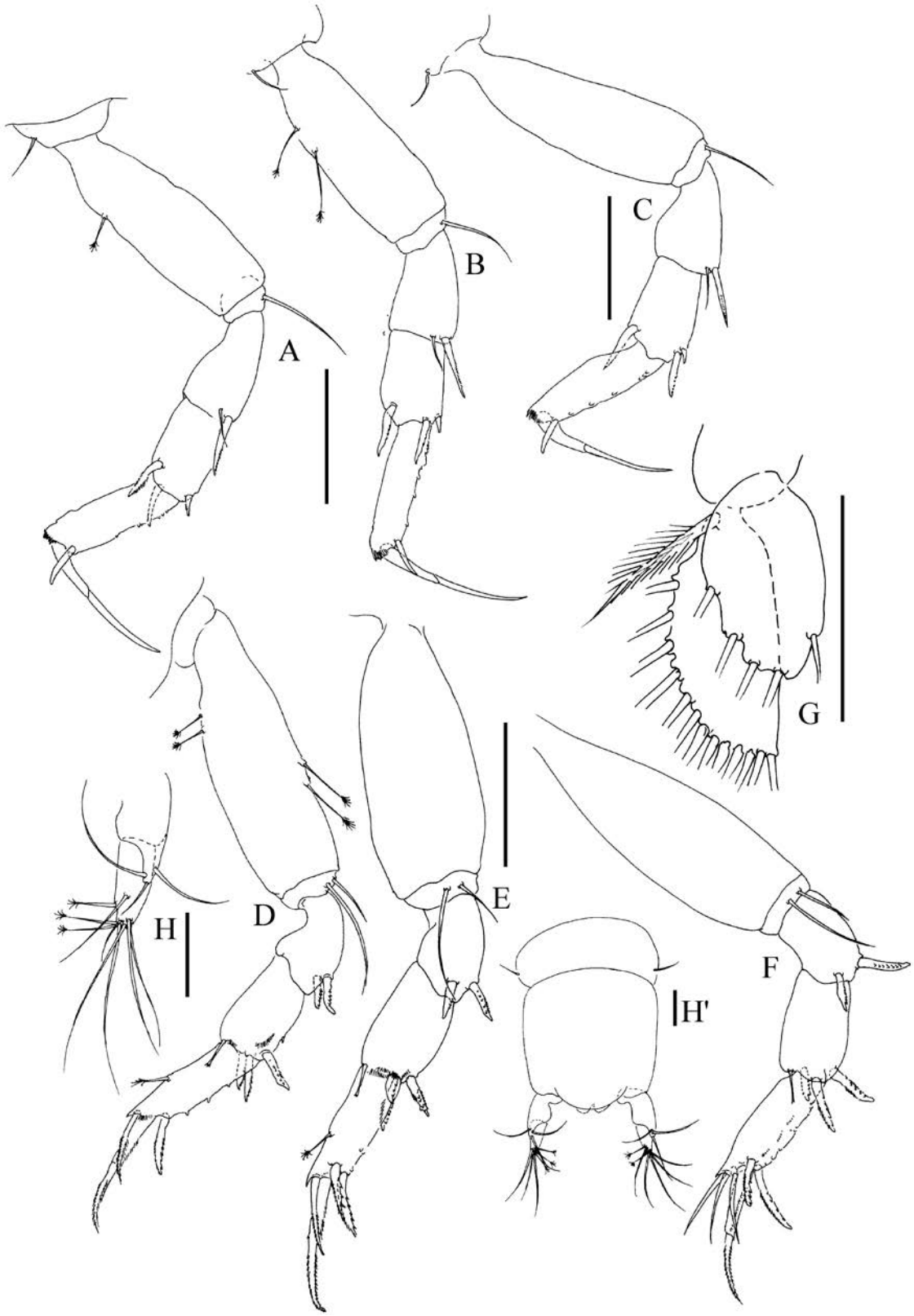

Fig. 104. *Araphuroides sala* sp. nov., female paratype. A to F, pereopods 1 to 6 respectively; G, pleopod; H, uropod; H' pleotelson, dorsal (distal setae not shown). Scale = 0.1 mm.

with two ventral setae, dorsally with two rows of rounded tubercles in distal half, outer face with row of rounded tubercles along ventral margin of fixed finger, inner comb-row of four setae; fixed finger with three setae below cutting edge and two or three small tooth-like apophyses on cutting edge; dactylus with rounded tubercles along dorsal margin.

Pereopod 1 (Fig. 104A) not longer than others, coxa without apophysis, with seta; basis 2.9 times as long as wide, with dorsoproximal penicillate seta; ischium compact, with one ventrodistal seta almost as long as merus; merus 1.2 times as long as carpus, ventrodistally with seta and longer distally-denticulate spine just exceeding half length of carpus; carpus distally with shorter ventral spine and single distally-denticulate dorsodistal spines anteriorly and posteriorly; propodus 1.25 times as long as carpus, with ventrodistal spine and dorsodistal and ventral microtrichia; dactylus naked, unguis 1.5 times as long as dactylus, both together 1.4 times as long as propodus. Pereopod 2 (Fig. 104B), similar to pereopod 1, basis with two dorsoproximal penicillate setae; merus and carpus subequal in length; propodus 1.5 times as long as carpus; dactylus and unguis together 1.2 times as long as propodus. Pereopod 3 (Fig. 104C) similar to pereopod 2.

Pereopod 4 (Fig. 104D) not more compact, coxa naked, basis three times as long as wide, with two dorsoproximal and two midventral penicillate setae; ischium with one shorter and one longer ventrodistal setae, latter as long as merus; merus just shorter than carpus, with two finely-denticulate ventrodistal spines; carpus with single dorsodistal and ventrodistal setae and three finely-denticulate ventrodistal spines, distally with microtrichia; propodus 1.2 times as long as carpus, with ventral fields of microtrichia, dorsal penicillate seta, two ventrodistal and one dorsodistal finely-denticulate spines; dactylus 0.8 times as long as unguis, both with fields of microtrichia, dactylus and unguis not fused into a claw, the two together 1.1 times as long as propodus. Pereopod 5 (Fig. 104E) as pereopod 4, but basis without penicillate setae. Pereopod 6 (Fig. 104F) as pereopod 5, but propodus with two ventral and three dorsal distal spines.

Pleopods (Fig. 104G) all alike, with naked basis, endopod with subdistal inner plumose seta, exopod without setae on inner margin, outer margins with respectively 5 and 12 plumose setae, additional proximal exopod seta separated from others.

Uropod (Fig. 104H, H') half as long as pleotelson, basis naked, exopod process half as long as endopod, with three distal setae; endopod of one segment, setose as figured.

Male. Unknown.

Etymology. Named after the English journalist George Augustus Henry Sala who, during a visit to Victoria in 1885, coined the phrase "Marvellous Melbourne", which stuck long into the twentieth century and is apparently still used today by Melburnians (noun in apposition).

Remarks. Within the genus *Araphuroides*, only the three species described herein and *A. bombus* Larsen, 2005 are without a pseudo-articulation line on the fourth antennal article, and only the present species and *A. batmania* have rounded tubercles on the chela; these two also share the elongate setae on the ischia of the pereopods. *A. batmania* differs from *A. sala* sp. nov. in being without the dorsodistal tubercles on the chela, as well as in having only rounded distal tubercles on the mandibular molar process, and in having a uropod with a longer exopod process and a two-segmented endopod.

Araphuroides sala was found in Western Port and off Flinders Island in coarse to muddy sands at depths between 11 and 124 m.

Discussion of the genera Araphura *and* Araphuroides.

Sieg (1986a) originally distinguished *Araphuroides* from *Araphura* by their "body shape", the pereonites of *Araphura* having parallel margins while those of the two species he attributed to *Araphuroides* (see above) having "gently rounded" margins; additionally, pereonite 2 in *Araphura* is "normally" as long as wide or slightly wider than long, while it is "distinctly broader than long" in *Araphuroides*; further, he maintained that the merus on pereopod 1 is short, "only slightly longer than broad", in *Araphura*, but "distinctly longer than broad" in *Araphuroides*. Finally, the pars molaris of the mandible is broad, with "at least one longer and several small toothlike processes" in *Araphuroides*, but is pointed "ending in three or four tiny tips" in *Araphura*.

Sieg & Dojiri (1989) expanded on these distinctions, citing pereonite 2 as being "at least as long as broad, but mostly longer than broad" in *Araphura*; strangely, these authors showed the features of the ratio of length to width of pereonite 2, and of parallel- or convex-sided pereonites to be ontogenically variable. Larsen (2005) and Larsen *et al*. (2009) added the body length to width proportions as distinguishing these two genera (*Araphura* 9 to 13 times as long as wide, *Araphuroides* less than nine times), even though this feature was not cited by Sieg (locc. cit.).

These various features for the Australian species of these two genera are shown in Table 2. None of the species has a pereopod 1 merus "only slightly longer than broad". Other than this, it is apparent that the only species agreeing wholly with Sieg's concept of *Araphura* is *A. pygmothymus*, and it is the only one with a "pointed" mandibular molar process. Yet, from their remaining morphology, *A. yarra* is clearly a species close to *A. pygmothymus*. Indeed, a number of these species appear to be siblings. Considering Larsen's (2005) concept of body length to width, these Australian species show a gradation suggesting that any such distinction is entirely arbitrary.

Indeed, it is apparent that the "characters" diagnosing these genera according to Sieg (locc. cit.) are not consistent, and consideration of the features shown in table 2 as being diagnostic is to fall into the error or classifying characters rather than animals. To quote Linnaeus, "Characters come from the genus, not the genus from the characters. Characters are not there so that there should be a genus but in order that the genus should be recognized." (Linné, 1751; see also Mayr, 1969). One might be as justified in using the tuberculation on the chela found here (and in *A. whakarakaia*) in all three species named in *Araphura* plus two of the *Araphuroides* species; however, this can hardly be a generic character, as it is also present in another and quite distinct tanaellid genus, described below, as well as some species of the unrelated genera *Chauliopleona* Dojiri & Sieg, 1997 and *Akanthophoreus* Sieg, 1986.

Table 2. Characters of the Australian species of *Araphura* and *Araphuroides*, together with those defined as characterizing the genera by Sieg & Dojiri (1989). *data from Larsen (2005), who further distinguished these genera on body proportion, but note that Sieg (1986a) and Sieg & Dojiri (1989) did not.

	Body length: width	**pereonite 2 width: length**	**pereopod 1 merus length: width**	**pereopod 1 merus: carpus**	**mandible molar process**	**mandibular molar ventrodistal slender spines**	**lateral borders of pereonites**	**Tuberculation on the chela**
Araphura pygmothymus	9.7	0.9	1.7	~1.0	tapering	absent	parallel	present
Araphura yarra	8.8	1	2.1	1.4	stout	present	~ parallel	present
Araphura doutagalla	7.4	1.4	1.7	~1.0	stout	present	~ parallel	present
Araphuroides stabastris	7	1.6	1.3	0.6	stout	absent	convex	absent
Araphuroides batmania	6.6	1.5	1.7	~1.0	stout	absent	~ convex	present
Araphuroides sala	8.1	1.25	1.7	1.2	stout	present	convex	present
Araphura io Bamber, 2005	7.3	1.5	1.6	~1.0	stout	present	~ parallel	absent
Araphura sensu Sieg & Dojiri, 1989	9 to 13*	≤ 1.0	~1.0	~1.0	tapering	absent	parallel	
Araphuroides sensu Sieg & Dojiri, 1989	< 9.0*	>1.0	>1.0	>1.0	stout	present	convex	

The right conclusion is probably to dismiss *Araphuroides* as a distinct genus, but that must necessitate a reanalysis of all 24 species attributed to these two genera (including those described herein). At present, the three species above attributed to *Araphuroides* are distinguished simply on their convex (or relatively convex) lateral pereonite margins. On that basis, despite its being apparently close to the *Araphuroides* species described above, *Araphura io* is returned to its original genus.

Genus ***Inconnivus*** gen. nov.

Diagnosis, female. Tanaellid with cephalothorax showing lateral concavity towards anterior. Eyelobes present. Antennule with four articles, antenna with six articles, proximal article fused to cephalothorax; second and third articles with slender dorsodistal spines. Mandibular pars molaris longer than pars incisiva, with distal ring or spines, longer ventrally. Pereopods, chelipeds, maxillipeds with microtrichia; merus and carpus of all pereopods with spines. Dactylus and unguis of pereopods distinct, as long as or longer than propodus; distal propodal spine of pereopods 2 and 3 coaxial with dactylus. Pleopods present. Uropods stout, exopod present as small process fused to basis; endopods short, the two not configured in the form of "pincers".

Type species. Inconnivus billibunteri sp. nov. by monotypy.

Etymology. from the Latin "that does not close the eyes", alluding to the presence of distinct eyelobes in a taxon otherwise hardly distinct from the eyelobe-less genus *Tanaella* Norman and Stebbing, 1886; noun derived from the adjective, male.

Remarks. With the anterolateral concavity to the cephalothorax, the conformation of the antennules, antennae, pereopods, pleopods, uropods and mouthparts, the species described below shows a very close affinity to *Tanaella*. The uropods are very short for a *Tanaella*, and clearly not "pincer-like" (see diagnosis of *Tanaella* by Larsen & Heard, 2004b), although this configuration is also approached by, for example, *T. kroyeri* Larsen *et al*., 2009. However, the present species takes this reduction in the uropods much further, and, most distinctly, has evident eyelobes, although no ocelli were observed in the preserved material: Larsen and Heard (2004b) included a lack of eyelobes in their generic diagnosis for *Tanaella,* and Larsen (2005) considered it one diagnostic feature of the Tanaellidae.

The species below shows some superficial similarities to the Cryptocopinae, but the conformation of the uropods, antennae, maxilliped endites and chelipeds, and the pereopod spination all suggest otherwise.

This species is therefore attributed to a separate genus, closely related to *Tanaella,* but with the presence of eyelobes, probably more plesiomorphic. It is not possible at present to say whether the additional features of the tuberculate rugosity on the cheliped or the microtrichia on the pereopods are generic or specific characters.

Inconnivus billibunteri sp. nov.

Figures 105–107

Material examined. 1 ♀ (J37873), holotype, off Nowra, New South Wales, Stn SLOPE 1, 34º59.52'S 151º05.93'E, 204 m depth, 14 July 1986; coll. G.C.B. Poore; 1 ♀ (J58564), paratype, Central Bass Strait, 25 km SW of Cape Frankland, Flinders Island, Stn BSS 162, 40º09.4'S 147º32.6'E, 51 m depth, shelly sand, 14 November 1981; coll. R.S. Wilson; 1 ♀ (J58903), paratype, Eastern Bass Strait, 100 km NE of North Point, Flinders Island, Stn BSS 170, 38º52.6'S 148º25.2'E, 130 m depth, fine sand, 15 November 1981; coll. R.S. Wilson.

Description of female. Body (Fig. 105) compact, holotype 2.9 mm long, 4.8 times as long as wide. Cephalothorax narrowing towards anterior, as long as wide, about as long as pereonites 1 to

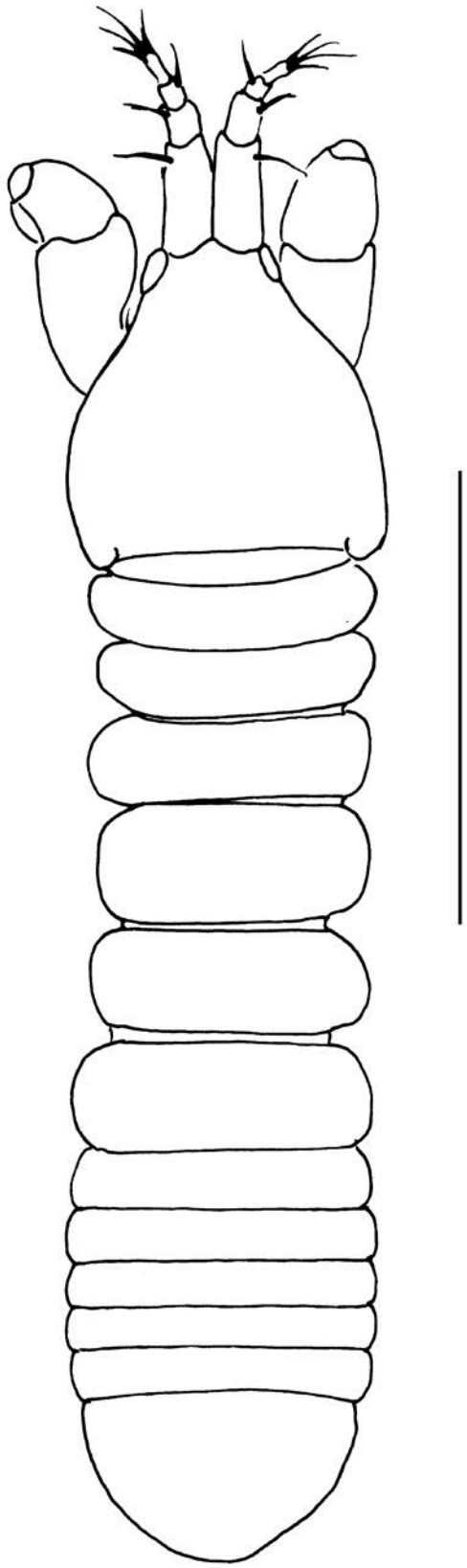

Fig. 105. *Inconnivus billibunteri* sp. nov. A, holotype female dorsal view. Scale = 1 mm.

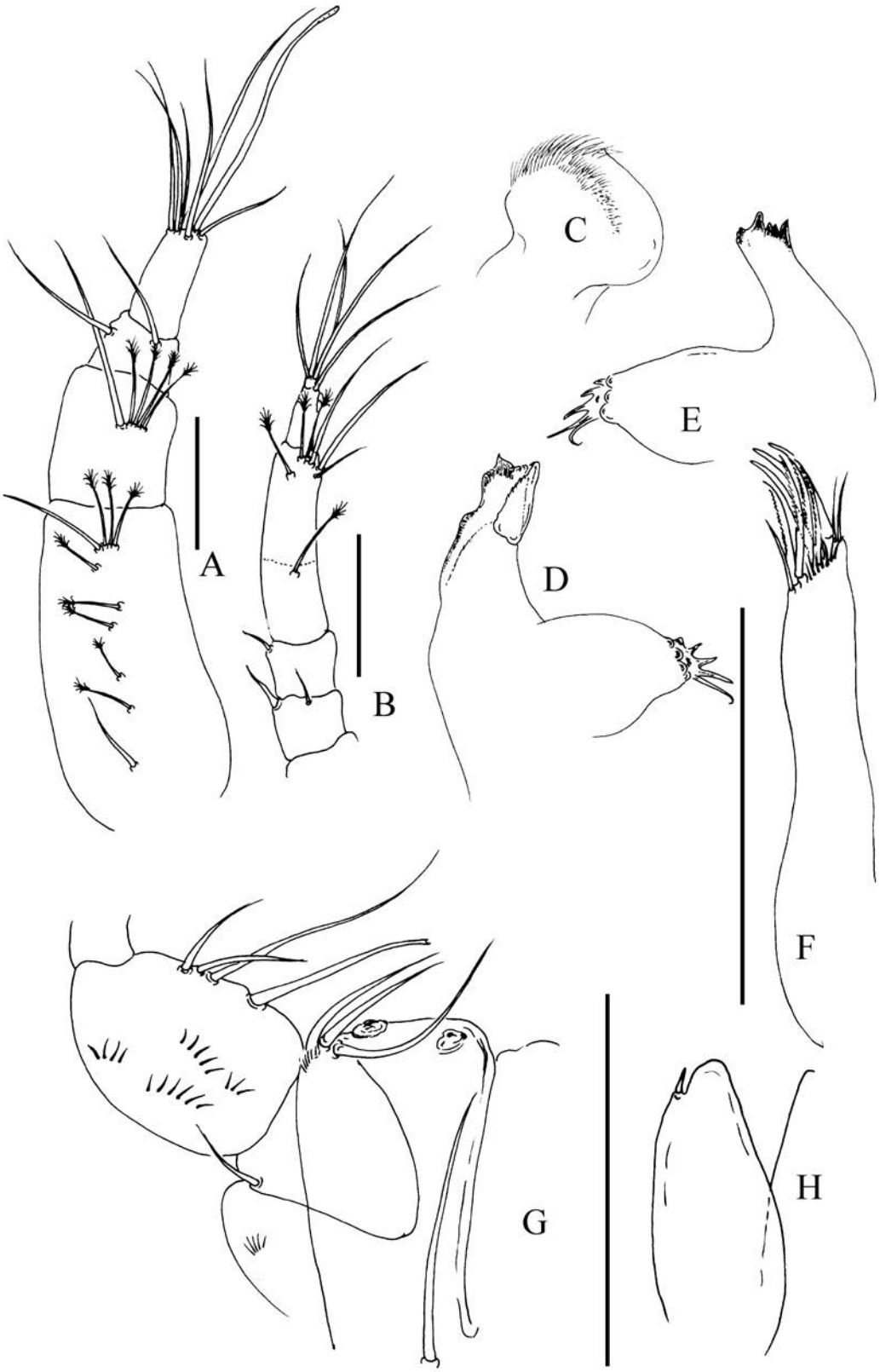

Fig. 106. *Inconnivus billibunteri* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule endite; G, maxilliped (distal palp article damaged); H, labium. Scale = 0.1 mm.

Fig. 107. *Inconnivus billibunteri* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

4 together, naked; eyelobes present, eyes absent. All pereonites laterally convex; pereonites 1 to 3 subequal in length, narrow, less than one-quarter as long as cephalothorax; pereonite 4 longest, 1.5 times as long as pereonite 3; pereonites 5 and 6 subequal, 0.9 times as long as pereonite 4 (all pereonites respectively 4, 4.4, 3.8, 2.3, 2.7 and 2.9 times as wide as long). Five free subequal pleonites bearing pleopods; each pleonite 6.4 times as wide as long. Pleotelson semicircular, as long as maximum width, longer than last three pleonites together, naked.

Antennule (Fig. 106A) of four articles, proximal article 2.4 times as long as wide, 1.3 times as long as distal three articles together, with mid-dorsal row of two simple and about eight penicillate setae; second article slightly longer than wide, one-third as long as first article, with distal tuft of one simple and four penicillate setae; third article compact, one-third as long as second article, with two simple distal setae; fourth article 2.5 times as long as third with six simple distal setae and one aesthetasc.

Antenna (Fig. 106B) proximal article compact, fused to cephalothorax; second article as long as wide, with distal seta and dorsodistal spinule; third article as long as wide, with dorsodistal seta; fourth article longest, 3.9 times as long as wide, with suggestion of secondary articulation just proximal of mid-length, and with one penicillate seta just proximal of mid-length and group of three simple and three penicillate distal setae; fifth article 0.3 times as long as fourth with one simple distal seta; sixth article minute with four distal setae.

Labrum (Fig. 106C) rounded, distally setose. Left mandible (Fig. 106D) with narrow, irregularly-crenulate pars incisiva, lacinia mobilis triangular with fine outer denticulations, right mandible (Fig. 106E) as left but without lacinia mobilis; pars molaris of both mandibles robust with slender ventrodistal spines. Labium (Fig. 106H) simple, elongate, with outer-distal spinule. Maxillule (Fig. 106F) with nine distal spines, six of these slender, scythe-like with fine denticulations; palp not recovered. Maxilliped palp (Fig. 106G) with groups of microtrichia; first article naked; second article with outer distal seta and three longer inner-distal setae; third article with four inner setae, longest seta much longer than article; fourth article damaged in preparation; basis with single, long seta not reaching distal margin of endites; endites distally with two oval tubercles. Epignath not recovered.

Cheliped (Fig. 107A) sclerite with triangular attachment to basis; basis just longer than wide and bearing microtrichia; merus subtriangular with single ventral seta; carpus rounded, compact, 1.1 times as long as wide, with two midventral setae, one dorsoproximal and one dorsodistal setae; propodus as long as carpus, with comb-row of four setae, fixed finger with two ventral and one inner setae, three setae on cutting edge, cutting edge crenulate; dactylus with robust row of rounded crenulations along outer dorsal margin, cutting edge with three coarser crenulations.

Pereopod 1 (Fig. 107B) coxa naked; basis slender, 4.5 times as long as wide, with mid-ventral microtrichia and ventrodistal seta; ischium compact with long ventral seta 0.85 times as long as merus; merus, carpus and propodus subequal in length; merus with midventral microtrichia and ventrodistal spine; carpus with microtrichia, ventrodistal spine, two inner-distal setae and long dorsodistal spine, 0.75 times as long as propodus and with inner denticulation; propodus with ventral microtrichia, subdistal dorsal seta and ventrodistal spine longer than dactylus; dactylus and claw subequal in length, both together 1.15 times as long as propodus. Pereopod 2 (Fig. 107C) similar to pereopod 1, basis four times as long as wide, without ventrodistal seta; carpus with two ventrodistal spines, dorsodistal spine half as long as propodus; propodus 1.3 times as long as carpus, without dorsal seta; dactylus with proximal seta. Pereopod 3 (Fig. 107D) similar to pereopod 2 but carpus and propodus subequal in length and 1.4 times as long as merus.

Pereopod 4 (Fig. 107E) basis stout, 2.5 times as long as wide, with two penicillate setae; ischium with ventrodistal seta as long as merus; merus shorter than carpus, with two finely-denticulate ventrodistal spines; carpus with three finely-denticulate ventrodistal spines and slender dorsodistal blunt spine; propodus 1.2 times as long as carpus, with dorsal penicillate seta, ventral rows of microtrichia, and three distal spines almost as long as dactylus; dactylus and claw subequal in length, curved, both together 1.3 times as long as propodus. Pereopod 5 (Fig. 107F) as pereopod 4, but seta on ischium longer than merus, merus and carpus subequal in length, distal setae on propodus longer than dactylus. Pereopod 6 (Fig. 107G) as pereopod 4, but basis more slender (3.25 times as long as wide), propodus with four distal finely-denticulate spines and one simple seta.

Pleopods (Fig. 107H) all alike, with naked basis, endopod shorter than exopod, both without setae on inner margin, outer margins with respectively 7 and 14 plumose setae.

Uropod (Fig. 107I) short; basis naked and with minute rounded exopodal process bearing two long and one short distal setae; endopod of one segment just longer than basis, with two penicillate setae at mid-length and array of five simple distal setae.

Male. Unknown.

Etymology. named after William George ("Billy") Bunter, a proportionately-fat schoolboy character in books written by Charles Hamilton using the pen-name Frank Richards.

Remarks. The characterizing features of this species, which distinguish it from the related genus *Tanaella*, particularly the presence of eyelobes, are described above under the generic remarks. Further, it is much less slender than species of *Tanaella.* In comparison with those species, *Inconnivus billibunteri* sp. nov. would key out to *T. mclellandi* Larsen and Heard, 2004b, in the key to the genus given by Guerrero-Kommritz & Blazewicz-Paszkowycz (2004) but the antennule is distinct, the uropods too short, the chela smaller, the propodi of pereopods 1 and 2 proportionately shorter, and pleopods are present.

Since that publication, two further species of *Tanaella* have been described. *T. kommritzia* Larsen & Shimomura, 2007(a) has much longer (and incurved) uropods, *inter alia,* and is distinctly more slender. The only species of *Tanaella* recorded from Australia, *T. dongo* Bamber, 2005, is the slenderest of the genus, and has a 2-segmented uropod. Neither, of course, has eyelobes.

Inconnivus billibunteri was collected sporadically at depths from 51 to 204 m on shelly to fine sand substrata.

Family **Mirandotanaidae** Błażewicz-Paszkowycz & Bamber, 2009

Genus ***Pooreotanais*** Błażewicz-Paszkowycz & Bamber, 2009

Pooreotanais gari Błażewicz-Paszkowycz & Bamber, 2009

Pooreotanais gari Błażewicz-Paszkowycz & Bamber, 2009, 7–11, figs 1–3.

Remarks. Pooreotanais gari was described from a male and a number of females and subadults collected from Western Port, Victoria, at depths between 13 and 18 m on a variety of substrata. The genus, and indeed the family Mirandotanaidae, is characterized by having a grossly inflated posterior half (or more) of the body, including the pleon and at least pereonite 6 (pereonites 4 to 6 in the present species). The function of this inflated posterior is unknown, but is unlikely to be related to reproduction as it is also shown by the male.

The only other species of *Pooreotanais, P. ningaloo,* is from Western Australia, and is distinct in having only pereonite 6 inflated, and the pleotelson longer than any pleonites (shorter in *P. gari*)*, inter alia.*

Family **Typhlotanaidae** Sieg, 1984

Genus ***Typhlotanais*** Sars, 1882 *sensu lato*

Typhlotanais herthio sp. nov.

Figures 108–110

Material examined. 1 ♀ (J58514), holotype, Eastern Bass Strait, 60 km E of North Point, Flinders Island, Stn BSS 32, 39°41.7'S 148°39.5'E, 115 m depth, muddy sand, 27 March 1979; coll. G.C.B. Poore; 45 ♀♀ and neuters (J58515), paratypes, Central Bass Strait, 32 km SE of Cape Otway, Stn BSS 48DN, 39°01'S 143°49'E, 81 m depth, coarse sand, 07 October 1980; coll. G.C.B. Poore; 41 ♀♀ and neuters (J58518), paratypes, Central Bass Strait, 66 km S of Rodondo Island, Stn BSS 158S, 39°48.6'S 146°18.8'E, 82 m depth, sand with silt and mud, 13 November 1981; coll. R.S. Wilson.

Description of female. Body (Fig. 108A, B) slender, holotype 2.7 mm long, 6.4 times as long as wide. Cephalothorax subrectangular, tapering towards anterior with slight triangular rostrum, 1.2 times as long as wide, about as long as pereonites 1 and 2 together, naked, eyes absent. Pereonite margins parallel, pereonite 1 shortest, 0.4 times as long as cephalothorax; pereonites 2 to 5 subequal, 0.8 times as long as cephalothorax, pereonite 6 shorter, 0.6 times as long as pereonite 5 (all pereonites respectively 2.4, 1.4, 1.4, 1.3, 1.4 and 1.7 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite 5.8 times as wide as long. Pleotelson pentangular, one-third length of pleon and twice as wide as long, with four small distal setae (Fig. 110I).

Antennule (Fig. 109A) of three articles, proximal article 5.2 times as long as wide, 1.8 times as long as distal two articles together, with row of three strong inner-dorsal setae, outer margin with tufts of one simple and two or three penicillate setae at mid-length and distally; second article nearly twice as long as wide, 0.4 times as long as third article, with single inner distal penicillate and longer simple setae; third article tapering, 0.4 times as long as first article, with five simple and one penicillate distal setae.

Antenna (Fig. 109B) of six articles, proximal article compact, naked; second article stout, as long as wide, with dorsodistal seta longer than article; third article shorter than wide, with fine dorsodistal seta; fourth article longest, ten times as long as wide, curved, with one simple and one penicillate distal setae; fifth article one-quarter as long as fourth with one distal seta; sixth article minute with four distal setae.

Labrum (Fig. 109C) rounded, hood-shaped, distally setose. Left mandible (Fig. 109D) with subtriangular pars incisiva and wide, crenulate lacinia mobilis, right mandible (Fig. 109E) without lacinia mobilis; pars molaris of both mandibles with strong, rounded tooth-like protrusions around distal margin. Labium (Fig. 109H) simple, finely setose on outer margins. Maxillule (Fig. 109F) with eight distal spines, palp (Fig. 109F') with two distal setae. Maxilla (Fig. 109G) ovoid, naked. Maxilliped palp (Fig. 109I) first article naked, second article with one outer and three inner setae, distal of these finely denticulate in distal half; third article with four inner setae in distal half of article, two of these finely denticulate in distal half; fourth article with five inner to distal setae, four of these finely denticulate in distal half, and one outer subdistal seta; basis with single, long seta reaching distal margin of endites; endites distally with two setae and two slight tubercles, outer distal margin slightly denticulate. Epignath (Fig. 109J) elongate, linguiform, naked.

Cheliped (Fig. 110A) with rounded basis reaching pereonite 1 ventrally, 1.2 times as long as wide, with single dorsodistal seta; merus subtriangular with single ventral seta; carpus elongate, three times as long as wide, with two midventral setae of markedly unequal length, one fine ventrodistal seta, and row of eight setae along dorsal margin; propodus slender, curved, twice as long as wide, fixed finger 0.73 times as long as palm, with two ventral setae, three setae on cutting edge; dactylus with fine proximal seta.

Pereopod 1 (Fig. 110B) longer than others, coxal apophysis large, triangular, pointed, with seta; basis arcuate, slender, nearly six times as long as wide, with six simple setae along dorsal margin; ischium compact, with ventral seta two-thirds as long as merus; merus 0.4 times as long as basis, with three simple distal setae; carpus just shorter than merus with distal crown of eight simple setae; propodus 1.5 times as long as carpus, with three dorsal subdistal setae, longer ventral subdistal seta; short, stout dactylus with proximal seta longer than dactylus, slender unguis 2.6 times as long as dactylus, both together 0.9 times as long as propodus. Pereopod 2 (Fig. 110C), coxa similar to that of pereopod 1, basis 3.3 times as long as wide, with midventral seta and eight setae along dorsal margin; ischium with seta only half as long as merus; merus 0.25 times as long as basis, with single dorsal and two ventral distal simple setae, and dense field of microtrichia across ventral and ventrolateral surfaces in distal two-thirds; carpus 1.4 times as long as merus, with distal crown of eight setae and dense field of microtrichia across ventral and ventrolateral surfaces in distal two-thirds; propodus 1.6 times as long as carpus, with two dorsal subdistal setae, longer ventral subdistal

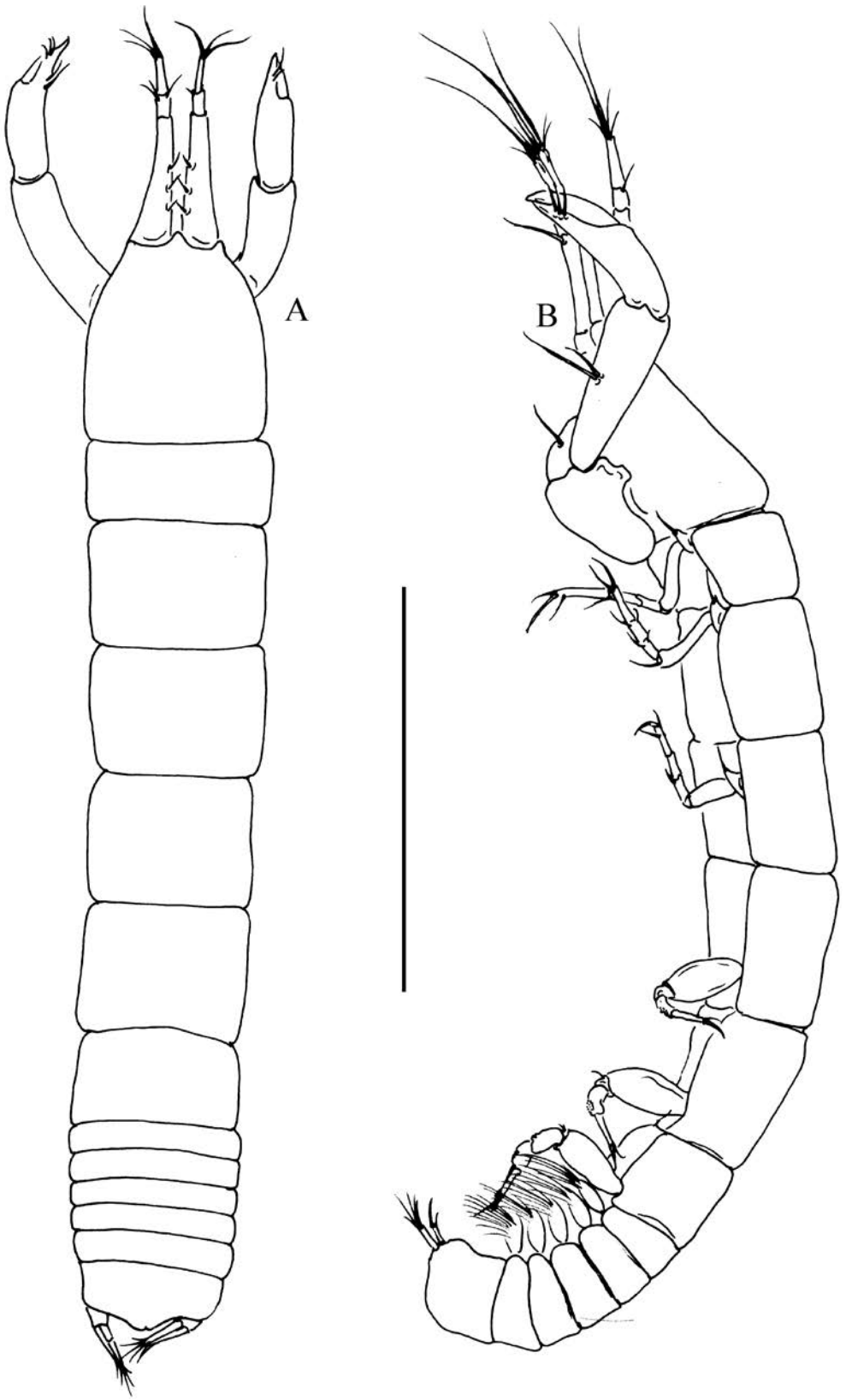

Fig. 108. *Typhlotanais herthio* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1.0 mm.

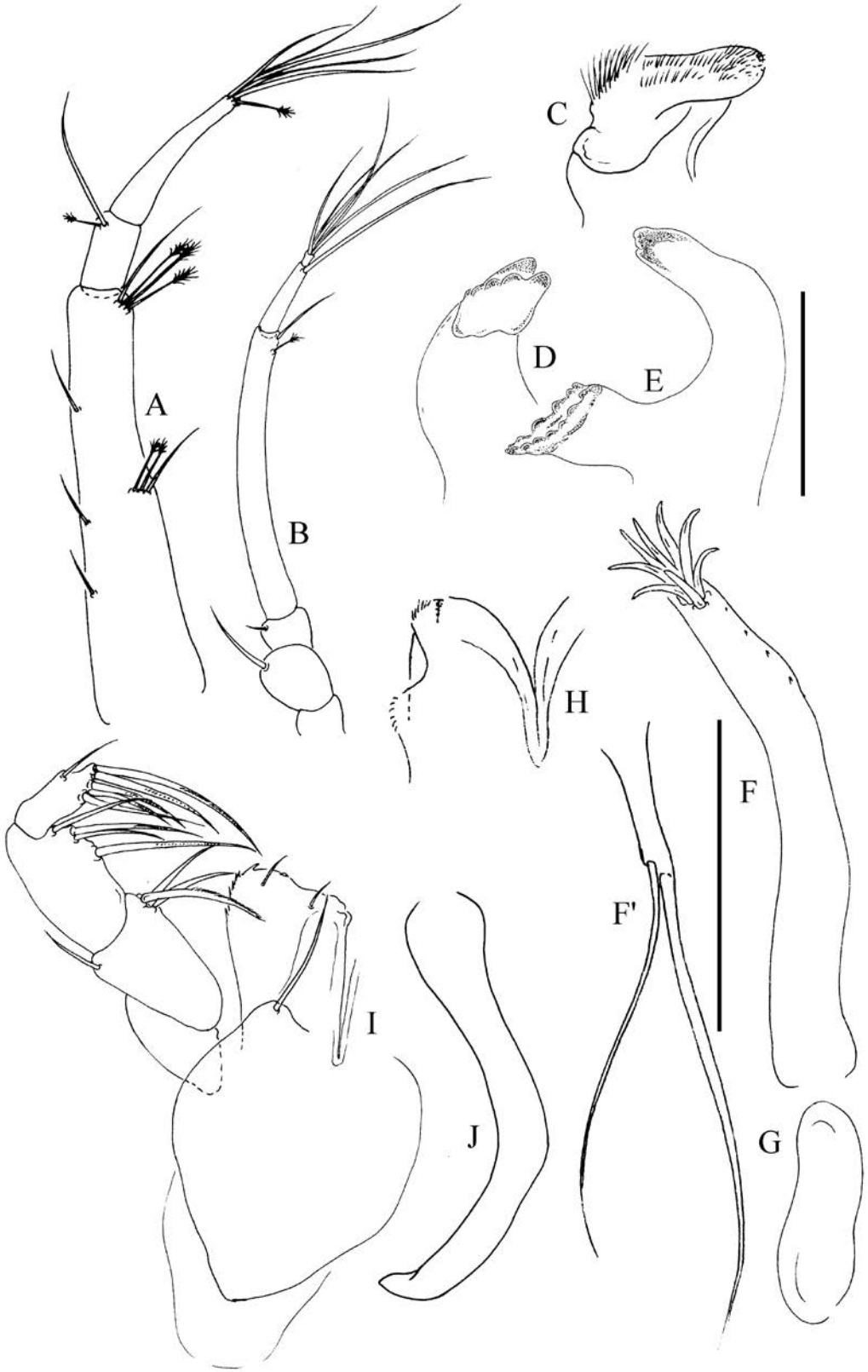

Fig. 109. *Typhlotanais herthio* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule endite; F' maxillule palp; G, maxilla; H, labium; I, maxilliped; J, epignath. Scale = 0.1 mm.

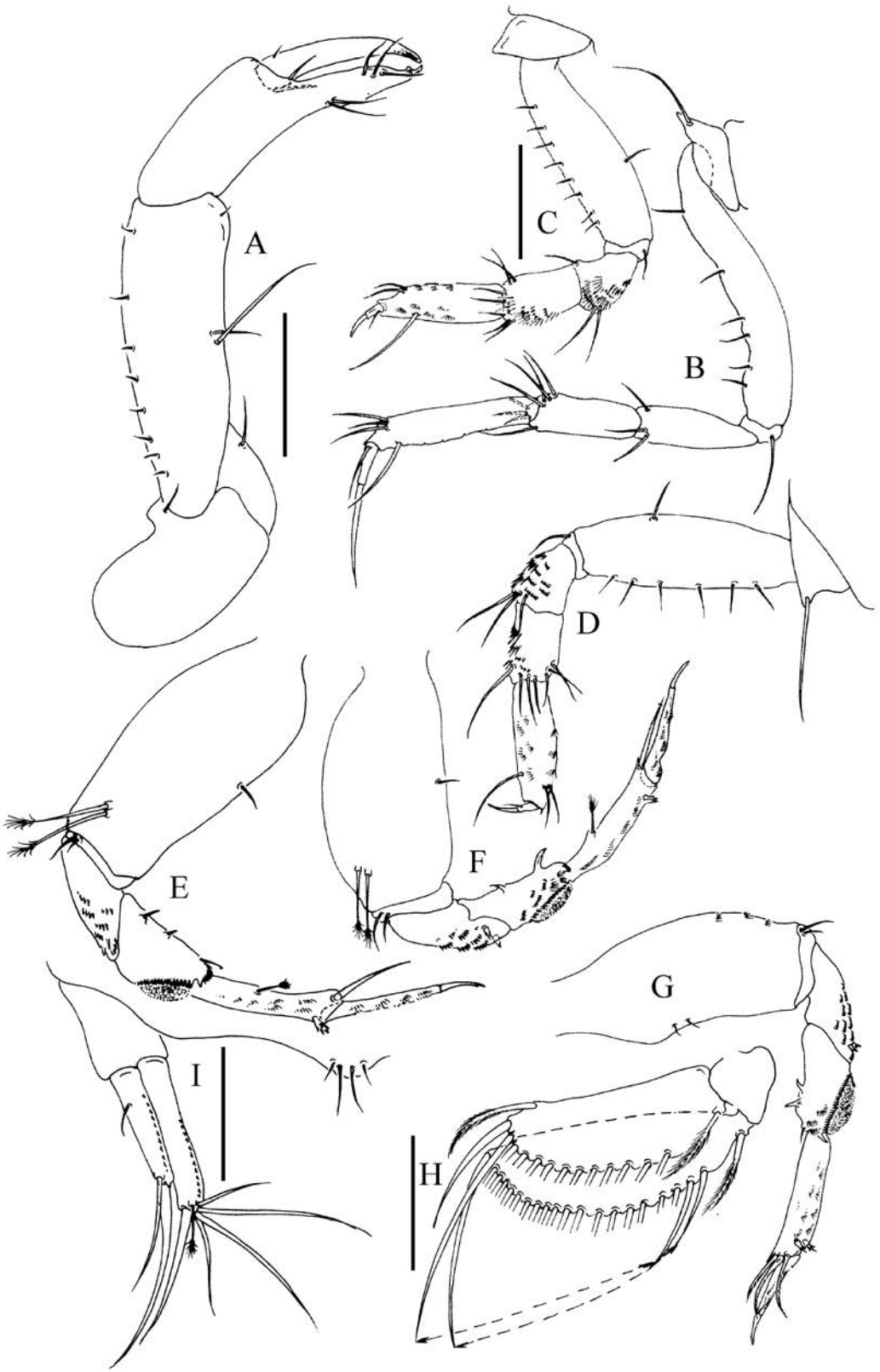

Fig. 110. *Typhlotanais herthio* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod-6. Scale = 0.1 mm.

seta, and fields of microtrichia; short, stout dactylus with proximal seta longer than dactylus, slender unguis longer than dactylus, both together 0.4 times as long as propodus. Pereopod 3 compact (Fig. 110D), similar to pereopod 2, basis with six dorsal marginal setae; merus with three ventrodistal setae.

Pereopod 4 (Fig. 110E) basis stout, 2.1 times as long as wide, with simple mid-dorsal seta and two penicillate setae near ventrodistal corner; ischium with two ventrodistal setae; merus 0.8 times as long as carpus, with field of microtrichia across ventral and ventrolateral surfaces in distal two-thirds, and two small ventrodistal spines; carpus with robust distal molar spine, two simple mid-dorsal and one dorsodistal setae, and "prickly tubercle" (*sensu* Błażewicz-Paszkowycz, 2007) surrounded by minute spines in ventrodistal half; propodus 1.5 times as long as carpus, with fields of microtrichia, mid-dorsal penicillate seta, strong dorsodistal seta, and two ventrodistal dentiform spines; dactylus slender, with fields of microtrichia, three times as long as curved unguis, both together longer than propodus. Pereopod 5 (Fig. 110F) as pereopod 4, but carpus with mid-dorsal and dorsodistal spines. Pereopod 6 (Fig. 110G) as pereopod 5, but basis without penicillate setae, propodus with three dorsodistal setae.

Pleopods (Fig. 110H) all alike, with naked basis, exopod shorter than endopod; endopod and exopod without setae on inner margin, outer margins with respectively 15 and 21 plumose setae, proximal seta on both rami separated from others.

Uropod (Fig. 110I) biramous, basis naked; exopod and endopod of one segment, exopod shorter than endopod, with one fine proximal, one slender and one stouter distal setae; endopod with four slender, one stouter and one penicillate distal setae.

Male. Unknown.

Etymology. From the Anglo-Saxon *haer* – hairy, and *thioh* – the thigh, alluding to the density of dorsal marginal setae on the bases of the anterior pereopods, which distinguish this species most evidently from the other species of the *greenwichensis*-group of *Typhlotanais sensu lato*; noun in apposition

Remarks. With the pronounced coxal spurs on the anterior pereopods, the curving carpus-propodus and the dorsal marginal spines on the carpus of the cheliped, and the prickly tubercles on the posterior carpi, this species fits into the "*greenwichensis*-group" of Błażewicz-Paszkowycz (2007). The two described species of this group are *T. greenwichensis* Shiino, 1970, from the Antarctic-Subantarctic, and *T. messinensis* Sars, 1882 from the Mediterranean.

Typhlotanais greenwichensis differs from *T. herthio* sp. nov. in being more elongate (nearly seven times as long as wide), with a less-slender proximal article to the antennule (four times as long as wide), and, most obviously, has only a few dorsal marginal setae on the pereopods 1 to 3 (4, 4 and 3 respectively). *T. messinensis* is quite distinct in having a more compact proximal peduncle article to the antennule (three times as long as wide), and two-segmented rami on the uropods.

Typhlotanais herthio was collected sporadically through the Bass Strait, from sandy substrata at depths between 81 and 115 m.

Genus ***Antiplotanais*** Bamber, 2008

Antiplotanais actuarius sp. nov.

Figures 111–113

Material examined. 1 ♀ (J58529), holotype, Western Bass Strait, 26 km SW of Cape Otway, Stn BSS 120, 39°01.0'S 143°22.1'E, 84 m depth, medium sand, 31 January 1981; coll. M.F. Gomon; 1 ♀ (J56616), paratype, Southern Port Phillip Bay, Stn PPBES 985, 38°21.0'S 144°51.5'E, 9 m depth, sand, 09 December 1971; coll. G.C.B. Poore & S.F. Rainer.

Description of female. Body (Fig. 111A, B) compact, holotype 1.7 mm long, 4.5 times as long as wide. Cephalothorax subrectangular, tapering towards anterior with slight triangular rostrum, as long as wide, longer than pereonites 1 to 3 together, naked, eyes absent. Pereonite 1 shortest, 0.2 times as long as cephalothorax; pereonites 2 to 5 progressively longer, pereonite 2 being 1.4 times as long as pereonite 1, pereonite 5 being twice as long as pereonite 1; pereonite 6 as long as pereonite 4 (all pereonites respectively 4.5, 3.3, 2.8, 2.5, 2.1 and 2.4 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite 3.7 times as wide as long. Pleotelson pentangular, one-third length of pleon and 1.6 times as wide as long, with four small dorso-distal setae.

Antennule (Fig. 112A) of three articles, proximal article 1.9 times as long as wide, 2.4 times as long as distal two articles together, with row of five inner setae, outer margin with proximal and mid-length tufts penicillate setae, one simple seta at mid-length and two distally; second article nearly twice as wide as long, 0.6 times as long as third article, with single inner distal penicillate and longer simple setae and outer distal simple seta; third article tapering, 0.25 times as long as first article, with six simple and one penicillate distal setae.

Antenna (Fig. 112B) of six articles, proximal article compact, naked; second article stout, as long as wide, with dorsodistal seta much shorter than article; third article shorter than wide, with fine dorsodistal seta; fourth article longest, nearly five times as long as wide, with one simple and three penicillate distal setae; fifth article 0.4 times as long as fourth with one distal seta; sixth article minute with five distal setae.

Labrum (not figured) rounded, hood-shaped, distally setose. Left mandible (Fig. 112C) with subtriangular pars incisiva and linguiform, crenulate lacinia mobilis, right mandible (Fig. 112D) without lacinia mobilis but with wider, rounded pars incisiva; pars molaris of both mandibles stout with few (two or three) large, pointed, tooth-like protrusions on distal margin. Labium (Fig. 112G) simple, finely setose on outer and distal margins. Maxillule (Fig. 112E) with eight distal spines, palp with two distal setae. Maxilla not recovered. Maxilliped palp (Fig. 112F) first article naked, second article with one outer and three inner setae, at least one of these finely denticulate in distal half; third article with four inner setae in distal half of article, two of these finely denticulate in distal half; fourth article with five inner to distal setae, four of these finely denticulate in distal half, and one outer subdistal seta; basis with single, long seta exceeding distal margin of endites; endites distally with two setae and two distinct tubercles, and microtrichia. Epignath (Fig. 112H) elongate, linguiform, naked.

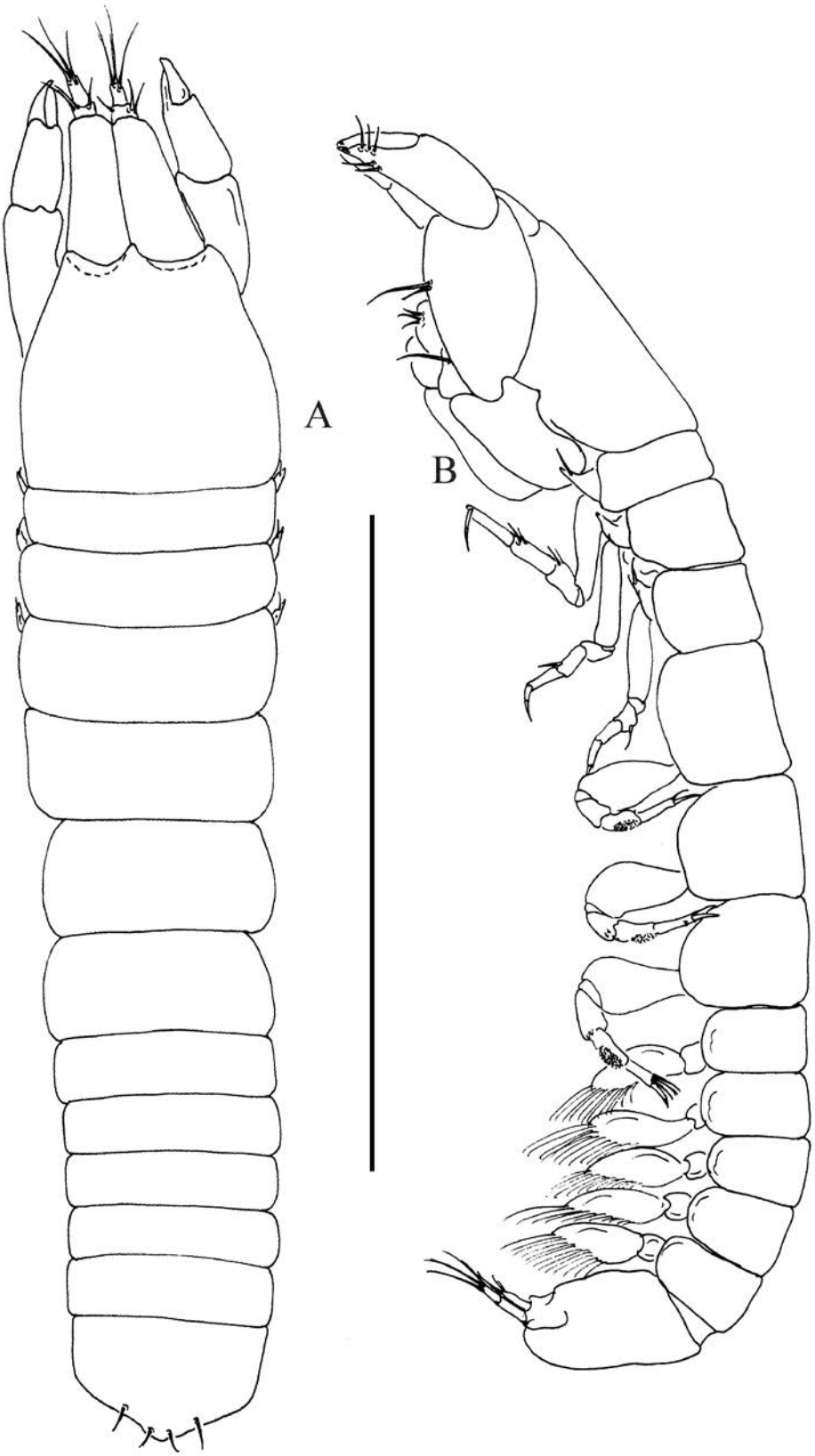

Fig. 111. *Antiplotanais actuarius* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1 mm.

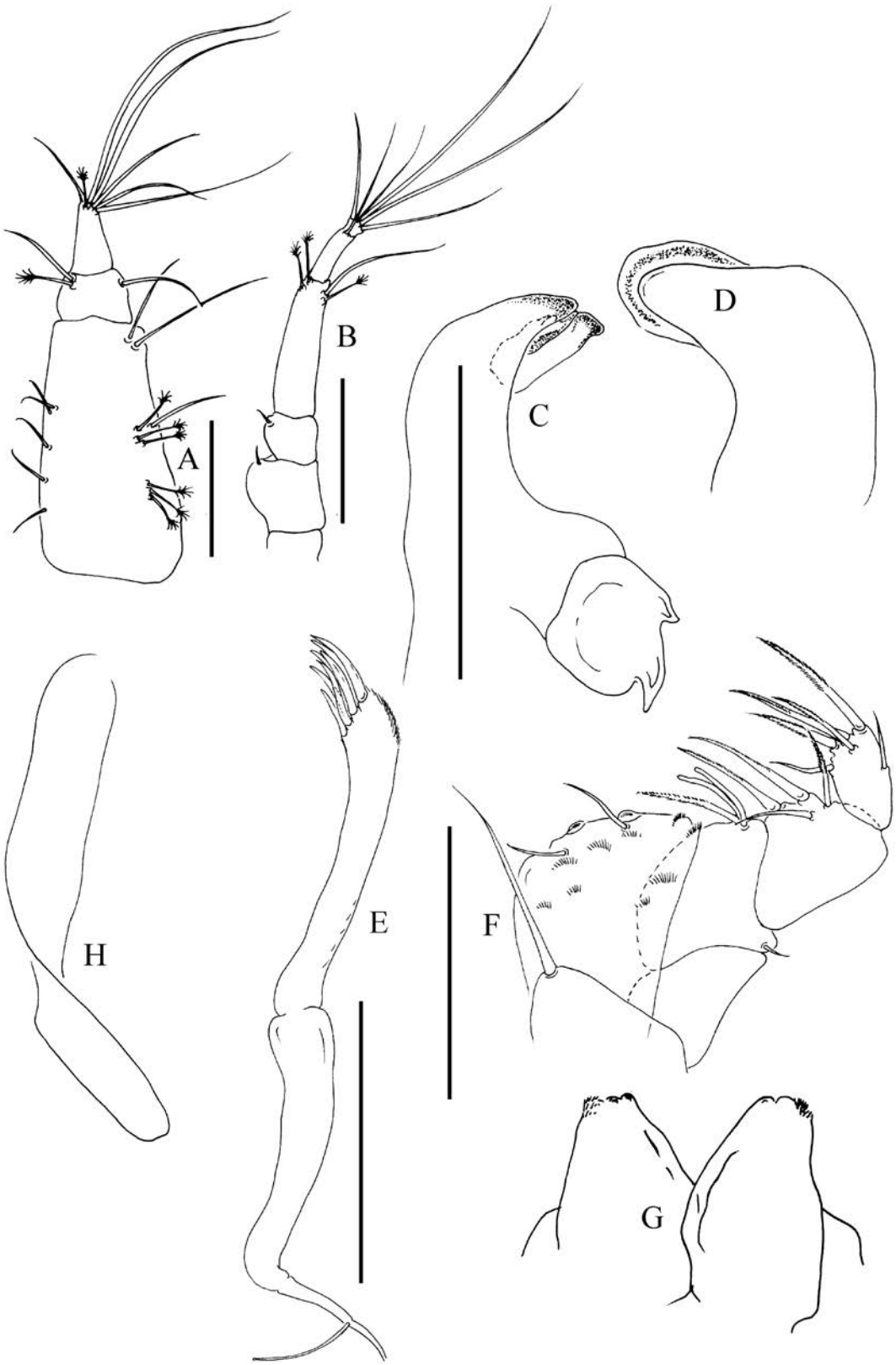

Fig. 112. *Antiplotanais actuarius* sp. nov., female paratype. A, antennule; B, antenna; C, left mandible; D, right mandible; E, maxillule; F, maxilliped; G, labium; H, epignath. Scale = 0.1 mm.

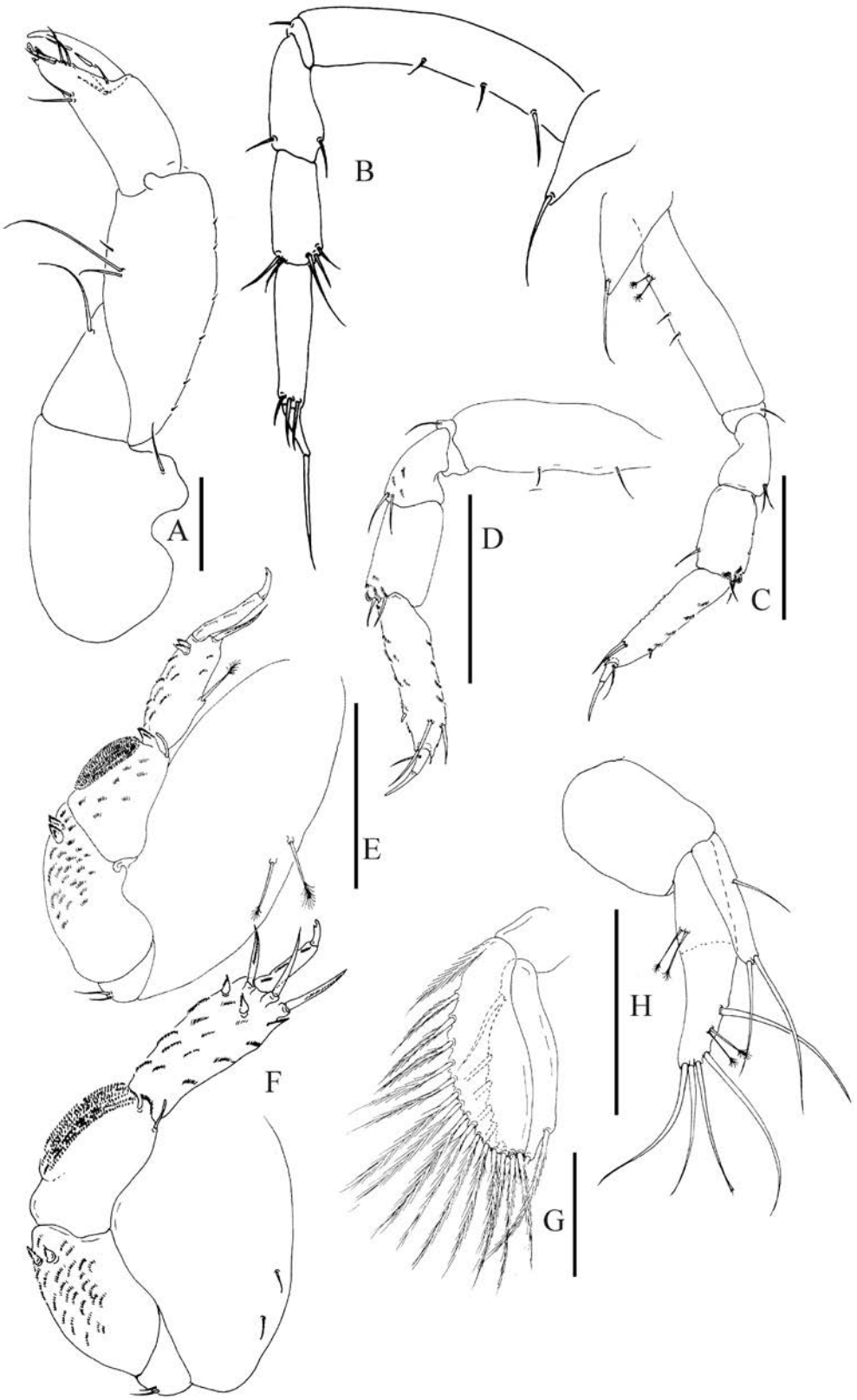

Fig. 113. *Antiplotanais actuarius* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

Cheliped (Fig. 113A) with rounded basis reaching pereonite 1 ventrally, 1.65 times as long as wide, with single dorsodistal seta; merus subtriangular with single ventral seta; carpus elongate, 2.5 times as long as wide, with three midventral setae very unequal in length, and row of six minute setae along dorsal margin; propodus slender, curved, 1.5 times as long as wide, fixed finger 0.7 times as long as palm, with two ventral setae, three setae on cutting edge; dactylus naked.

Pereopod 1 (Fig. 110B) longer than others, coxal apophysis large (evident dorsally on whole animal, see Fig. 108A), triangular, pointed, with seta; basis curved, 4.6 times as long as wide, with three simple setae along dorsal margin; ischium compact, with short ventral seta; merus 0.4 times as long as basis, with one dorsal and one ventral simple distal setae; carpus as long as merus with three dorsal and two ventral simple distal setae; propodus 1.4 times as long as carpus, with three distal setae; short, naked dactylus half as long as slender unguis, both together 1.2 times as long as propodus. Pereopod 2 (Fig. 113C), coxa similar to that of pereopod 1, basis 3.7 times as long as wide, with two setae on dorsal margin; ischium with single seta; merus 0.4 times as long as basis, ventrodistally with two simple setae; carpus 1.1 times as long as merus, with one dorsodistal seta, ventrodistally with two simple setae and field of microtrichia; propodus 1.6 times as long as carpus, with two dorsal subdistal setae, shorter ventral subdistal seta, and fields of microtrichia; short, stout dactylus with proximal seta longer than dactylus, slender unguis longer than dactylus, both together 0.4 times as long as propodus. Pereopod 3 compact (Fig. 113D), similar to pereopod 2, basis with two simple setae on dorsal margin; ischium with single seta; merus ventrodistally with two simple setae and field of microtrichia; carpus ventrodistally with two simple setae and field of microtrichia; propodus with two dorsal subdistal setae, shorter ventral subdistal seta, and fields of microtrichia; short, stout dactylus with proximal seta longer than dactylus, slender unguis longer than dactylus.

Pereopod 4 (Fig. 113E) basis stout, 2.2 times as long as wide, with two penicillate setae mid-ventrally; ischium with two ventrodistal setae; merus 1.1 times as long as carpus, with field of microtrichia across ventral and ventrolateral surfaces in distal two-thirds, and two small ventrodistal spines; carpus with robust distal molar spine, one dorsodistal blunt seta, and "prickly tubercles" (*sensu* Błażewicz-Paszkowycz, 2007) surrounded by minute spines in ventrodistal half; propodus as long as carpus, with fields of microtrichia, mid-dorsal penicillate seta, simple dorsodistal seta, and two small ventrodistal spines; dactylus slender, with fields of microtrichia, three times as long as curved unguis, both together 0.9 times as long as propodus. Pereopod 5 (not figured) as pereopod 4. Pereopod 6 (Fig. 113F) as pereopod 4, but basis with simple setae, propodus with three dorsodistal setae finely denticulate in their distal half.

Pleopods (Fig. 113G) all alike, with naked basis, exopod shorter than endopod; endopod and exopod without setae on inner margin, outer margins with respectively 9 and 16 plumose setae, proximal seta on both rami separated from others.

Uropod (Fig. 113H) biramous, basis naked; exopod half as long as endopod, with one fine proximal, one shorter and one longer distal setae; endopod with residual (atrophied) articulation line, with two penicillate setae just proximal to this line, one subdistal and four distal simple setae and two subdistal penicillate.

Male. Unknown.

Etymology. From the Latin *actuarius* – a shorthand writer, a pun referring to the shorter chela ("hand") in proportion to the cheliped carpus in this species when compared with the other two described species of *Antiplotanais.*

Remarks. The genus *Antiplotanais* shares with the *Typhlotanais greenwichensis*-group (see above) the conspicuous coxal apophyses on the anterior pereopods, and prickly tubercles on the carpi of the posterior pereopods. It differs in the much more compact antennule and antenna, the proportionately shorter habitus (all less than 6 times as long as wide with all pereonites at least twice as wide as long), the relatively long pleonites, the presence of dorsal or dorsodistal setae on the pleotelson, the stouter dactyli on the posterior pereopods and the presence of distal lobes on the mandibular pars molaris.

There were two described species of *Antiplotanais, A. coochimudlo* Bamber, 2008, from off Brisbane, Queensland, and *A. lutze* (Bamber, 2005), from Esperance Bay, Western Australia. *Antiplotanais actuarius* sp. nov. differs from the other two particularly in the presence of dorsal setae on the bases of the anterior pereopods, in the cephalothorax being no longer than wide, and in the proportionately-shorter cheliped propodus (including the fixed-finger), being 0.64 times as long as the carpus compared with 0.85 times in *A. coochimudlo* and the same length in *A. lutze*. All three species are from sandy substrata in shallow waters off Australia.

Bamber (2008) remarked that the dactyli and ungues of the posterior pereopods appeared to be fused; it is evident from the present material that this is not the case. The posterior ungues are distinct but very short, and confirmed by re-examination of paratypic material of *A. lutze,* so evidently missed in the examination of the previous material of this genus of very small animals.

Antiplotanais actuarius was recorded only twice, from Port Phillip Bay and the Western Bass Strait at 9 and 24 m respectively, on sandy substrata.

Genus ***Hamatipeda*** Błażewicz-Paszkowycz, 2007

Hamatipeda sima sp. nov.

Figures 114–116

Material examined. 1 ♀ (J58901), holotype, 4 ♀♀ (J58902), paratypes, Eastern Bass Strait, 85 km NE of North Point, Flinders Island, Stn BSS 169S, 39º02.4'S 148º30.6'E, 120 m depth, sandy-mud, 15 November 1981; coll. R.S. Wilson.

Description of female. Body (Fig. 114A, B) elongate, slender, holotype 3.9 mm long, 13 times as long as wide. Cephalothorax subrectangular, tapering towards anterior with slight triangular rostrum, 1.4 times as long as wide, naked, eyes absent. All pereonites with parallel sides, all but the sixth longer than wide: pereonite 1 as long as cephalothorax; pereonites 2 and 4 subequal, 1.5 times as long as cephalothorax; pereonite 3 longest,

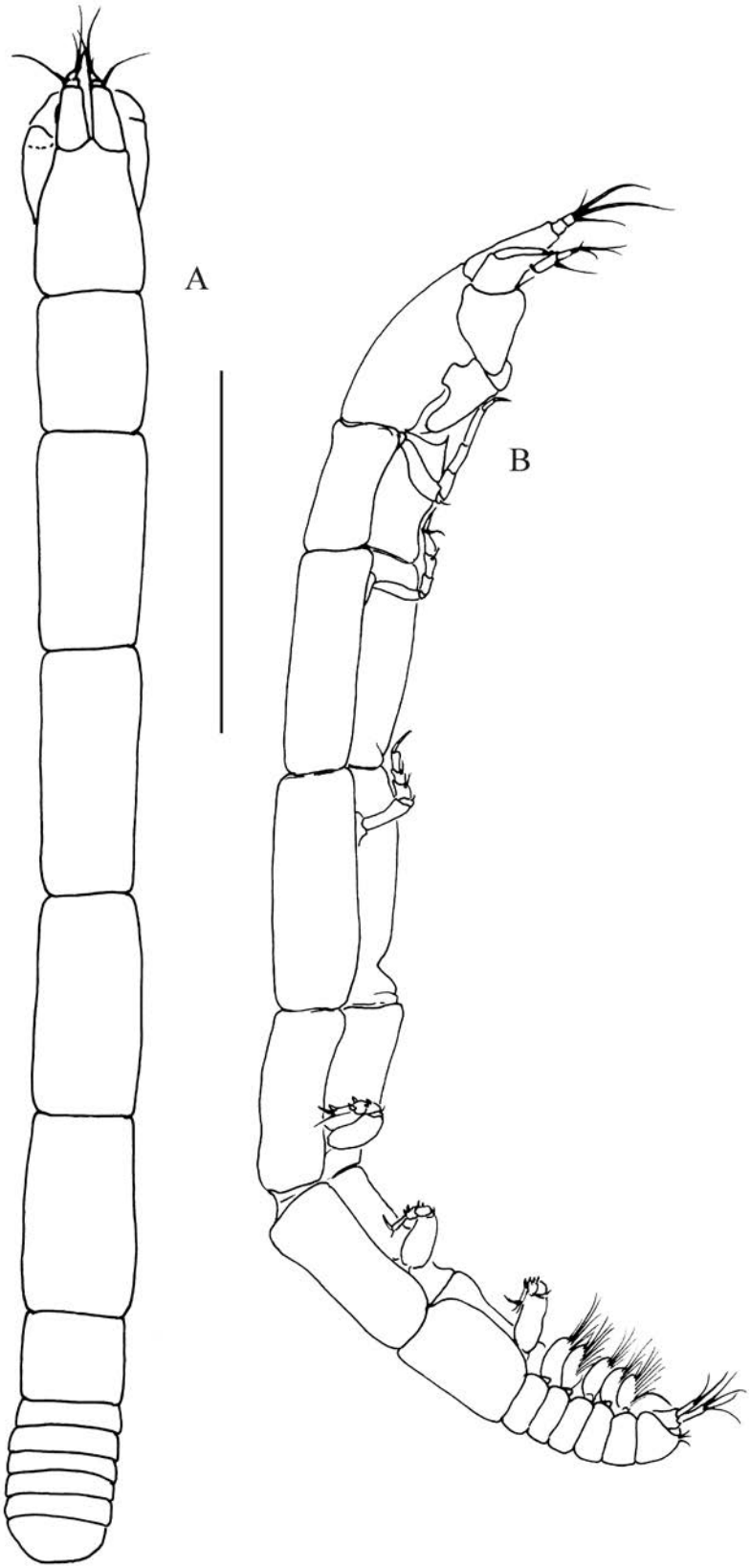

Fig. 114. *Hamatipeda sima* sp. nov. female holotype. A, dorsal view; B, lateral view. Scale = 1 mm.

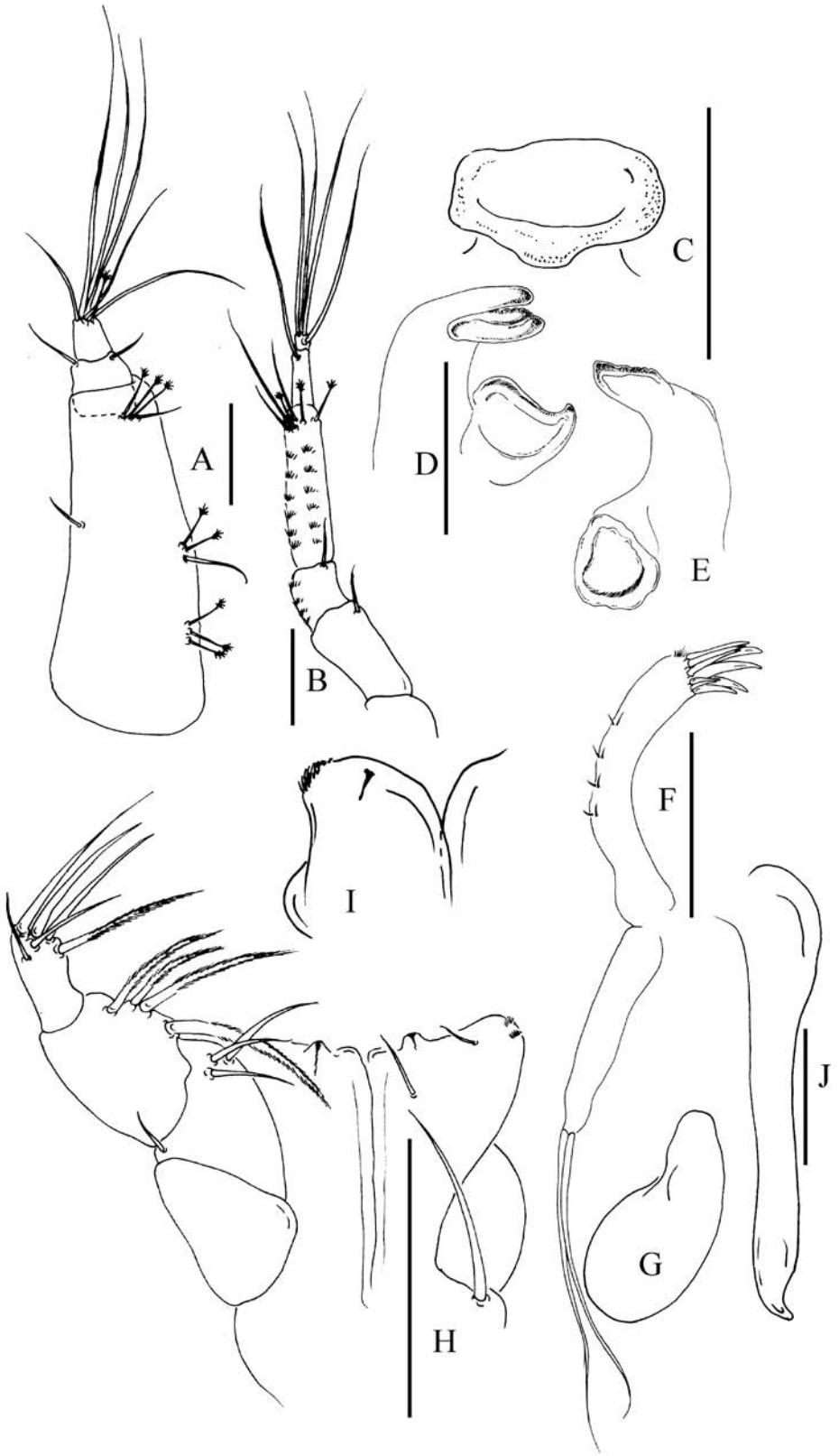

Fig. 115. *Hamatipeda sima* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule; G, maxilla; H, maxilliped; I, labium; J, epignath. Scale = 0.1 mm.

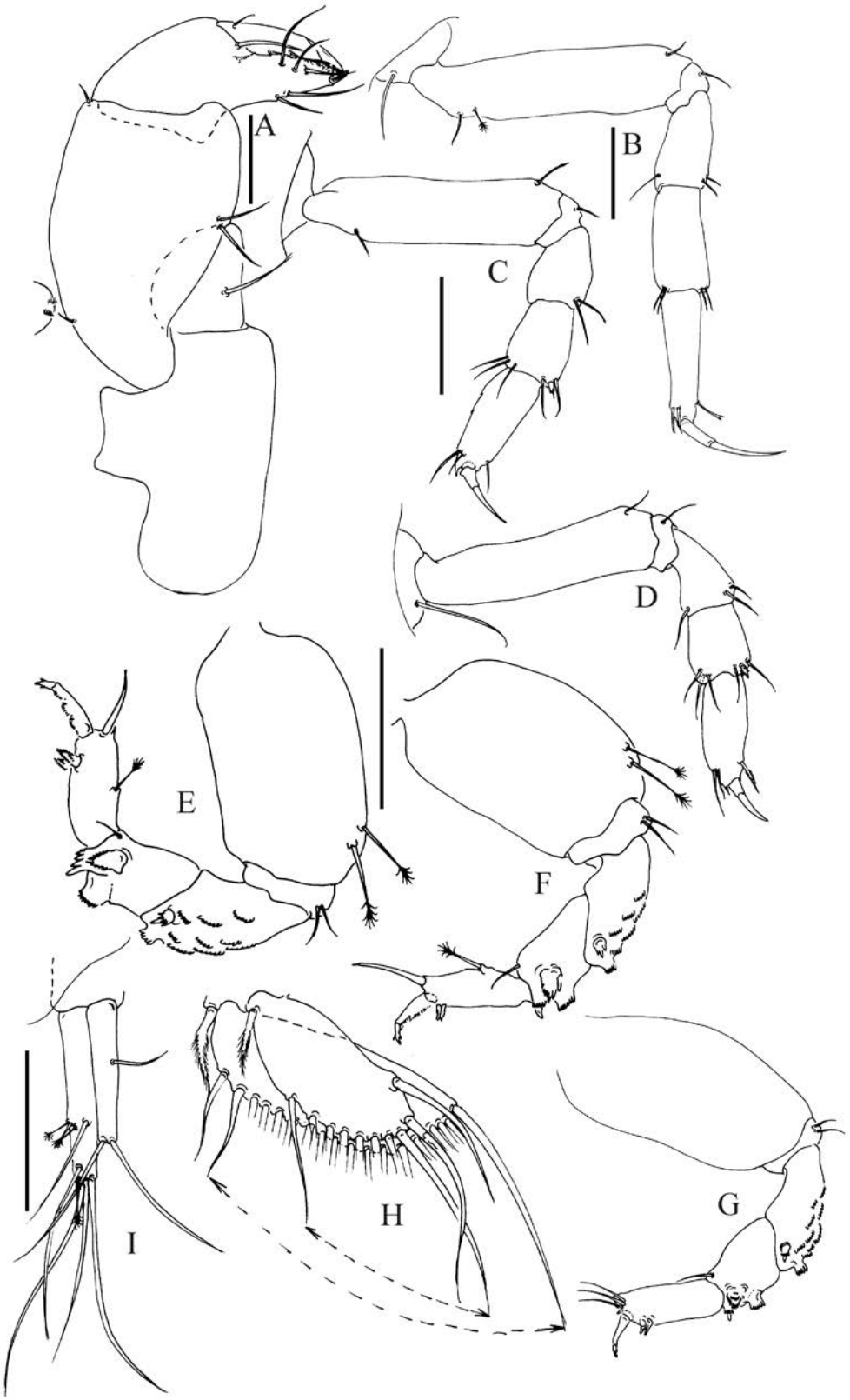

Fig. 116. *Hamatipeda sima* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

1.75 times as long as cephalothorax; pereonite 5 shorter than pereonite 4, 1.4 times as long as cephalothorax; pereonite 6 shortest, 0.6 times as long as cephalothorax (all pereonites respectively 0.8, 0.5, 0.4, 0.5, 0.6 and 1.1 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite 4.8 times as wide as long. Pleotelson semicircular, twice as long as each pleonite and 1.9 times as wide as long, with four small distal setae.

Antennule (Fig. 115A) of three articles, proximal article stout, 2.7 times as long as wide, five times as long as distal two articles together, with one simple inner seta, outer margin with tufts of two or three penicillate setae proximally, at mid-length and distally, the last two tufts also with one simple seta; second article nearly as long as wide, attached within invagination of proximal article but as long as third article, with single outer and inner simple setae; third article tapering, 1.4 times as long as wide, with six simple and one penicillate distal setae.

Antenna (Fig. 115B) of six articles, proximal article compact, naked; second article twice as long as wide and twice as long as first article, with dorsodistal seta; third article as long as wide, as long as first article, with dorsodistal seta and ventral microtrichia; fourth article longest, five times as long as wide, with fields of microtrichia, and distal crown of three simple and three penicillate setae; fifth article one-quarter as long as fourth with one distal seta; sixth article minute with four distal setae.

Labrum (Fig. 115C) rounded, hood-shaped, distally very-finely setose. Left mandible (Fig. 115D) with subtriangular pars incisiva and linguiform, bilobed lacinia mobilis, right mandible (Fig. 115E) without lacinia mobilis but with longer cutting edge on pars incisiva; pars molaris of both mandibles with strong, smooth distal margin. Labium (Fig. 115I) simple, finely setose on outer margins. Maxillule (Fig. 115F) with eight distal spines, rows of microtrichia on outer margin of endite, palp with two distal setae. Maxilla (Fig. 115G) ovoid, naked. Maxilliped palp (Fig. 115H) first article naked, second article with one outer and three inner setae; third article with one robust and three shorter inner setae, all finely denticulate in distal two-thirds; fourth article with five inner to distal setae, proximal of these finely denticulate in distal half, and one outer subdistal seta; basis with single, long seta not reaching distal margin of endites; endites distally with two setae and non-articulate tubercle. Epignath (Fig. 115J) elongate, linguiform, naked.

Cheliped (Fig. 116A) with rounded basis not reaching pereonite 1 ventrally, twice as long as wide; merus subtriangular with single ventral seta; carpus stout, 1.5 times as long as wide, with two midventral setae, one fine dorsoproximal seta, and one dorsodistal seta; propodus palm just longer than wide, fixed finger 0.85 times as long as palm, with two ventral setae, three setae on cutting edge, cutting edge finely denticulate; dactylus with fine proximal seta.

Pereopod 1 (Fig. 116B) longer than others, coxal without apophysis, with seta; basis straight, 4.3 times as long as wide, with one simple and one penicillate dorsoproximal setae and one ventrodistal seta; ischium compact, with ventral seta; merus one-third as long as basis, with two ventrodistal and one dorsodistal simple setae; carpus just longer than merus with two ventrodistal and two dorsodistal simple setae; propodus 1.3 times as long as carpus, with two dorsal subdistal setae and one ventral subdistal seta; dactylus half as long as slender unguis, both together 0.9 times as long as propodus. Pereopod 2 (Fig. 116C), coxa similar to pereopod 1, basis 4.1 times as long as wide without dorsoproximal penicillate seta; merus 0.25 times as long as basis, without dorsodistal seta; carpus with three dorsodistal and three ventrodistal setae and small ventrodistal spine; propodus 1.5 times as long as carpus, with two dorsal subdistal setae and one ventral subdistal seta; short, stout dactylus half as long as unguis, both together 0.7 times as long as propodus. Pereopod 3 compact (Fig. 116D), similar to pereopod 2, merus with dorsodistal seta.

Pereopod 4 (Fig. 116E) basis stout, 1.8 times as long as wide, with two penicillate setae near ventrodistal corner; ischium with two ventrodistal setae; merus 1.4 times as long as carpus, with field of microtrichia across ventral and ventrolateral surfaces in distal two-thirds, and two dentiform ventrodistal spines; carpus with three dentiform hook-like ventrodistal spines and dorsodistal seta; propodus 1.25 times as long as carpus, with mid-dorsal penicillate seta, strong dorsodistal seta, and two ventrodistal dentiform spines; dactylus slender, with fields of microtrichia, four times as long as curved unguis, unguis distally trifurcate, both together 0.65 times as long as propodus. Pereopod 5 (Fig. 116F) as pereopod 4. Pereopod 6 (Fig. 116G) as pereopod 4, but basis without penicillate setae, propodus with three dorsodistal setae.

Pleopods (Fig. 116H) all alike, with naked basis, exopod shorter than endopod; endopod and exopod without setae on inner margin, outer margins with respectively 11 and 20 plumose setae, proximal seta on both rami separated from others.

Uropod (Fig. 116I) biramous, basis naked; exopod and endopod of one segment, exopod shorter than endopod, with one fine proximal and two distal setae; endopod with one simple and two penicillate setae just distal of mid-length, distally with four simple and one penicillate setae.

Male. Unknown.

Etymology. From the Greek *simos*, meaning "snub-nosed", alluding to the characteristic very short distal antennular articles of the present species.

Remarks. The distinctive genus *Hamatipeda* is characterized by the very elongate body, with pereonites 1 to 5 longer than wide and as long as (pereonite 1) or longer than the cephalothorax, and the specialized dentiform hook-like spines on the carpus of the posterior pereopods, *inter alia*. *H. sima* sp. nov. is entirely typical of the genus.

Of the two previously described species, *Hamatipedia trapezoida* Błażewicz-Paszkowycz, 2007, is distinct in having trapezoidal pereonites which are narrower posteriorly than anteriorly, while *H. longa* (Kudinova-Pasternak, 1975) is distinct in having a two-segmented uropod endopod. Both have a more slender cheliped carpus, more slender posterior pereopod bases, lack distinctive tubercles on the maxilliped endites, and have a much longer distal antennule article than the present species, more than twice (*H. trapezoida*) or three times (*H. longa*) as long as wide, compared with less than 1.5 times as long as wide in *H. sima*.

Hamatipeda sima is known only from the type-locality off Tasmania (see above).

Genus ***Paratyphlotanais*** Kudinova-Pasternak & Pasternak, 1978

Paratyphlotanais colouros sp. nov.

Figures 117–119

Material examined. 1 ♀ (J58551), holotype, 3 ♀♀ (J58552), paratypes, Eastern Bass Strait, 82 km ENE of North Point, Flinders Island, Stn BSS36, 39°27.7'S 148°51.4'E, 293 m depth, coarse sand, 28 March 1979; coll. G.C.B. Poore; 1 ♀ (J58553), paratype, Eastern Bass Strait, 67 km ENE of North Point, Flinders Island, Stn BSS38, 39°22.4'S 148°38.7'E, 73 m depth, coarse sand, 29 March 1979; coll. G.C.B. Poore; 2 ♀♀ (J58554), paratypes, Central Bass Strait, 44 km NE of Cape Wickham, King Island, Stn BSS203, 39°22.0'S 144°18.3'E, 60 m depth, coarse sand, 23 November 1981; coll. R.S. Wilson.

Description of female. Body (Fig. 117A, B) relatively slender, holotype 1.6 mm long, 6.4 times as long as wide. Cephalothorax subrectangular, tapering towards anterior with slight triangular rostrum, 1.5 times as long as wide, naked, eyes absent. Pereonites wider than long, ventrally with anteriorly-pointed hyposphenia on pereonites 1 to 3; pereonite 1 shortest, 0.12 times as long as cephalothorax; pereonite 2 parallel-sided, 2.4 times as long as pereonite 1; pereonite 3 with convex margins, 1.3 times as long as pereonite 2; pereonites 4 and 5 subequal, twice as long as pereonite 2; pereonite 6 as long as pereonite 3 (all pereonites respectively 5.8, 2.5, 1.9, 1.3, 1.3 and 1.7 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite four times as wide as long. Pleotelson pentangular, as long as last two pleonites together and 1.6 times as wide as long, with four small distal setae.

Antennule (Fig. 118A) stout, proximal article 1.7 times as long as wide, 1.2 times as long as distal two articles together, with four simple setae along inner margin, outer margin with one simple seta at mid-length and two penicillate and one simple setae distally; second article shorter than wide, one-quarter as long as first article, with one outer simple seta and single inner penicillate and longer simple distal setae; third article tapering, 2.5 times as long as second article, with five simple and one penicillate subdistal setae adjacent to apical spur *sensu* Bird (2004).

Antenna (Fig. 118B) of six articles, proximal article compact, naked; second article as long as wide, with dorsodistal seta; third article shorter than wide, 0.6 times as long as second article, with dorsodistal seta; fourth article longest, four times as long as third article and four times as long as wide, curved, with three simple and one penicillate distal setae; fifth article half as long as fourth article with one distal seta; sixth article minute with four distal setae.

Labrum (Fig. 118C) rounded, hood-shaped, marginally setose. Left mandible (Fig. 118D) with bilobed, crenulate pars incisiva and wide, crenulate lacinia mobilis, right mandible (Fig. 118E) similar but without lacinia mobilis; pars molaris of both mandibles with strong, rounded marginal tubercles. Labium (Fig. 118H) simple, finely setose on outer and inner-distal margins. Maxillule (Fig. 118F) with eight distal spines, palp not recovered. Maxilla not recovered. Maxilliped palp (Fig. 118G) first article naked, second article with one outer and three inner setae; third article with four inner setae in distal half of article; fourth article with five inner to distal setae and one outer subdistal seta; basis with single, long seta reaching past distal margin of endites; endites distally with one seta and slight tubercle, outer distal margin denticulate. Epignath (Fig. 118I) elongate, linguiform, naked.

Cheliped (Fig. 119A) basis not reaching back to anterior of pereonite 1 ventrally, 1.7 times as long as wide, with single dorsodistal seta; merus subtriangular with three ventral setae; carpus 2.2 times as long as wide, with two longer and one shorter mid-ventral setae, one mid-dorsal and one dorsodistal setae; propodus slender, palm 1.25 times as long as wide, fixed finger as long as palm, with two ventral setae, three setae on cutting edge; dactylus with fine proximal seta.

Pereopod 1 (Fig. 119B) longer than others, coxa without apophysis, with seta; basis straight, slender, 4.5 times as long as wide, with two dorsal and one ventral simple setae in proximal third; ischium compact, with ventral seta; merus 0.3 times as long as basis, with two ventral and one dorsal simple distal setae; carpus 1.5 times as long as merus with distal crown of six simple setae; propodus 1.4 times as long as carpus, with two dorsal subdistal setae, shorter ventral subdistal seta; slender dactylus with proximal seta exceeding tip of dactylus, slender unguis 1.6 times as long as dactylus, both together as long as propodus. Pereopod 2 (Fig. 119C) similar to pereopod 1, basis 4.8 times as long as wide, with three dorsal but no ventral setae; ischium with seta; merus with single dorsal and ventral distal simple setae, and ventrodistal spine; carpus 1.1 times as long as merus, with dorsodistal and mesiodistal simple setae, and two unequal ventrodistal spines, longer spine denticulate; propodus with one dorsal subdistal seta; dactylus and unguis together 0.9 times as long as propodus. Pereopod 3 (Fig. 119D) similar to pereopod 2, basis with two dorsal and one ventral setae; carpus with dorsodistal spine half as long as carpus.

Pereopod 4 (Fig. 119E) basis stouter than that of anterior pereopods, three times as long as wide; ischium with two ventrodistal setae; merus as long as carpus, with one denticulate slender ventrodistal spine and one seta; carpus with one dorsodistal setae and four ventrodistal denticulate spines; propodus 1.3 times as long as carpus, with one dorsodistal and two ventral subdistal denticulate spines; dactylus twice as long as curved unguis, both together 0.6 times as long as propodus. Pereopod 5 (not figured) as pereopod 4, but basis with ventral penicillate seta. Pereopod 6 (Fig. 119F) basis stout, 2.4 times as long as wide; ischium with two ventrodistal setae; merus 0.9 times as long as carpus, with two denticulate slender ventrodistal spines; carpus with one dorsodistal setae and apparently three ventrodistal slender denticulate spines; propodus as long as carpus, with three dorsodistal setae and two ventral subdistal slender spines; dactylus slender, with ventral microtrichia, twice as long as curved unguis, both together 0.7 times as long as propodus.

Pleopods (Fig. 119G) all alike, with naked basis, exopod shorter than endopod; endopod with subdistal inner seta, exopod without setae on inner margin, outer margins with respectively 10 and 15 plumose setae, proximal seta on both rami separated from others.

Uropod (Fig. 119H) biramous, basis naked; exopod of one segment, less than half as long as proximal endopod segment,

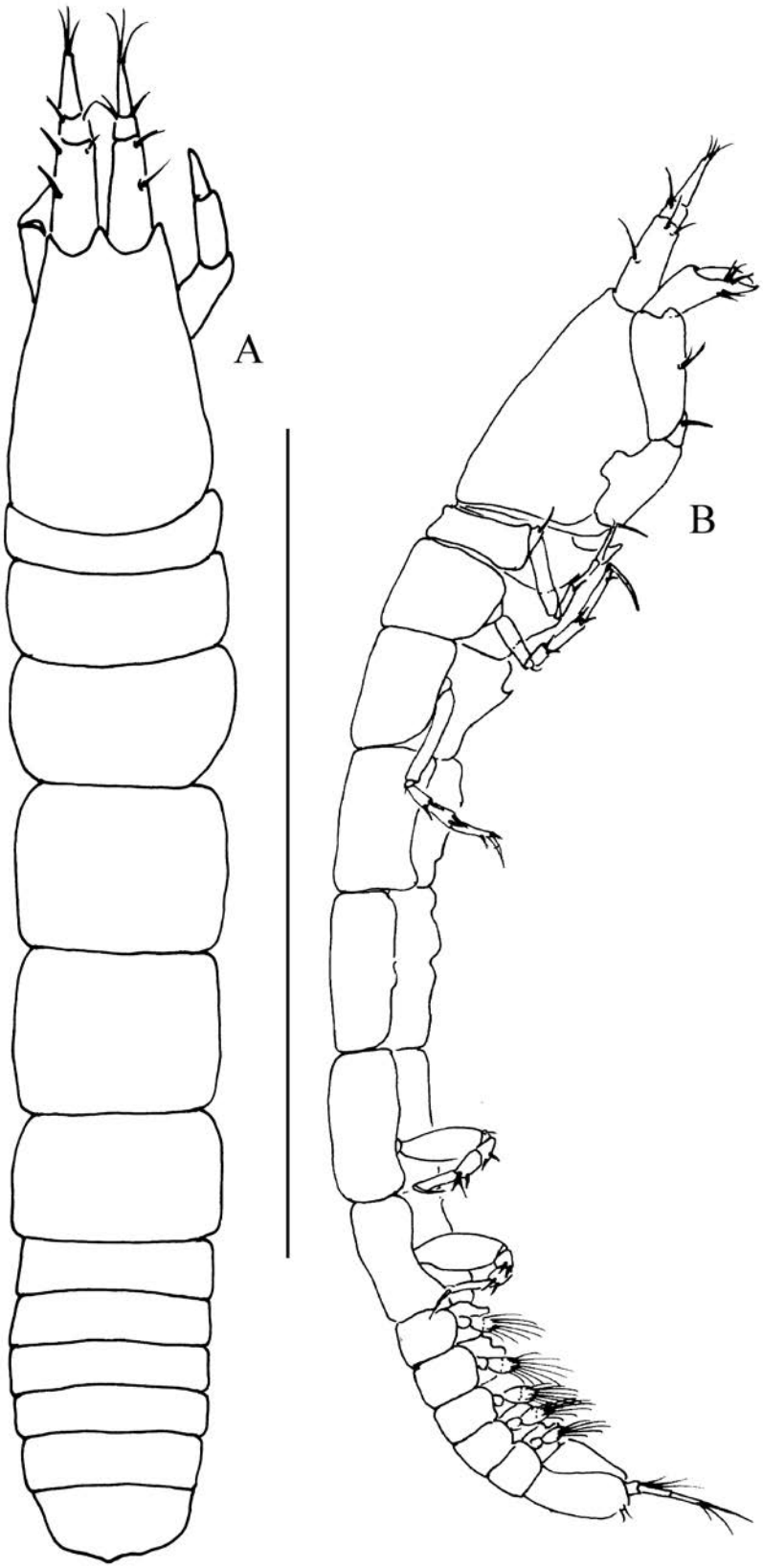

Fig. 117. *Paratyphlotanais colouros* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1 mm.

Fig. 118. *Paratyphlotanais colouros* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule endite; G, maxilliped; H, labium; I, epignath. Scale = 0.1 mm.

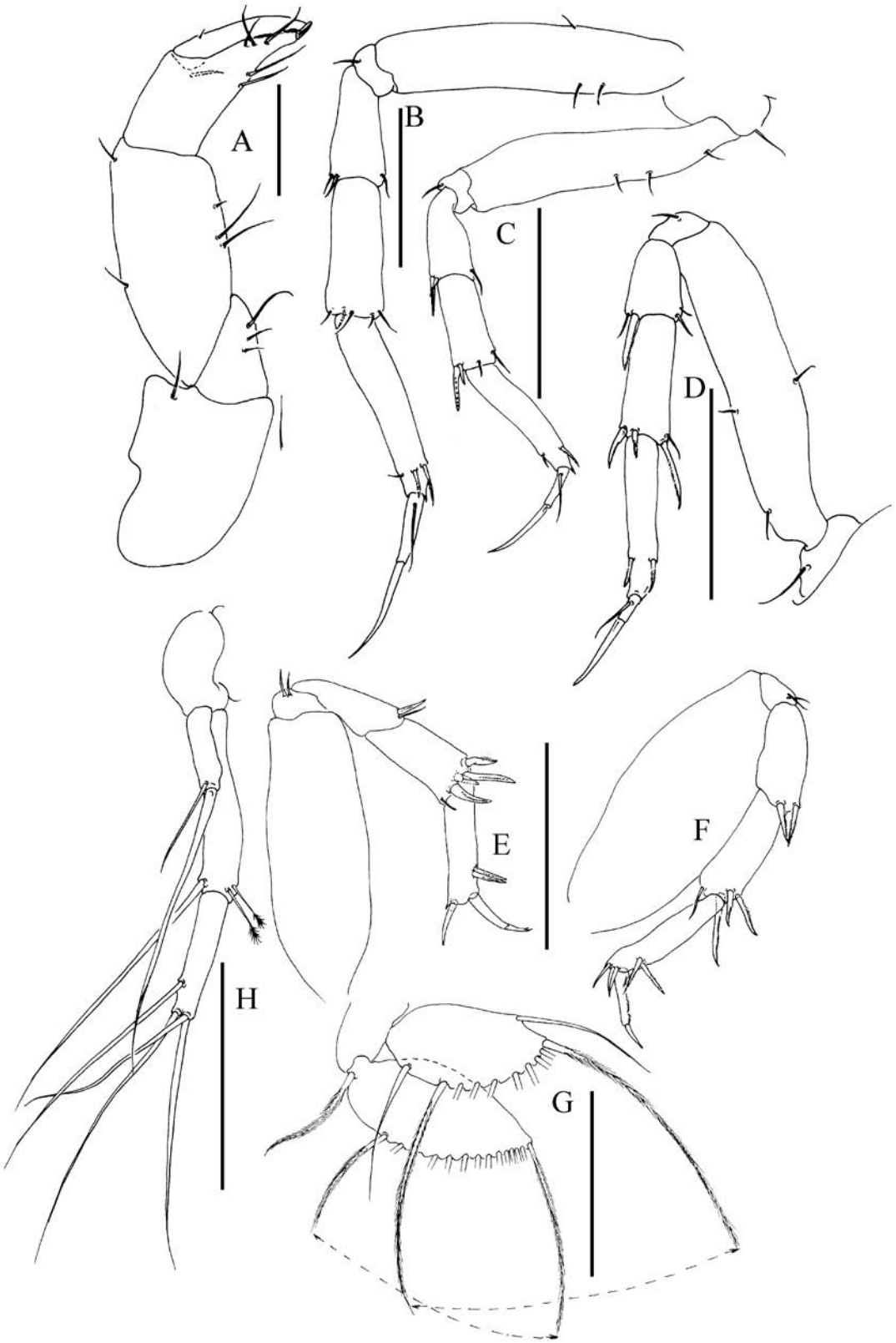

Fig. 119. *Paratyphlotanais colouros* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

with one shorter and one longer distal setae; endopod of two segments, distal segment 0.6 times as long as proximal segment; proximal segment with one simple and two penicillate distal setae, distal segment with one subdistal and three distal simple setae.

Male. Unknown.

Etymology. From the Greek *kolouros* – "bobtailed", alluding to the characterizing short uropod exopod of this species.

Remarks. The present species, with its pereopod spination, elongate and tapering cephalothorax, hyposphenia (sternal spurs) on the anterior pereonites and apical spur on the antennule, accords comfortably with the genus *Paratyphlotanais,* as most recently competently analyzed by Bird (2004), since when only one further species, *P. alveolus* Błażewicz-Paszkowycz, 2007, has been described. *P. colouros* sp. nov. has a unique conformation for the genus being without coxal apophyses (spurs) and with a narrow pereonite 1 (less than half the length of pereonite 2). Of the nine species previously attributed to this genus (see Błażewicz-Paszkowycz, 2007) only *P. gracilipes* (Hansen 1913) from the Northeast Atlantic south of Iceland, *P. pectinatus* Bird, 2004, from the Northeast Atlantic Margin and *P. armatus* (Vanhöffen, 1914) from the Antarctic share the short pereonite 1, but the first two have coxal spurs, while the last has a cephalothorax shorter than pereonites 1 to 3 together.

Furthermore, none of those species has such a short uropod exopod in proportion to the endopod, being much longer than half the length of the proximal segment of the endopod compared with 0.4 times that length in *P. colouros* (note that the endopod of *P. pectinatus* is only known from the proximal segment, but the exopod is much longer than that segment and two-segmented: see Bird, 2004, fig.7f).

P. colouros was collected from the Central and Eastern Bass Strait at 60 to 293 m in coarse sand.

Genus ***Peraeospinosus*** Sieg, 1986

Peraeospinosus tanytrix sp. nov.

Figures 120–122

Material examined. 1 ♀ (J58534), holotype, and 107 ♀♀, 36 neuters (J58535), paratypes, Eastern Bass Strait, 63 km E of North Point, Flinders Island, Stn BSS 167, 39º44.8'S 148º40.6'E, 124 m depth, fine sand and mud, 14 November 1981; coll. R.S. Wilson; 5 ♀♀ and 1 neuter (J58896), paratypes, Stn BSS 167G, 1 ♀ (J58898), paratype, Stn BSS 167S, same data as holotype; 1 ♀ (J58895), 7 ♀♀ in tubes with numerous mancae (J58897), paratypes, Eastern Bass Strait, 60 km E of North Point, Flinders Island, Stn BSS 32, 39º41.7'S 148º39.5'E, 115 m depth, muddy sand, 27 March 1979; coll. G.C.B. Poore; 1 ♀ (J58899), paratype, Eastern Bass Strait, 100 km NE of North Point, Flinders Island, Stn BSS 170, 38º52.6'S 148º25.2'E, 130m depth, fine sand, 15 November 1981; coll. R.S. Wilson; 1 ♀ (J58900), paratype, Eastern Bass Strait, 28 km SSW of Marlo, Stn BSS 207, 37º59'S 148º27'E, 51 m depth, muddy sand and fine shell, 30 July 1983; coll. M.F. Gomon; 4 ♀♀ in tubes with mancae (J57817), paratypes, off Nowra, New South Wales, Stn SLOPE 1, 34º59.52'S 151º05.93'E, 204 m depth, 14 July 1986; coll. G.C.B. Poore; 7 ♀♀ with tubes (J37858), paratypes, off Nowra, New South Wales, Stn SLOPE 2, 34º57.9'S 151º08.0'E, 503 m depth, 14 July 1986; coll. G.C.B. Poore; 2 ♀♀ (J37883), paratypes, off Nowra, New South Wales, Stn SLOPE 7, 34º52.28'S 151º15.02'E to 34º51.13'S 151º15.13'E, 1096 m depth, 15 July 1986; coll. G.C.B. Poore & C.-C. Lu.

Description of female. Body (Fig. 120A, B) slender, holotype 4.7 mm long, seven times as long as wide. Cephalothorax rounded but tapering towards anterior with triangular rostrum, as long as wide, naked, eyes absent. Pereonite 1 wider anteriorly, just over half as long as cephalothorax; pereonites 2 and 3 narrowed at mid-length, subequal in length, 1.6 times as long as pereonite 1; pereonites 4 and 5 subrectangular, subequal in length, 1.1 times as long as pereonite 1; pereonite 6 with mid-lateral creases, shortest, 0.8 times as long as pereonite 1 (all pereonites respectively 1.7, 0.9, 0.8, 1.2, 1.2 and 1.5 times as wide as long). Pleon with five free subequal pleonites bearing pleopods; each pleonite six times as wide as long. Pleotelson semicircular, one-third length of pleon and twice as wide as long, with two small distal setae (Fig. 122H).

Antennule (Fig. 121A) of three articles, proximal article clavate, twice as wide proximally as distally, 3.3 times as long as wide, 1.6 times as long as distal two articles together, with row of three fine inner-dorsal setae, outer margin with tufts of three, four and three penicillate setae proximally, at mid-length and distally, last two tufts with accompanying simple seta; second article 1.3 times as long as wide, one-third as long as third article, with two unequal dorsodistal simple setae; third article tapering, almost half as long as first article, with five simple distal setae.

Antenna (Fig. 121B) of six articles, proximal article compact, as long as second article, with ventral microtrichia; second article swollen, as long as wide, with ventral microtrichia; third article shorter than wide, 0.7 times as long as second article, with fine dorsodistal seta; fourth article longest, 8.4 times as long as wide, four times as long as second article, curved, with two simple and two penicillate distal setae; fifth article half as long as fourth with one distal seta; sixth article minute with five distal setae.

Labrum (Fig. 121C) rounded, hood-shaped, distally setose. Left mandible (Fig. 121D) with subtriangular, crenulate pars incisiva and wide, crenulate lacinia mobilis, right mandible (Fig. 121E) with rounded, smooth cutting edge on pars incisiva, without lacinia mobilis; pars molaris of both mandibles with fine denticulations around distal margin. Labium (Fig. 121H) simple, finely setose on distal margin and with rows of microtrichia on outer margins. Maxillule (Fig. 121F) with nine distal spines and sparse microtrichia, palp not recovered. Maxilla (Fig. 121G) ovoid, naked. Maxilliped (Fig. 121I) palp first article naked, remaining articles with microtrichia; second article with one outer simple seta and three inner setae finely denticulate in distal half; third article with four inner setae in distal half of article, two of these finely denticulate in distal half; fourth with five inner to distal setae finely denticulate in distal half; basis with single seta about half as long as endites; endites distally with two setae. Epignath not recovered.

Cheliped (Fig. 122A) basis not quite reaching anterior margin of pereonite 1 ventrally, 1.4 times as long as wide, with single dorsodistal seta; merus subtriangular with single ventral seta; carpus 1.5 times as long as wide, with two midventral setae, one fine dorsodistal seta, and row of five setae along

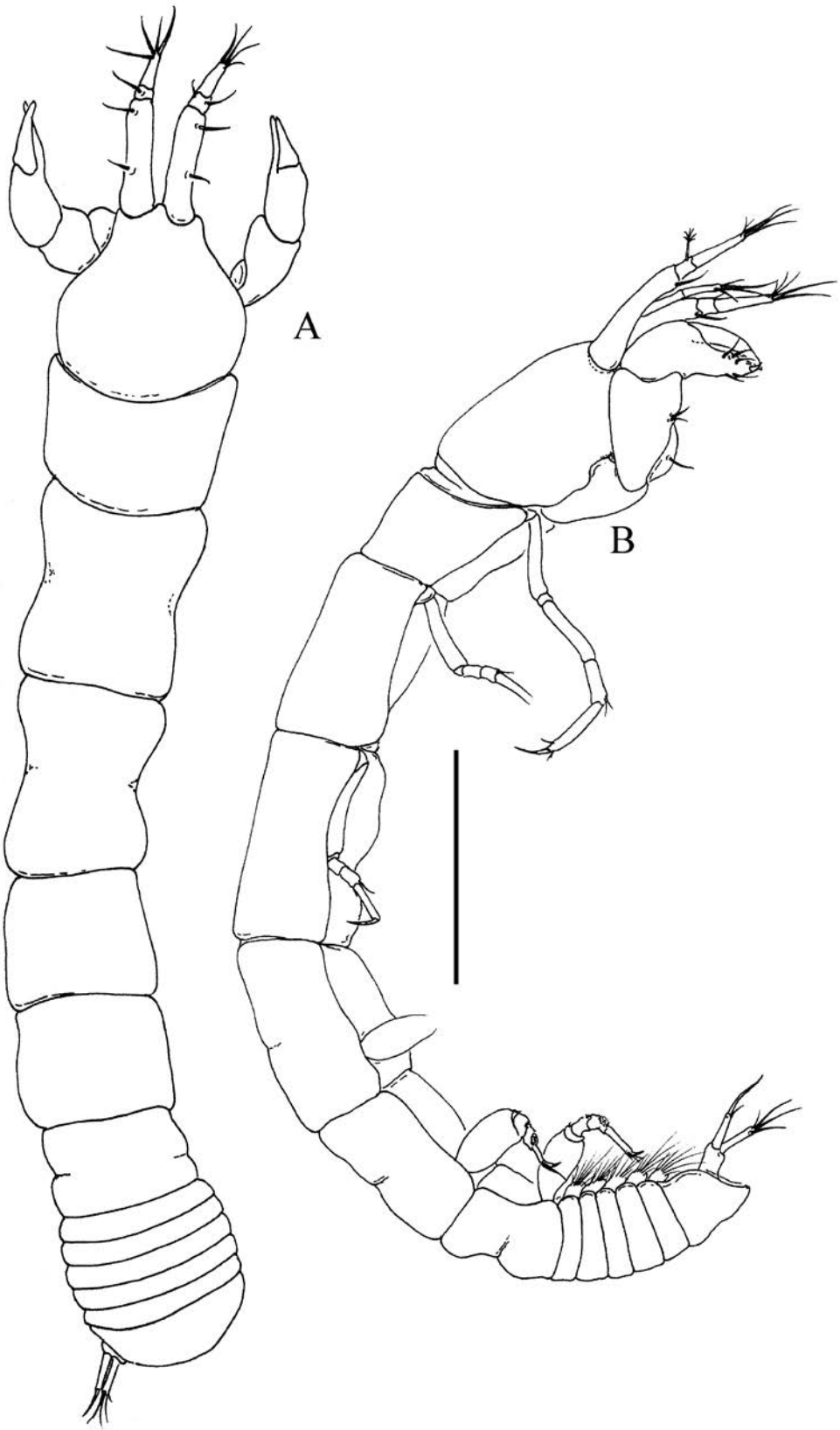

Fig. 120. *Peraeospinosus tanytrix* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1 mm.

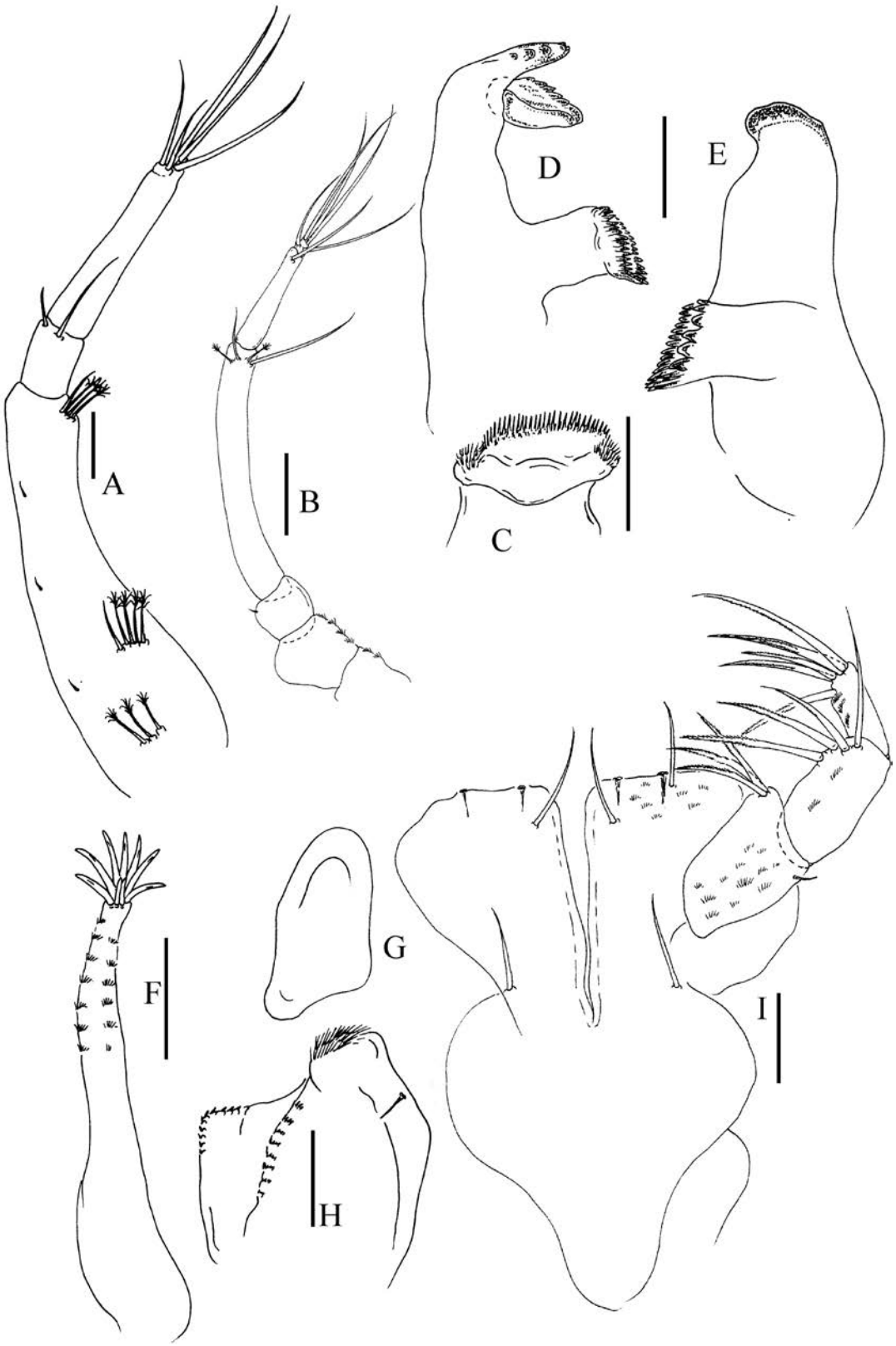

Fig. 121. *Peraeospinosus tanytrix* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; E, right mandible; F, maxillule endite; G, maxilla; H, labium; I, maxilliped. Scale = 0.1 mm.

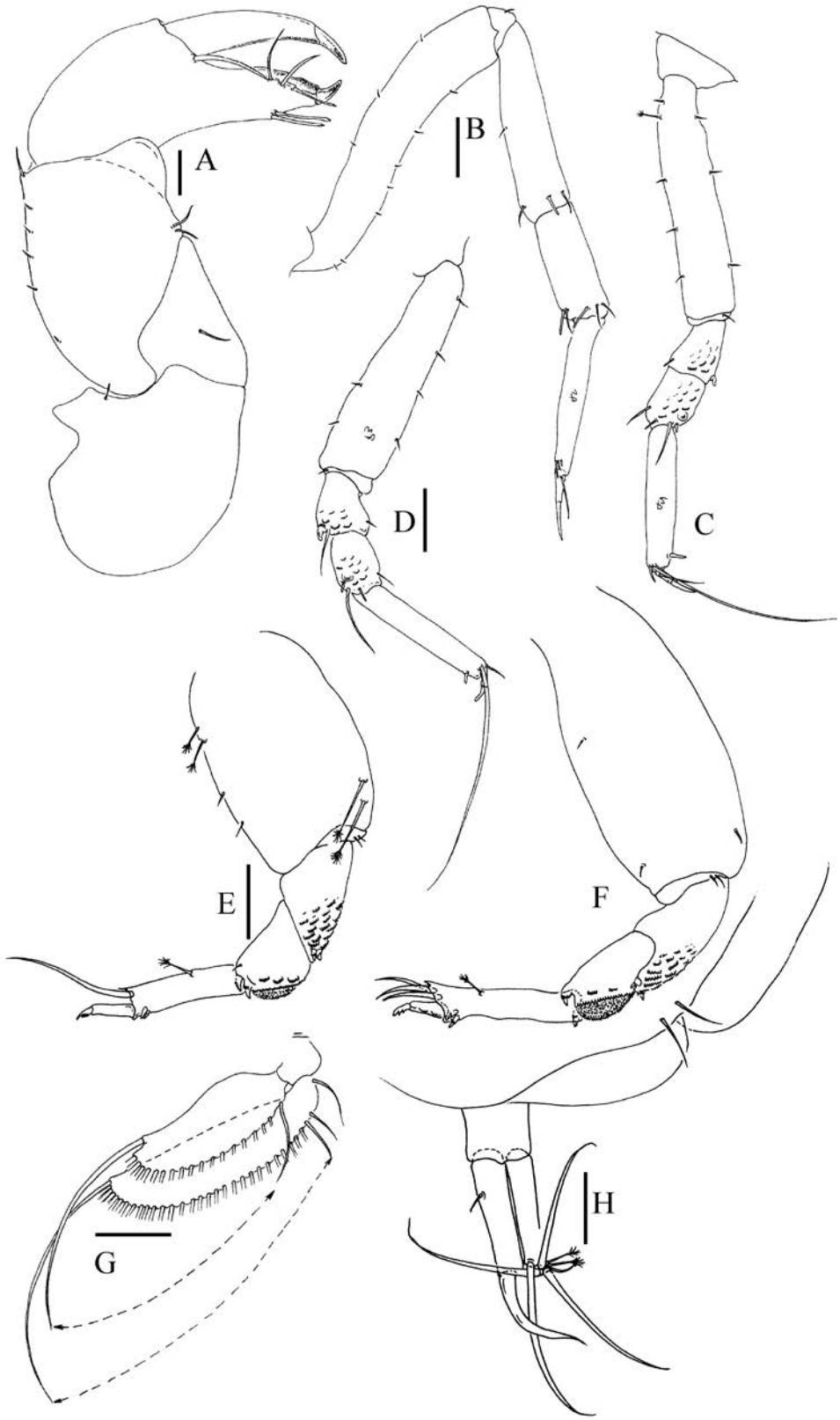

Fig. 122. *Peraeospinosus tanytrix* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

dorsal margin, ventral margin distally invaginated to accommodate propodus on reflexion; propodus about as long as wide, fixed finger as long as palm, with two ventral setae, three setae on cutting edge; dactylus naked.

Pereopod 1 (Fig. 122B) coxa without apophysis, naked; basis arcuate, slender, 5.7 times as long as wide, with seven fine setae along dorsal margin and three more along ventral margin; ischium compact, with fine ventral seta; merus elongate, 0.6 times as long as basis and 4.7 times as long as wide, with mid-dorsal fine seta and three simple distal setae; carpus 0.6 times as long as merus, 2.5 times as long as wide, with distal crown of five simple setae; propodus 1.5 times as long as carpus, six times as long as wide, with two dorsal subdistal setae; short, stout dactylus with proximal seta longer than dactylus, slender unguis 1.4 times as long as dactylus, both together 0.4 times as long as propodus. Pereopod 2 (Fig. 122C), coxa similar to that of pereopod 1, basis 4.9 times as long as wide, with one penicillate and four fine simple setae along dorsal margin and three simple setae along ventral margin; ischium with ventral seta; merus 0.25 times as long as basis, with single dorsodistal seta, short ventrodistal spine, and dense field of microtrichia across ventral and ventrolateral surfaces in distal two-thirds; carpus 0.9 times as long as merus, with dorsal, mesial and ventral distal setae, short ventrodistal spine, and dense field of microtrichia across ventral and ventrolateral surfaces; propodus 2.6 times as long as carpus, with ventral subdistal seta, one shorter dorsodistal seta, one very long dorsodistal seta 1.3 times as long as propodus; short, stout dactylus with proximal seta exceeding tip of subequal slender unguis, both together one-third as long as propodus. Pereopod 3 (Fig. 122D) similar to pereopod 2, basis without penicillate seta; merus with additional ventrodistal seta; dactylus and unguis together 0.2 times as long as propodus, long distal seta 1.6 times as long as propodus.

Pereopod 4 (Fig. 122E) basis stout, 1.5 times as long as wide, with two simple mid-dorsal seta and two dorsoproximal and two ventrodistal penicillate setae; ischium with two ventrodistal setae; merus 1.2 times as long as carpus, with field of microtrichia across ventral and ventrolateral surfaces in distal half, and two small ventrodistal spines; carpus with two hooked distal spines, fine dorsodistal seta, and prickly tubercle surrounded by minute spines and microtrichia in ventrodistal half; propodus 1.3 times as long as carpus, with mid-dorsal penicillate seta, strong dorsodistal seta, and two short ventrodistal spines; dactylus slender, nearly three times as long as denticulate unguis, both together half as long as propodus. Pereopod 5 (not figured) as pereopod 4. Pereopod 6 (Fig. 122F) similar to pereopod 4, but basis without penicillate setae, propodus with three dorsodistal setae.

Pleopods (Fig. 122G) all alike, with naked basis, exopod shorter than endopod; endopod and exopod without setae on inner margin, outer margins with respectively 19 and 31 plumose setae, proximal seta on both rami slightly separated from others.

Uropod (Fig. 122H) biramous, basis naked; exopod and endopod of one segment, subequal in length; exopod with one fine proximal, one stout distal setae; endopod with four simple and three penicillate distal setae.

Male. Unknown.

Etymology. From the Greek *tany* – long, and *thrix* – a hair, with reference to the exceedingly long distal seta on the propodi of pereopods 2 and 3.

Remarks. The genus *Peraeospinosus* was reviewed most recently by Błażewicz-Paszkowycz (2005), who presented an identification key to the ten species then described; in that key, *P. tanytrix* sp. nov. identifies as *P. emergensis* Błażewicz-Paszkowycz, 2005, sharing the rounded cephalothorax not longer than wide and the elongate pereonites 1 to 3, but does not share with that species the elongate merus, carpus and propodus of pereopod 2, nor the elongate dorso-distal "rod-seta" on the carpus of pereopod 1. The only other species described since that key is *P. acruxi* Błażewicz-Paszkowycz, 2007, which shares with *P. emergensis* the pereopod 1 rod seta and elongate anterior pereonites, but has a cephalothorax longer than wide. Most distinctively, none of the eleven previously described species have such an extraordinarily long distal seta on the propodi of pereopods 2 and 3 as found in *P. tanytrix*, although this condition is approached in some species of *Torquella* Błażewicz-Paszkowycz, 2007.

Peraeospinosus tanytrix was collected from Eastern Bass Strait at depths between 51 and 1096 m. The tubes, apparently used for brooding, were of agglomerated sediment particles and fibrous material.

Genus ***Meromonakantha*** Sieg, 1986

Meromonakantha anarsios sp. nov.

Figures 123–125

Material examined. 1 ♀ (J62058), holotype; 1 ♀ (J62059), paratype, Stn BSS 36 (CR 79-K-1), Eastern Bass Strait, 82 km ENE of North Point, Flinders Island, 293 m, 28 March 1979, 39°27.7'S 148°41.4'E, 293 m depth, coarse sand, 28 March 1979, coll. G.C.B. Poore.

Description of female. Body (Fig. 123A, B) slender, holotype 1.4 mm long, 7.5 times as long as wide. Cephalothorax subrectangular, narrowing anteriorly (conical) with slight triangular rostrum, 1.2 times as long as wide, twice as long as pereonite 1, naked, eyes absent. Pereonites all naked and rectangular; pereonites 1 and 6 subequal in length; pereonites 2 and 3 subequal, 1.3 times as long as pereonite 1; pereonites 4 and 5 subequal, 1.5 times as long as pereonite 1 (all pereonites respectively 1.6, 1.2, 1.1, 1.0, 1.0 and 1.3 times as wide as long). Pleon of five free subequal pleonites bearing pleopods plus pleotelson; each pleonite 4.2 times as wide as long. Pleotelson subpentangular, as long as last two pleonites together, 1.75 times as wide as long.

Antennule (Fig. 124A) of three articles, proximal article three times as long as wide, 1.7 times as long as distal two articles together, outer margin with three pairs of penicillate setae, one central and one distal simple setae each as long as distal two articles together; second article longer than wide, 0.25 times as long as first article, with two distal simple setae; third article tapering, 1.4 times as long as second article, with five simple and one penicillate distal setae.

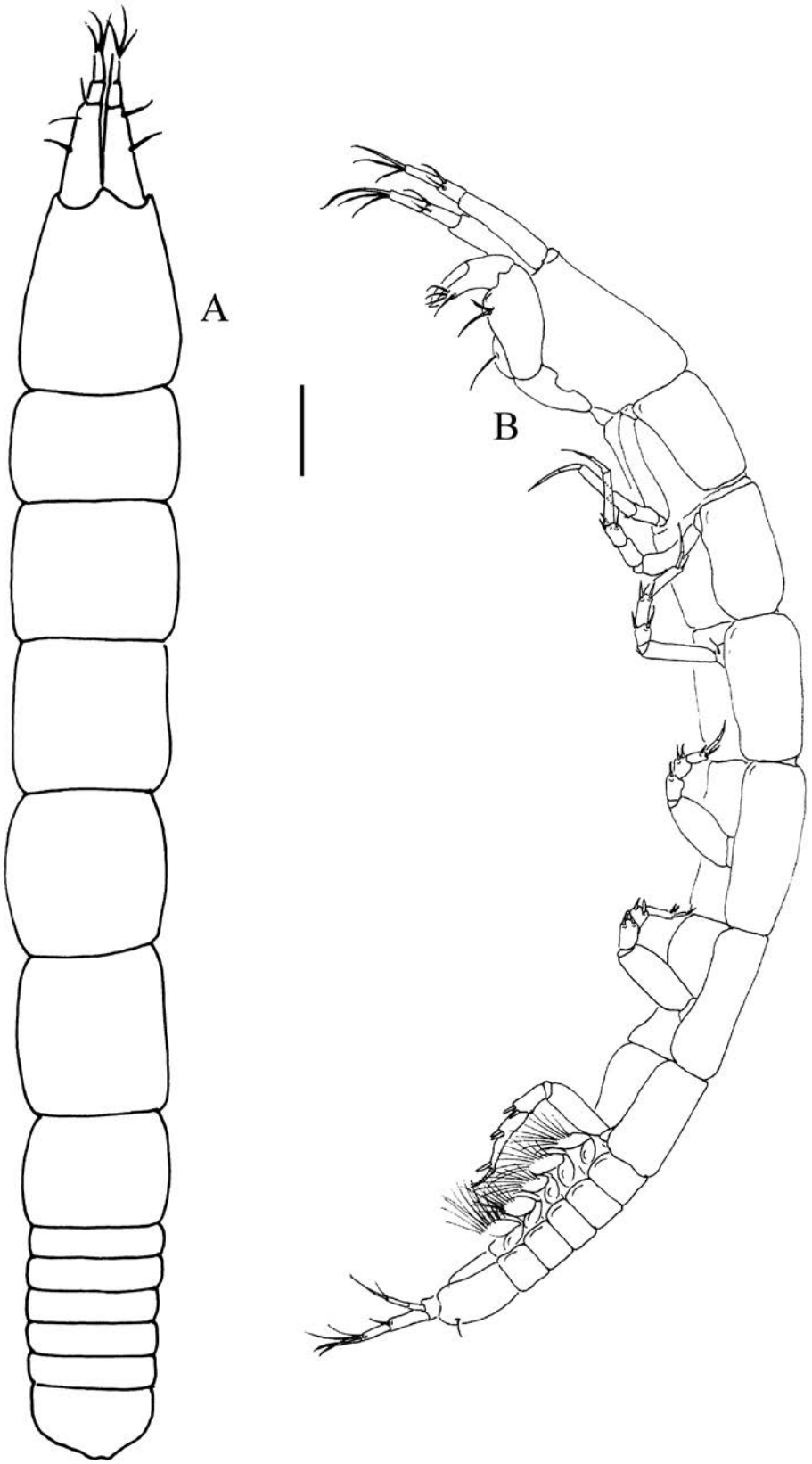

Fig. 123. *Meromonakantha anarsios* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 0.1 mm.

Fig. 124. *Meromonakantha anarsios* sp. nov., female paratype. A, antennule; B, antenna; C, right mandible; D, maxillule endite; E, maxilla; F, labium; G, maxilliped; H, epignath; I, cheliped. Scale = 0.1 mm.

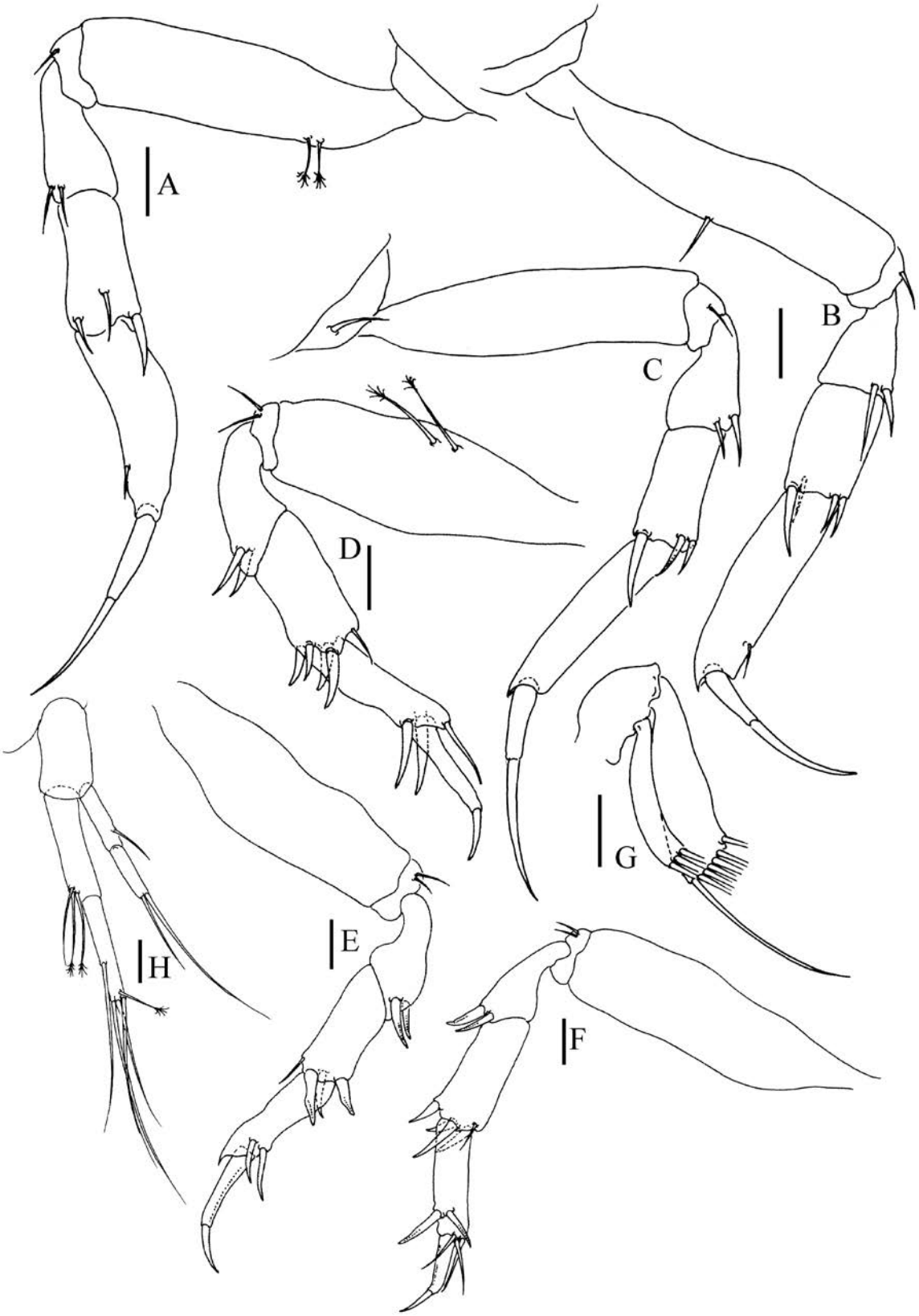

Fig. 125. *Meromonakantha anarsios* sp. nov., female paratype. A to F, pereopods 1 to 6 respectively; G, pleopod; H, uropod. Scale = 0.1 mm.

Antenna (Fig. 124B) of six articles, proximal article compact, fused to cephalothorax; second article just longer than wide, with dorsodistal seta; third article as long as wide and as long as second article, with strong dorsodistal seta; fourth article longest, four times as long as wide, 3.6 times as long as third article, with three simple and two penicillate distal setae; fifth article 1.5 times as long as third, with one distal simple seta; sixth article minute with four distal setae.

Labrum and left mandible not recovered. Right mandible (Fig. 124C) with wide, spade-like pars incisiva bearing upper and lower marginal rounded "teeth" and submarginal denticulations; pars molaris stout, blunt, with rounded distal tubercles. Labium (Fig. 124F) simple, outer distal corner with unarticulated setulose projection. Maxillule (Fig. 124D) with eight distal spines and small seta. Maxilla (Fig. 124E) simple, linguiform, naked. Maxilliped (Fig. 124G) palp first article naked, second article with one outer and three distal inner setae, one of inner setae finely plumose; third article with three longer and one shorter distal inner setae, fourth article elongate, with four distal setae and one subdistal outer seta; basis naked; endites distally naked, with outer-distal microtrichia and paired inner setae. Epignath (Fig. 124H) elongate, ribbon-like, distally pointed.

Cheliped (Fig. 124I) sclerite dorsally inserted, basis not reaching anterior of pereonite 1 ventrally, 1.6 times as long as wide with outer dorsodistal seta; merus subtriangular with single ventral seta, and covering about half of ventral margin of carpus; carpus 1.9 times as long as wide, with two midventral setae, one dorsodistal seta; propodus elongate, 1.5 times as long as wide, with two ventral setae, inner comb-row of three setae; fixed finger slender, two-thirds as long as palm, with three setae below cutting edge; dactylus with proximal seta.

Pereopod 1 (Fig. 125A) coxa without apophysis; basis slender, 3.8 times as long as wide, with two dorsal penicillate setae in proximal half; ischium compact, with one ventrodistal seta; merus 0.7 times as long as carpus, ventrodistally with two slender spines; carpus distally with slender spines dorsally, mesially and ventrally; propodus slightly curved, 1.3 times as long as carpus, with ventral subdistal seta; dactylus naked, unguis 1.4 times as long as dactylus, both together 1.2 times as long as propodus. Pereopod 2 (Fig. 125B), similar to pereopod 1, basis with mid-dorsal simple seta but no penicillate setae; carpus with additional distal seta; propodus straight, 1.9 times as long as carpus; dactylus and unguis together 0.9 times as long as propodus. Pereopod 3 (Fig. 125C) similar to pereopod 2, basis naked.

Pereopod 4 (Fig. 125D) somewhat more compact, basis three times as long as wide with two penicillate setae; ischium with two ventrodistal setae; merus as long as carpus, with two stout ventrodistal spines; carpus with four curved distal spines and dorsodistal seta; propodus 1.2 times as long as carpus, with two curved ventrodistal spines and one dorsodistal seta; dactylus with fine ventral denticulation, about twice as long as unguis, the two together as long as propodus. Pereopod 5 (Fig. 125E) as pereopod 4, but without penicillate seta on basis, propodus with dorsodistal spine-like apophysis but no seta. Pereopod 6 (Fig. 125F) as pereopod 5, but propodus with three dorsodistal setae.

Pleopods (Fig. 125G) all alike, with naked basis, endopod and exopod elongate, linguiform, without setae on inner or outer margins, exopod wider and slightly longer than endopod, each respectively with seven and three distal plumose setae.

Uropod (Fig. 125H) basis naked, twice as long as wide; exopod of two subequal segments, just longer than proximal endopod segment; endopod of two subequal segments, setose as figured.

Male. Unknown.

Etymology. From the Greek *anarsios* – strange, incongruous, as this species diverges on a number of characters from the current diagnosis for the genus (see below).

Remarks. With the long seta on the third article of the antenna, the simple setation/spination of the pereopods (lacking fields of microtrichia or prickly-tubercles), the conformation of the cephalothorax, of the mandibular molar process and of the uropods, *inter alia*, the present species accords with *Meromonakantha* rather than any other typhlotanaid genus. It diverges from the diagnosis given by Błażewicz-Paszkowycz (2007) in that neither the cephalothorax nor the pleon are wider than the pereon, and the dactyli and ungues of the posterior pereopods are not "semi-fused".

Although, as pointed out by Błażewicz-Paszkowycz (2007), the genus is in need of revision once sufficient material of a number of its less-well described species becomes available, *Meromonakantha anarsios* sp. nov. is also distinguished from all of the other species in having relatively long curved spines on the posterior pereopods, a more slender proximal article to the antennule, and the pereonites mostly parallel-sided.

While these differences may be considered sufficient to distinguish *Meromonakantha anarsios* as a separate genus, we choose at present to maintain its affiliation with other members of *Meromonakantha* rather than erect a monotypic genus.

Family **Tanaissuidae** Bird & Larsen, 2009

Genus ***Tanaissus*** Norman & Scott, 1906

Tanaissus giraffa sp. nov.

Figures 126–129

Material examined. 1 ♀ (J58475), holotype; 1 ♀ (J23599), paratype, stn MSL-EG 45, Eastern Bass Strait, 13.5 km E of eastern edge of Lake Tyers, 37°51.74'S 148°14.77'E, 37 m depth, sand-shell, 25 September 1990, R.V. Sarda, Smith-McIntyre Grab. 1 ♂ (J28482), dissected, stn MSL-EG 67, Eastern Bass Strait, 13.3 km E of eastern edge of Lake Tyers, 37°51.42'S 148°14.36'E, 37 m depth, sand-shell, 4 June 1991, coll. N. Coleman, Smith-McIntyre Grab.

Description of female. Body (Fig. 126A, B) slender, ten times as long as wide, 1.4 mm long. Cephalothorax as long as pereonites 2 and 3 combined, twice as long as wide, rostral half much narrower than posterior, with finely-rugose rounded rostral margin (Fig. 127A). Pereonites all rectangular, pereonite1 shortest, 0.2 times as long as cephalothorax; pereonite 2 twice as long as pereonite 1; pereonites 3 to 6

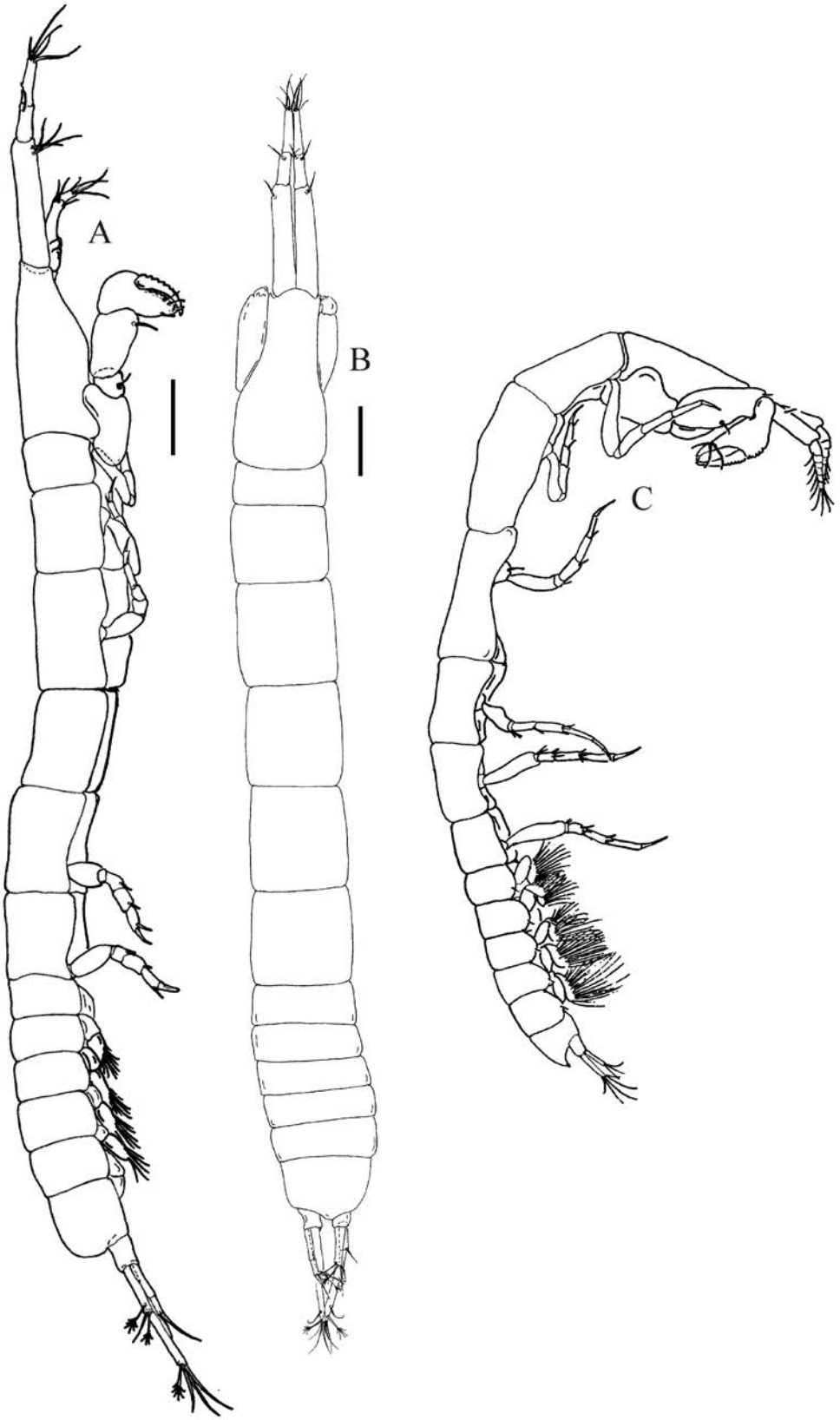

Fig. 126. *Tanaissus giraffa* sp. nov. A, holotype female lateral view; B, holotype female dorsal view; C, male lateral. Scale = 0.1 mm.

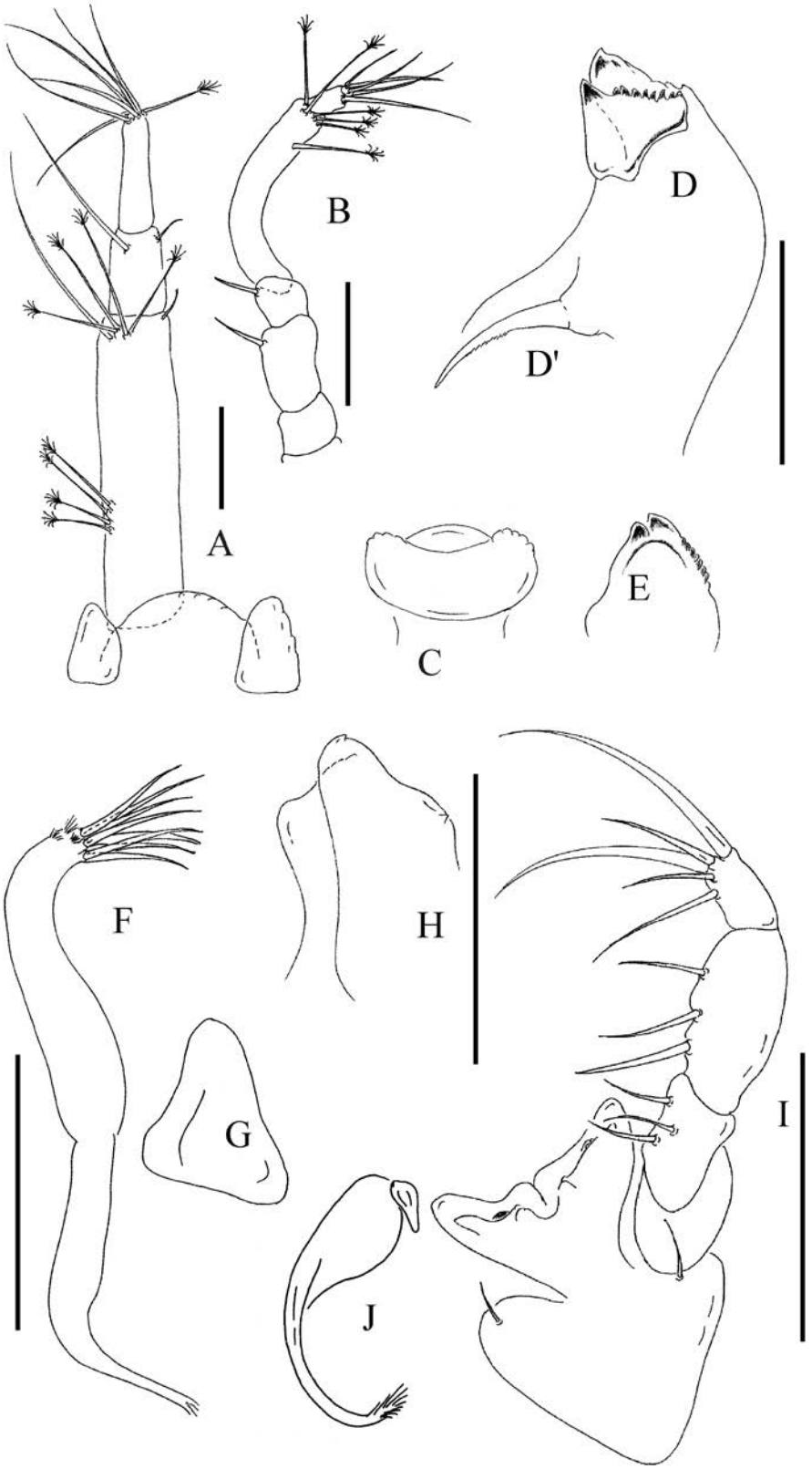

Fig. 127. *Tanaissus giraffa* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, left mandible; D', mandible molar; E, right mandible; F, maxillule; G, maxilla; H, labium; I, maxilliped; J, epignath. Scale = 0.1 mm.

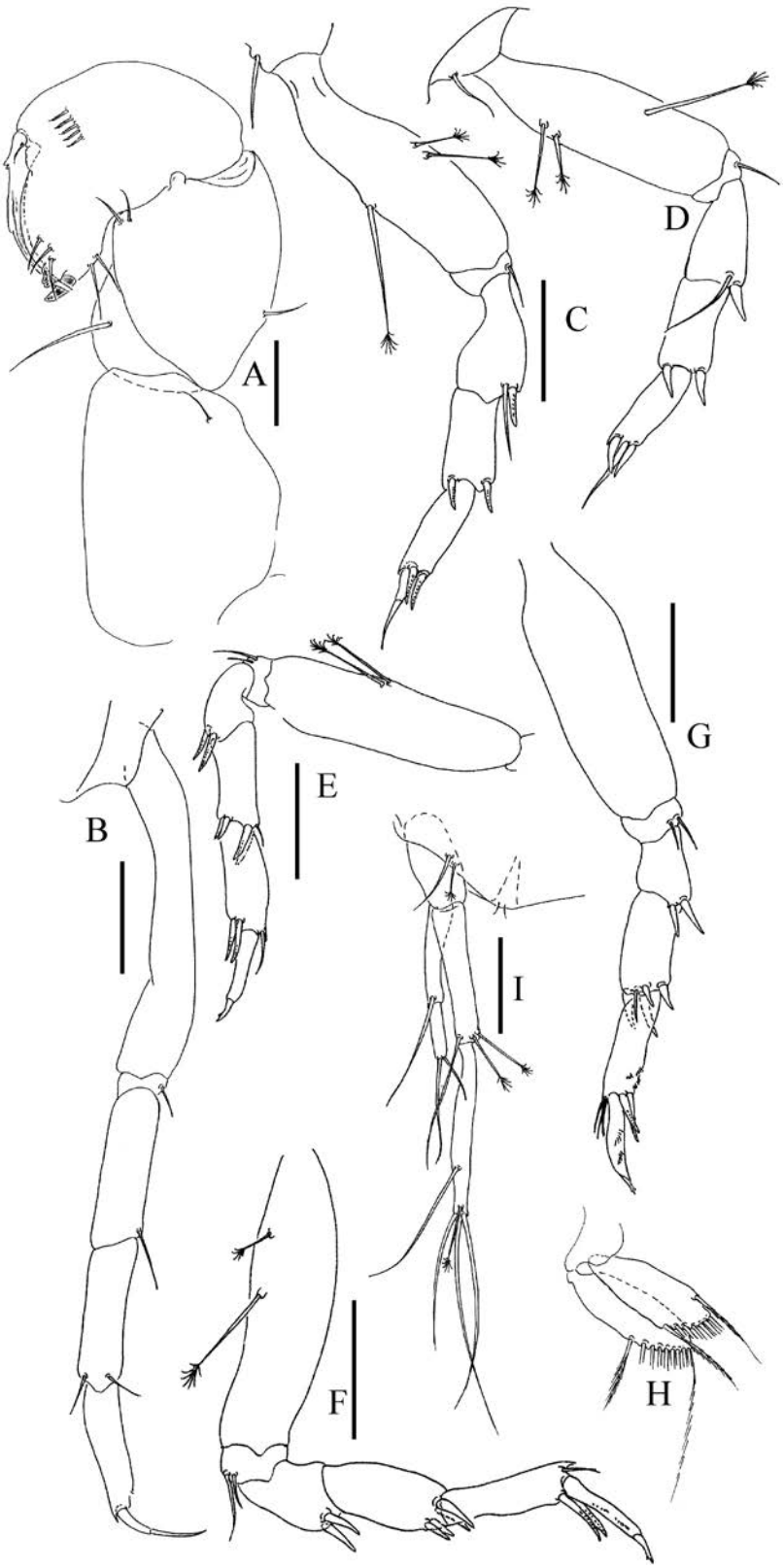

Fig. 128. *Tanaissus giraffa* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G. pereopod 6; H, pleopod; I, uropod. Scale = 0. 1 mm.

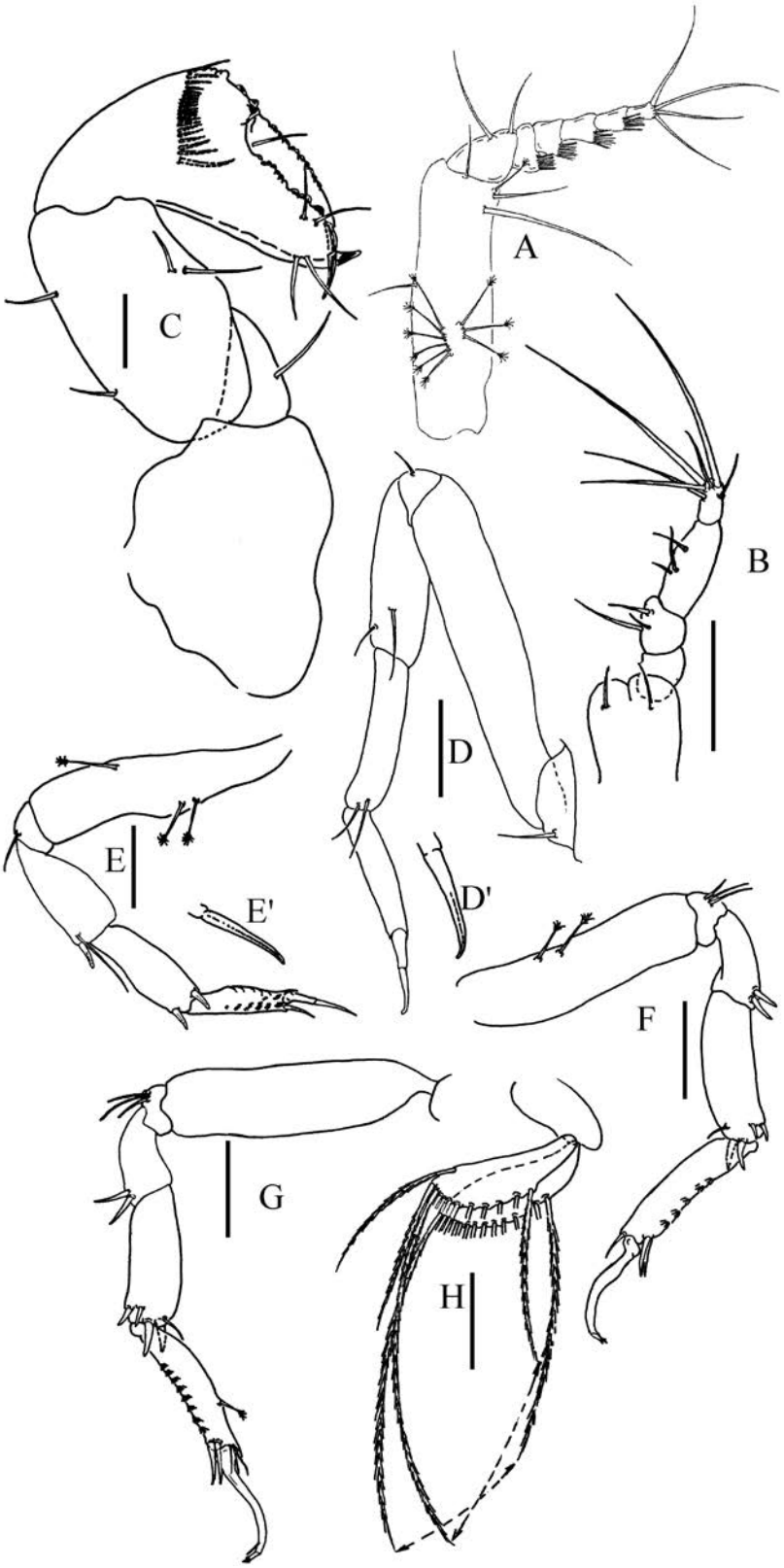

Fig. 129. *Tanaissus giraffa* sp. nov., male. A, antennule; B, antenna; C, cheliped; D, pereopod 1; D' pereopod 1 dactylus; E, pereopod 2; E', pereopod 2 dactylus; F, pereopod 4; G, pereopod 6; H, pleopod. Scale = 0.1 mm.

subequal, 2.8 times as long as pereonite 1 (all pereonites respectively 2.5, 1.2, 0.9, 0.9, 0.9 and 1.0 times as wide as long). Pleon nearly twice as long as pereonite 6; pleonites subequal in length, three times as wide as long, all bearing pleopods; pleotelson subrectangular, as long as two preceding pleonites, 1.4 times as wide as long, with two setae above each uropod attachment and two fine distal setae.

Antennule (Fig. 127A) slender, as long as cephalothorax, three–articled; article 1 four times as long as wide, 1.6 times as long as articles 2 and 3 combined, with proximal and distal outer clusters of four penicillate setae, and single inner and outer simple distal setae; article 2 longer than wide with single inner and outer simple distal setae; article 3 three times as long as wide, 1.5 times as long as article 2, with six simple distal setae and one penicillate seta.

Antenna (Fig. 127B) six–articled, article 1 short and annular, article 2 twice as long as article 1, 1.5 times as long as wide, with dorsal seta; article 3 as long as article 1, with dorsal seta; article 4 longer than articles 1 to 3 combined, five times as long as wide, curved, with six distal and subdistal penicillate setae; article 5 as long as article 1, with long seta; article 6 very small, with four setae.

Labrum (Fig. 127C) rounded, hood-shaped, naked. Mandibles stout; left mandible (Fig. 127D) with triangular incisor and broader denticulate lacinia mobilis, molar gently curved, weak and acutely pointed; right mandible (Fig. 127E) with finely denticulate distal margin and bifid incisor; molar as on left mandible. Labium (Fig. 127H) two-lobed with slightly notched distal processes. Maxillule (Fig. 127F) endite sigmoid, with two distal setae and eight terminal spines; palp with two distal setae. Maxilla (Fig. 127G) triangular, naked. Maxilliped (Fig. 127I) basis with short seta near articulation with palp; palp article 1 naked, article 2 with three inner weak setae, article3 with three unequal inner setae, and article 4 with two longer and three shorter simple setae; endites almost-completely fused. Epignath (Fig. 127J) with distinct basal lobe, distally slender and finely setulose.

Cheliped (Fig. 128A) attachment posterior on cephalothorax, basis extending past anterior margin of pereonite 1 ventrally, with rounded posterior free margin, 1.4 times as long as wide, with small laterodistal seta; merus subtriangular, with ventral seta; carpus 1.3 times as long as broad, with one dorsal and two ventral setae; chela 1.4 times as long as carpus, propodus without bifid dorsodistal crest, anterior comb-row of five dendritic setae; fixed finger robust, with convex cutting edge, two ventral setae and three setae near cutting edge; dactylus narrow, curved and acute, with several dorsal nodules and one small anterior seta.

Pereopod 1 (Fig. 128B) longer and more slender than pereopods 2–3; coxa with seta; basis 7.3 times as long as wide; ischium with small seta; merus three times as long as wide, half as long as basis, with ventrodistal seta; carpus as long as merus, with two distal setae, both much shorter than propodus; propodus 0.8 times as long as carpus, with small dorsodistal spine-like apophysis; dactylus half as long as unguis , both together 0.7 times as long as propodus. Pereopod 2 (Fig. 128C) stouter than pereopod 1, coxa with seta; basis narrow proximally, 3.5 times as long as wide, with one mid-dorsal and two ventral penicillate setae; ischium with one small seta; merus distally expanded, 0.4 times as long as basis, with one seta and one spine ventrodistally; carpus 0.7 times as long as merus, rectangular, with one dorsodistal and one ventrodistal spines; propodus 1.2 times as long as carpus, with two ventrodistal spines; dactylus and unguis together 0.8 times as long as propodus. Pereopod 3 (Fig. 128D) similar to pereopod 2.

Pereopod 4 (Fig. 128E) basis 3.8 times as long as wide with two mid-ventral penicillate setae; ischium with two setae; merus 0.8 times as long as carpus, with two ventrodistal spines; carpus nearly three times as long as wide, with outer and inner dorsal spines longer than outer and inner ventral spines, simple dorsodistal seta; propodus 1.25 times as long as carpus, 2.4 times as long as wide, with one dorsodistal seta and two ventrodistal spines; dactylus and very short bifurcate unguis apparently distinct, together 0.9 times as long as propodus. Pereopod 5 (Fig. 128F) similar to pereopod 4, dactylus with microtrichia, together with unguis as long as propodus. Pereopod 6 (Fig. 128G) similar to pereopods 4 and 5 but basis without penicillate setae, propodus with three dorsodistal setae, dactylus plus unguis shorter than propodus.

Pleopods all similar (Fig. 128H), with basal article about as long as wide, naked; endopod and exopod rami similar, but endopod somewhat wider, with eight terminal setae, exopod with nine terminal setae; all setae plumose and longest barely as long as rami.

Uropod (Fig. 128I) slender, twice as long as pleotelson; basal article twice as long as wide, naked; exopod two-segmented, just longer than proximal article of endopod, with one distal seta on longer proximal segment, two unequal distal setae on distal segment; endopod two–segmented, proximal segment shorter and with one simple and two penicillate distal setae, distal article with one subdistal and three distal simple setae and one distal penicillate seta.

Distinctions of male. Body (Fig. 126C) slightly larger than female, length 1.5 mm. Cephalothorax similar to that of female. Pereonites more or less rectangular, or with slightly concave lateral margins; pereonite 1 not shortest, 0.7 times as long as each of cephalothorax and pereonite 2; pereonites 2 and 3 subequal, pereonites 4 to 6 progressively shorter, pereonite 6 half as long as pereonite 1. Pleon as long as pereonites 4 to 6 inclusive.

Antennule (Fig. 129A) seven–articled, shorter than cephalothorax; peduncle article 1 stout, 3.3 times as long as wide, with array of nine dorsal penicillate setae in proximal half, mid-inner simple seta, one longer and one shorter outer distal simple setae with adjacent penicillate seta, and one dorsodistal seta; peduncle article 2 compact, 0.2 times as long as article 1, with two inner setae; flagellum of five segments, proximal four segments with group of five or six outer distal aesthetascs; distal segment with four simple distal setae.

Mouthparts absent apart from large maxillipeds. Maxilliped (Fig. 129B) basis with seta near articulation with palp; palp articles 1 and 2 similar in length, article 2 with two small and one long setae; article 3 longer than articles 1 and 2 combined, with three inner setae; article 4 small, with two short, tow medium and two very long terminal setae.

Cheliped (Fig. 129C) similar to that of female, but carpus more slender, 1.7 times as long as wide, chela more slender and longer than carpus, fixed finger narrower; comb-row of 20 setae.

Pereopods (Fig. 129D to G) generally similar to those of female; pereopod 2 (Fig. 129E) propodus with microtrichia; pereopods 4 to 6 (Fig. 129F, G) with more slender propodi (about 5 times as long as wide), dactyli slender and severely curved.

Pleopods all similar (Fig. 129H), proportionately larger than in female and rami more elongate; endopod with one distal and eleven outer plumose setae, exopod with fourteen plumose setae, longest setae more than twice as long as rami.

Uropod similar to that of female.

Etymology. With reference to the unusually long pereonite 1 of the male, *Giraffa* (from the Arabic – *zirafah*) is the genus of the African camelopard ruminant with an extraordinarily long neck (noun in apposition).

Remarks. There are four described species of *Tanaissus* (see Bird, 2002: Bamber *et al*., 2009), all from the Northern Hemisphere, three from the North Atlantic and one from the Mediterranean. Bamber *et al*. (2009) give a key to three of these, in which the female of *T. giraffa* sp. nov. fails at couplet 2, owing to its having a single-pointed, acuminate molar process on the mandible but no bifid dorsal crest on the chela; the male of the present species fails at couplet 4 owing to its having a pleon longer than pereonites 4 and 5 together, but no ventral apophysis on the cheliped carpus; in addition, its antennular segmentation is distinct from all of these species, as is the very long pereonite 1. The fourth species, *T. psammophilous* (Wallace, 1919, q.v.), known only from the female, is incompletely described, but differs from *T. giraffa* in being less elongate (about 7 times as long as wide), in the proportions of the pereonites and of the antennule, and in the structure of the chela.

Tanaissus giraffa was recorded from the Eastern Bass Strait on shelly sand at 37 m depth.

Genus ***Protanaissus*** Sieg, 1983

Diagnosis (after Shiino, 1970 and Sieg, 1983b). Antennule of three articles; antenna of six articles. Labrum naked. Mandible molar process tapering to a point, without grinding surface; incisor process of right mandible triangular, notched, and serrated on anterior border; incisor process of left mandible triangular, serrated on anterior border, lacinia mobilis of similar shape. Labium simple. Maxillule apically curved inwards. Maxilliped bases fused; endites flared, short and broad, fused proximally, not fused distally; palp article 1 naked; article 2 with three distal/inner setae, longest of which exceeds tip of palp. Chela of cheliped rugose; fixed finger cutting-edge serrated. Pereopod 1 dactylus plus unguis as long as or longer than propodus, each of these longer than merus and carpus combined. Pereopods 2 and 3 carpus with slender ventrodistal spines; pereopods 4 to 6 with three spines and one seta on carpus, and short, stout dactylus armed with small unguis, propodi with dorsodistal seta/setae exceeding length of dactylus. Pleopods with subequal rami, endopod with subdistal inner plumose seta. Uropod biramous, both rami with two segments, exopod shorter than endopod, endopod proximal segment with conspicuous distal penicillate setae.

Type species. Typhlotanais longidactylus Shiino, 1970 by monotypy.

Remarks. Sieg (1983b) erected the genus *Protanaissus* for *Typhlotanais longidactylus* Shiino, 1970, a species from the Antarctic, recognizing both that this species was not a typhlotanaid, and that it had affinities with the genus *Tanaissus*. As the diagnosis given by Sieg (ibid.) was very brief, this has been expanded above, based also on the original description of the type species by Shiino (1970). Particular characterizing features, especially as cited by Shiino (ibid.) are the elongate propodus and dactylus-plus-unguis of pereopod 1, and the wide maxilliped endites, while the longer inner seta on maxilliped palp article 2, the spination of the merus of pereopods 2 and 3, and the long distal propodal seta of pereopods 4 to 6 are further features distinguishing *Protanaissus* from *Tanaissus*.

Subsequent species attributed to this genus are discussed below, after the description of a new species of *Protanaissus* from the Bass Strait.

Protanaissus huberti sp. nov.

Figures 130–132

Material examined. 1 ♀ (J50812), holotype, Stn VC 41 C3, Eastern Bass Strait, 37°32.95'S 148°03.78'E, 40 m depth, 08 May 1998, coll. N. Coleman, Smith-McIntyre Grab. 1 ♀ (J51796), paratype dissected, Stn VC 40 C1, Eastern Bass Strait, 37°35.42'S 147°31.88'E, 40 m depth, 08 May 1998, coll. N. Coleman, Smith-McIntyre Grab. 1 ♀ (J48971), paratype, CPBS 32N/810, Western Port off Crib Point, 38°20.83'S 145°13.49'E, 13 m depth, sandy gravel, 12 August 1970, coll. A.J. Gilmour. 1 ♀ (J55829), paratype dissected, Stn VC 18 C2, Central Bass Strait, 38°30.2'S 144°15.0'E, 40 m depth, 13 May 1998, coll. N. Coleman, Smith-McIntyre Grab. 1 ♀ (J48980), paratype, CPBS 32S/770, Western Port off Crib Point, 38°21.6'S 145°13.67'E, 13 m depth, muddy sand, 06 July 1970; coll. A.J. Gilmour. 1 ♀ (J48919), paratype, CPBS 300/770, Western Port off Crib Point, 38°21.15'S 145°13.51'E, 15 m depth, fine sand with mud, 06 July 1970, coll. A.J. Gilmour.

Description of female. Body (Fig. 130) slender, parallel-sided, seven times as long as wide, holotype 1.3 mm long. Cephalothorax longer than pereonites 2 and 3 combined, 1.3 times as long as wide, rostral half narrower than posterior. Pereonites all rectangular with convex lateral margins, pereonite1 shortest, 0.25 times as long as cephalothorax; pereonites 2, 3 and 6 subequal, 1.7 times as long as pereonite 1; pereonites 4 and 5 subequal, 2.4 times as long as pereonite 1 (all pereonites respectively 2.5, 1.5, 1.5, 1.1, 1.1 and 1.6 times as wide as long). Pleon 2.5 times as long as pereonite 6; pleonites subequal in length, four times as wide as long, all bearing pleopods; pleotelson semicircular, as long as two preceding pleonites, 1.8 times as wide as long.

Antennule (Fig. 131A) slender, as long as cephalothorax, three–articled; article 1 four times as long as wide, 1.5 times as long as articles 2 and 3 combined, with mid-dorsal and dorsodistal tufts of penicillate setae, and single mid-length and distal simple inner setae; article 2 twice as long as wide, 0.4 times a slong as article 1, with single inner and outer simple

distal setae; article 3 twice as long as wide, 0.7 times as long as article 2, with five simple distal setae and one aesthetasc.

Antenna (Fig. 131B) six–articled, article 1 short and annular, article 2 more than twice as long as article 1, 1.5 times as long as wide, with dorsal seta; article 3 half as long as article 2, with dorsal seta; article 4 longer than articles 1 to 3 combined, 5.6 times as long as wide, curved, with two simple and three penicillate distal setae; article 5 as long as article 1, 1.5 times as long as wide, with long distal seta; article 6 very small, with two setae.

Labrum (Fig. 131C) rounded, hood-shaped, naked. Left mandible (Fig. 131D) with triangular incisor serrated on anterior border, and broader denticulate lacinia mobilis, molar gently curved, tapering to narrow tip with spinules but no grinding surface; right mandible (Fig. 131E) with finely denticulate distal margin and bifid incisor; molar as on left mandible. Labium not recovered. Maxillule (Fig. 131F) endite sigmoid, with two distal setules and six longer and two shorter terminal spines; palp not recovered. Maxilla (Fig. 131G) wide, rounded, naked. Maxilliped (Fig. 131G) basis fused, with long seta near articulation with palp almost reaching distal margin of palp article 3; palp setae simple, article 1 naked; article 2 with outer distal seta, three inner-distal setae, longest of which exceeds tip of palp; article 3 with four unequal inner distal setae; article 4 with two subdistal and four distal setae; endites basally fused, distally wide, inner distal margin with one short and one linguiform tubercles. Epignath not recovered.

Cheliped (Fig. 131H) basis with rounded posterior free margin, 1.6 times as long as wide, with small laterodistal seta; merus subtriangular, with ventral seta; carpus 1.8 times as long as broad, with one dorsoproximal, one dorsodistal and two mid-ventral setae; chela about as long as carpus, stout, resembling that of *Tanaissus* spp., propodus wider than long with dorsodistal rugosity; fixed finger robust, proximally wide, with convex denticulate cutting edge, one ventral seta and three setae near cutting edge; dactylus with dorsal rugosity in proximal half.

Pereopod 1 (Fig. 132A) longer and more slender than pereopods 2–3; coxa without seta; basis five times as long as wide, sinuous; ischium with small seta; merus 0.3 times as long as basis, naked; carpus 1.7 times as long as merus, naked; propodus 1.2 times as long as merus and carpus combined, with small dorsodistal spine-like apophysis and fine ventral subdistal seta; curved dactylus 0.8 times as long as curved unguis, both together as long as propodus. Pereopod 2 (Fig. 132B) stouter than pereopod 1, coxa with fine seta; basis 3.6 times as long as wide, with one dorsoproximal simple seta; ischium with one seta; merus distally wider, one-quarter as long as basis, with one slender ventrodistal spine; carpus 1.8 times as long as merus, with one slender ventrodistal spine; propodus as long as carpus, with one ventrodistal seta; dactylus shorter than unguis, both together as long as propodus. Pereopod 3 (Fig. 132C) similar to pereopod 2, but coxal seta longer, basis naked, ventrodistal spine on carpus larger (more than half as long as carpus), propodus with some distal microtrichia.

Pereopod 4 (Fig. 132D) basis 2.9 times as long as wide; ischium with two setae; merus 0.4 times as long as basis, with

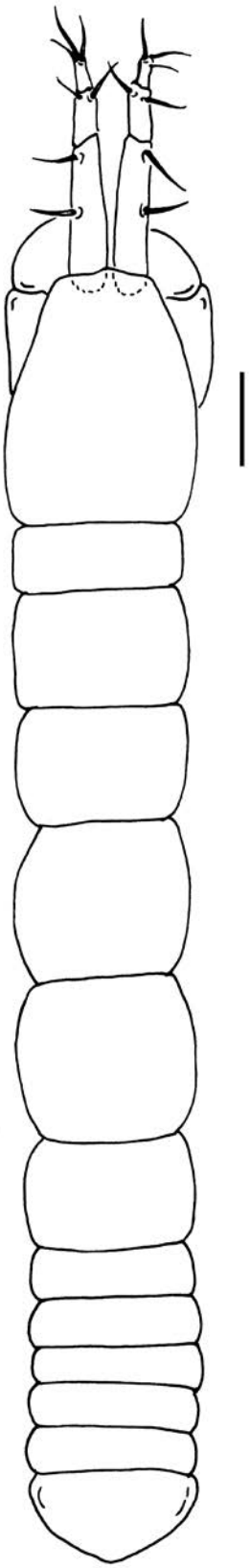

Fig. 130. *Protanaissus huberti* sp. nov. female holotype. Scale = 0.1 mm.

Fig. 131. *Protanaissus huberti* sp. nov. A, antennule; B, antenna; C, labrum; D, left mandible ; E, right mandible; F, maxillule ; G, maxilliped and maxilla ; H, cheliped. Scale = 0.01 mm.

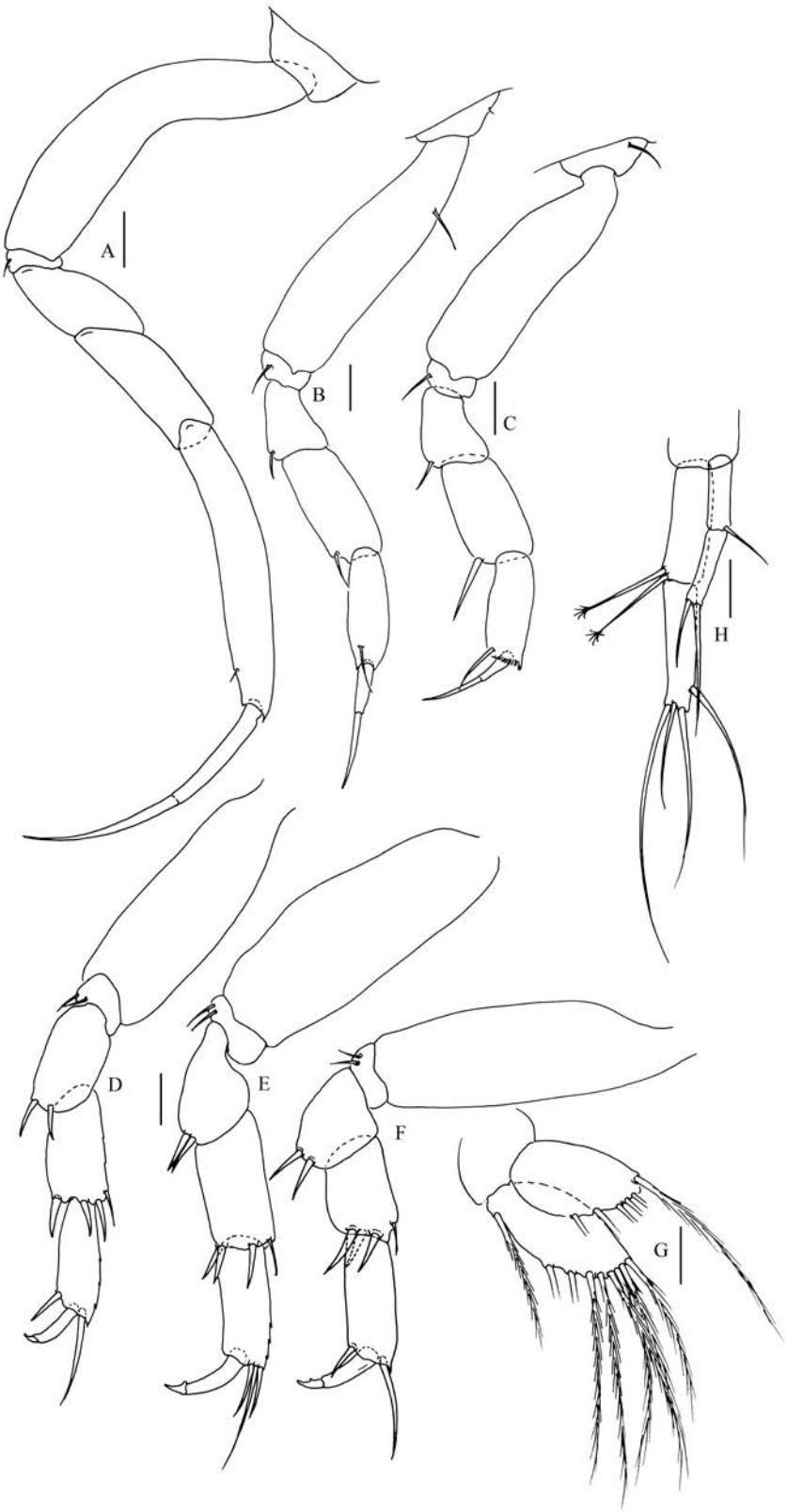

Fig. 132. *Protanaissus huberti* sp. nov. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.01 mm.

two ventrodistal spines; carpus as long as merus, with single ventral, outer and inner distal spines and dorsodistal spinule; propodus 1.1 times as long as carpus, with dorsal microtrichia in distal half, one dorsodistal seta exceeding length of dactylus plus unguis, and ventrodistal spine almost as long as dactylus; dactylus and very short bifurcate unguis together half as long as propodus. Pereopod 5 (Fig. 132E) similar to pereopod 4, merus somewhat shorter. Pereopod 6 (Fig. 132F) similar to pereopods 4 and 5 but propodus with two shorter and one longer dorsodistal setae, no ventrodistal seta or spine.

Pleopods all similar (Fig. 132G), basal article about as long as wide, naked; endopod and exopod rami similar, but endopod somewhat shorter, with five outer-distal and one inner-subdistal plumose setae; exopod with seven outer-distal and one separated outer proximal plumose setae.

Uropod (Fig. 132H) slender; basal article naked; exopod two-segmented, just longer than proximal article of endopod, segments subequal in length, with one distal seta on proximal segment, two unequal distal setae on distal segment; endopod two–segmented, segments subequal in length, proximal segment with two inner penicillate distal setae, distal article with one subdistal and three distal simple setae.

Male. Unknown.

Etymology. This species is dedicated to the first author's son and the second author's good friend, Hubert.

Remarks. Protanaissus huberti sp. nov. shows many similarities to *P. longidactylus*, including the elongate distal articles of pereopod 1, the rugose cheliped, the conformation of the mouthparts, particularly the wide maxilliped endites, and the long dorsodistal setae on the propodi of the posterior pereopods. It is distinguished from *P. longidactylus* in having the distal antennular article shorter than the second article (approaching twice as long in *P. longidactylus*), the more compact fifth article of the antenna, the presence of distal spinules on the mandibular molar process, the presence of linguiform distal tubercles on the maxilliped endites, in having only one ventrodistal spines on the merus and carpus of pereopods 2 and 3, only one ventral seta on the cheliped propodus (two in *P. longidactylus*), serrations along the whole cutting edge of the fixed finger of the cheliped propodus (only distally serrate in *P. longidactylus*) and in having only one ventrodistal seta on the propodus of the posterior three pairs of pereopods (or none on pereopod 6) compared with two in *P. longidactylus*.

Protanaissus huberti was taken occasionally throughout the eastern and central Bass Strait at depths between 13 and 40 m.

The second species to have been attributed to *Protanaissus* was *P. makrotrichos* Sieg 1986, from the shelf off Argentina, which showed many similarities to *P. longidactylus*, but had a distal grinding ("triturating") surface on the mandibular molar process, no rugosity on the cheliped, and a maxilliped endite distally folded to fuse with the basis giving the appearance of two narrow lobes; rather than having a long dorsodistal seta on the propodus of pereopod 6, *P. makrotrichos* has a long ventrodistal seta. Guţu (1996c) described *P. alvesi* from Brazil, which, while again similar to *P. longidactylus*, also had a distal grinding surface on a stout (not tapering) mandibular molar process, no rugosity on the cheliped, no very long seta on maxilliped palp article 2, a maxilliped endite apparently distally narrow, and a long ventrodistal seta on the propodus of pereopod 6, thus more similar to *P. makrotrichos*. Finally, Larsen and Heard (2004a) described *P. floridensis* from Florida, a species with a uniformly narrow mandibular molar process, rugosity on the cheliped, and distally narrow (but not infolded or fused) maxilliped endites, as well as a one-segmented uropod exopod, a uropod endopod without conspicuous pair of penicillate setae on the proximal segment, no very long seta on maxilliped palp article 2, the dactylus plus unguis of pereopods 4 to 6 fused into a claw, no long distal seta on the propodus of pereopod 6, and a quite distinct pereopod 1, with the propodus shorter than the merus and carpus combined, and a dactylus-plus-claw about half as long as the propodus.

That these three additional species have a distally-narrowed maxilliped endite, that two of them have a grinding mandibular molar and no cheliped rugosity, while the third has a quite distinct pereopod 1 and apparently fused claws on pereopods 4 to 6, *inter alia*, puts them in conflict with the generic diagnosis given above. Conversely, the new Australian species, *Protanaissus huberti*, described above agrees with the generic diagnosis in all respects.

We therefore remove *Protanaissus makrotrichos* and *P. alvesi* to a separate genus, clearly close to *Protanaissus*, while *P. floridensis* is moved to yet another distinct genus, no closer to *Protanaissus* than it is to *Tanaissus*. These genera are defined below.

Genus ***Molotanaissus*** gen. nov.

Diagnosis of female. Antennule of three articles; antenna of six articles. Labrum naked. Mandible molar process with distal grinding or crushing surface; incisor process of right mandible triangular, notched, and serrated on anterior border; incisor process of left mandible triangular, serrated on anterior border, lacinia mobilis of similar shape. Maxillule apically curved inwards. Maxilliped bases fused, endites short and distally narrowed and infolded, fused proximally; palp article 1 naked; article 2 with three distal/inner setae, longest of which does not exceed tip of palp. Chela of cheliped not rugose; fixed finger cutting-edge not serrated. Pereopod 1 dactylus plus unguis as long as or longer than propodus, each of these longer than merus and carpus combined. Pereopods 2 and 3 carpus with or without seta and with relatively stout ventrodistal spine; pereopods 4 to 6 with four distal spines on carpus, and with short, stout dactylus armed with small unguis, propodi with long ventrodistal seta exceeding length of dactylus. Pleopods with subequal rami, endopod with subdistal inner plumose seta. Uropod biramous, both rami with two segments, exopod shorter than endopod, endopod proximal segment with conspicuous distal penicillate setae.

Male. Unknown.

Etymology. From the Latin *molo* – "grind", pertaining to the grinding surface on the molar processes of the mandible (unlike the condition found in *Tanaissus* or *Protanaissus*), and *Tanaissus*; masculine.

Type species. Protanaissus makrotrichos Sieg, 1986 by original designation.

Species included: *Molotanaissus makrotrichos* (Sieg, 1986) comb. nov.; *M. alvesi* (Guţu, 1996) comb. nov. (see Guţu, 1996c, for distinctions between these two species).

Distribution. Patagonian Shelf off Argentina (20–50 m depth) and off Brazil (58=60 m).

Genus ***Unitanaissus*** gen. nov.

Diagnosis of female. Antennule of three articles; antenna of six articles. Labrum naked. Mandible molar process uniformly narrow, with distal bifurcation but no grinding surface; incisor process of left mandible triangular, serrated on anterior border, slightly notched, lacinia mobilis narrower with three rounded distal crenulations. Maxillule apically curved inwards. Maxilliped bases fused, endites short, parallel-sided and entirely narrowed; palp article 1 naked; article 2 with three distal/inner setae, longest of which does not exceed tip of article 3. Sclerite triangular, inserted dorsally to cheliped basis. Chela of cheliped rugose; fixed finger cutting-edge slightly serrated distally. Pereopod 1 dactylus plus unguis half as long as propodus, each of these shorter than merus and carpus combined. Pereopods 2 and 3 carpus with relatively stout ventrodistal spine; pereopods 4 to 6 with dactylus and unguis fused into short, stout claw, propodi without long distal seta. Pleopods with subequal rami, endopod with subdistal inner plumose seta. Uropod biramous, exopod with one segment and shorter than endopod, endopod with two segments, proximal segment without conspicuous distal penicillate setae.

Male. Unknown.

Etymology. From the Latin *unus* – "one", and *Tanaissus*, alluding to the single-segmented uropod exopod, a condition unlike that found in *Tanaissus, Protanaissus* or *Molotanaissus*; masculine.

Type species. Protanaissus floridensis Larsen & Heard, 2004 by monotypy.

Species included: *Unitanaissus floridensis* (Larsen & Heard, 2004) comb. nov.

Distribution. Atlantic coast of Florida, 7 m depth.

Family **Agathotanaidae** Lang, 1971

Genus ***Paragathotanais*** Lang, 1971

Paragathotanais wurundjeri sp. nov.

Figures 133–134

Material examined. 1 ♀ (J58566), holotype, Eastern Bass Strait, 60 km E of North Point, Flinders Island, Stn BSS 32, 39º41.7'S 148º39.5'E, 115 m depth, muddy sand, 27 March 1979, coll. G.C.B. Poore; 1 ♀ (J58567), paratype, Eastern Bass Strait, 24 km NNE of Eddystone Point, Stn BSS 163, 40º43.9'S 148º32.5'E, 56 m depth, muddy sand, 14 November 1981; coll. R.S. Wilson; 1 ♀ (J58568), paratype, Eastern Bass Strait, 85 km NE of North Point, Flinders Island, Stn BSS 169, 39º02.4'S 148º30.6'E, 120 m depth, muddy sand, 15 November 1981; coll. R.S. Wilson.

Description of female. Body (Fig. 133A) slender, holotype 3.7 mm long, 8.5 times as long as wide. Cephalothorax pear-shaped, widest and laterally-rounded posteriorly, tapering towards anterior with slight rounded rostrum, 1.5 times as long as wide, as long as pereonites 1 and 2 together, naked; eyelobes and eyes absent. Pereonites hexagonal, pereonites 1 to 3 widest anteriorly, pereonites 4 to 6 centrally; pereonites 1 and 6 subequal in length, shortest, half as long as cephalothorax; pereonite 2 just longer than pereonite 1; pereonites 3 to 5 subequal in length, longer than wide and about 1.25 times as long as pereonite 1 (all pereonites respectively 1.4, 1.1, 0.9, 0.8, 0.9 and 1.0 times as wide as long). Pleon narrower than pereon, pleonites without pleopods, each five times as wide as long. Pleotelson pentangular (Fig. 134H), one-half length of pleon and 1.4 times as wide as long.

Antennule (Fig. 133B) of four articles, proximal article 2.9 times as long as wide, as long as distal three articles together, outer margin with four penicillate setae in distal half, and simple seta distally as long as second peduncle article; second article twice as long as wide, 0.4 times as long as first article, with two outer distal penicillate and single longer simple setae, one inner distal seta; third article 0.3 times as long as second article, with single inner and outer distal setae; fourth article as long as second, with five simple and one penicillate distal setae.

Antenna (Fig. 133C) of six articles, proximal article compact, naked; second article nearly twice as long as wide, naked; third article just shorter than wide, half as long as second article, with fine dorsodistal seta; fourth article longest, twice as long as second article and four times as long as wide, with penicillate seta in proximal half and one simple and two penicillate distal setae; fifth article half as long as fourth with one distal seta; sixth article minute with five distal setae.

Labrum not recovered. Left mandible (Fig. 133D) with rounded "teeth" on pars incisiva, slender hook-like lacinia mobilis, pars molaris flaccid, lanceolate, directed proximally. Labium (Fig. 133H) with prominent setose mediodistal processes. Maxillule (Fig. 133E) with ten distal spines and proximal tufts of setae, palp not recovered. Maxilla (Fig. 133F) linguiform, naked. Maxilliped palp (Fig. 133G) first article naked, second article with three inner distal setae; third article with three inner setae; fourth article distally with two shorter and two longer setae, longer setae finely denticulate in distal half; basis naked; endites distally with two setae and outer rounded tubercle. Epignath (Fig. 133I) elongate, distally pointed, naked.

Cheliped (Fig. 134A) basis compact, 0.7 times as long as wide, naked; merus subtriangular with single ventral seta; carpus 1.5 times as long as wide, with two unequal midventral setae, one fine dorsodistal seta and one fine mid-dorsal seta; propodus as long as wide, fixed finger 0.9 times as long as palm, with one ventral seta, three setae adjacent to cutting edge, tooth-like apophyses centrally and distally on cutting edge; dactylus stout, naked.

Pereopod 1 (Fig. 134B) coxa with seta; basis slightly arcuate, slender, 5.2 times as long as wide, naked; ischium compact, with ventral seta; merus 0.4 times as long as basis,

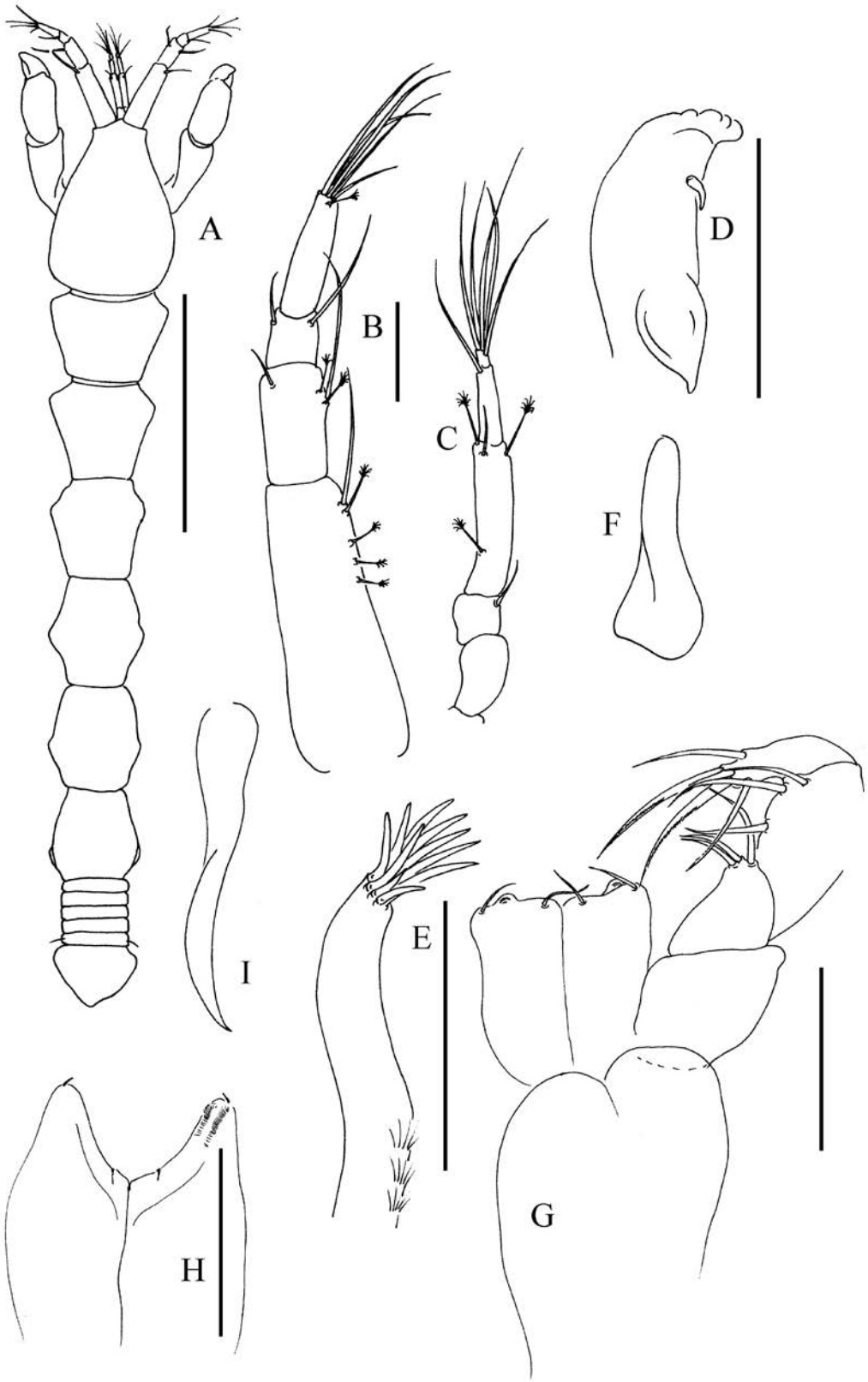

Fig. 133. *Paragathotanais wurundjeri* sp. nov., female paratype. A, whole body dorsally; B, antennule; C, antenna; D, left mandible; E, maxillule endite; F, maxilla; G, maxilliped; H, labium; I, epignath. Scale A = 1 mm, B-I = 0.1 mm.

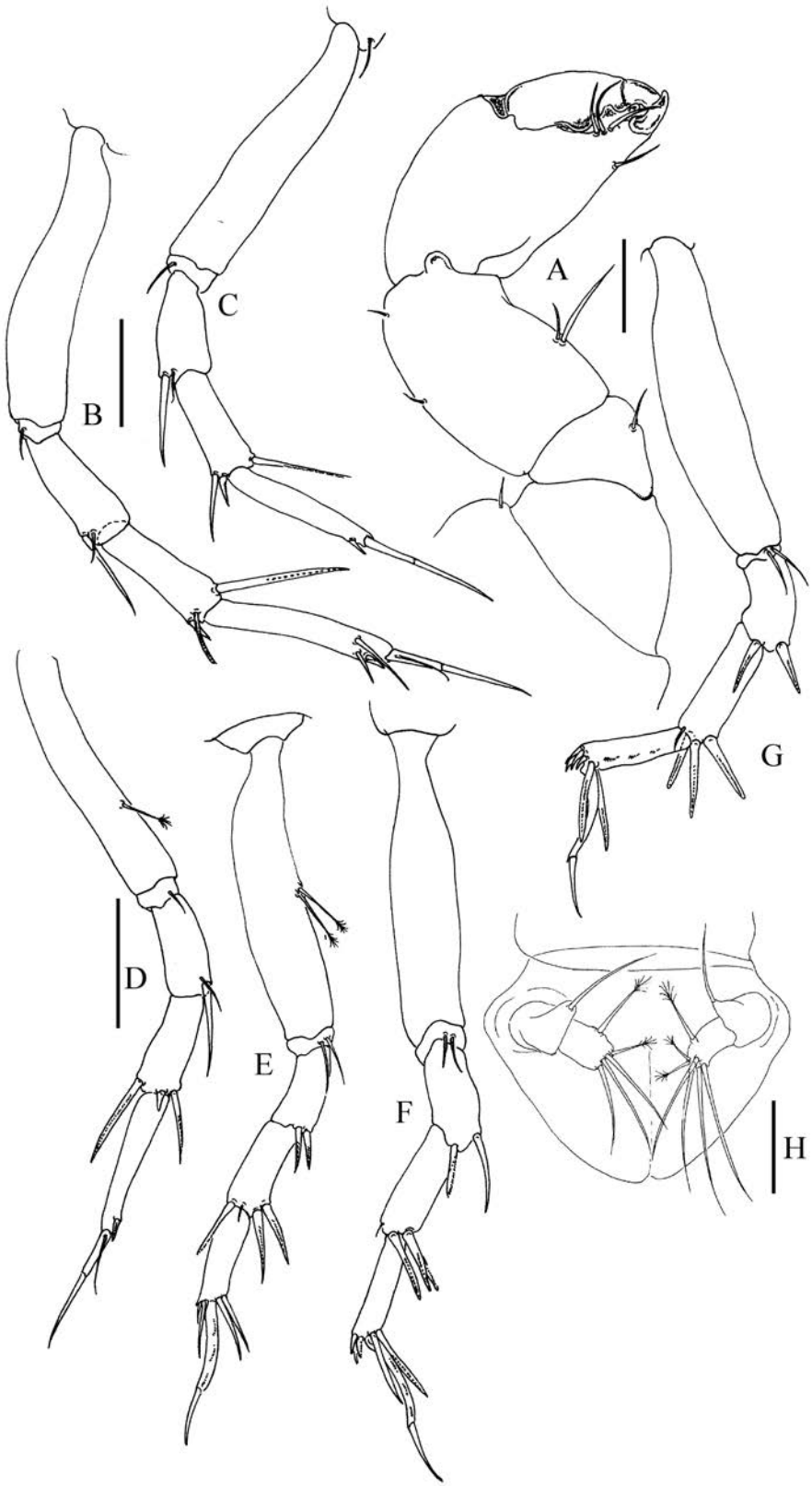

Fig. 134. *Paragathotanais wurundjeri* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleotelson and uropods, ventral. Scale = 0.1 mm.

ventrodistally with seta and elongate slender spine 0.6 times as long as merus; carpus as long as merus, distally with dorsal finely-denticulate spine longer than carpus and one simple shorter and one finely-denticulate longer ventral spines; propodus 1.6 times as long as carpus, with two subdistal setae, shorter ventral spine; dactylus with proximal seta, slender unguis 1.8 times as long as dactylus, both together 0.8 times as long as propodus. Pereopod 2 (Fig. 134C) similar to pereopod 1, but merus 0.85 times as long as carpus, propodus without subdistal setae. Pereopod 3 compact (Fig. 134D), similar to pereopod 2, basis with ventral penicillate seta.

Pereopod 4 (Fig. 134E) coxa naked; basis slightly stouter than those of anterior pereopods, 4.7 times as long as wide, with two midventral penicillate setae; ischium with two ventrodistal setae; merus one-quarter as long as basis, with two finely-denticulate ventrodistal spines; carpus 1.2 times as long as merus, distally with two ventral and one dorsal finely-denticulate spines and fine mesial seta; propodus as long as carpus, distally with two ventral finely-denticulate spines. and one longer and one shorter dorsal setae; dactylus sinuous, with fields of microtrichia, 1.6 times as long as curved unguis, both together 1.5 times as long as propodus. Pereopod 5 (Fig. 134F) as pereopod 4, but carpus with lateral rather than dorsodistal spine; propodus with three short dorsodistal spines and no setae. Pereopod 6 (Fig. 134G) as pereopod 5, but propodus with microtrichia and four dorsodistal spines.

Pleopods absent.

Uropods (Fig. 134H) held ventrally beneath anterior of pleotelson; basis naked; exopodal process shorter than endopod, with one distal seta; endopod of one segment, with one subdistal penicillate seta, four simple and one or two penicillate distal setae.

Male. Unknown.

Etymology. The Wurundjeri were one of the indigenous hunter-gatherer tribes of the Melbourne region, from whom John Batman, in 1835, negotiated a "purchase" of 2,400 km^2 of land which became the site of the original settlement which developed into the city of Melbourne (noun in apposition).

Remarks. Larsen (2005) gave a key to the females of *Paragathotanais*, in which the present species fails at couplet 5 in having a relatively stout cheliped, but "shoulders" (supercoxal processes) on the pereonites. In addition to the species listed that publication, Guerrero-Kommritz (2003) described *P. insolitus* from the Angola basin, but that species is distinct in having only four articles in the antenna, and very reduced spination of the anterior pereopods; *P. abyssorum* Larsen, 2007 is distinguished from *P. wurundjeri* sp. nov. by the much more compact antennule, the more slender cheliped and the smaller spines on the anterior pereopods, *inter alia* (Larsen, 2007); *P. vikingus* Bird, 2010 has far more compact pereonites, a characteristically elongate and parallel-sided cephalothorax, and a distinct mandibular morphology (Bird, 2010); *P. zevinae* (Kudinova-Pasternak, 1970), moved to this genus from *Paranarthrura* by Larsen (2007), has a more compact antennule and a more slender cheliped (Kudinova-Pasternak, 1970). All of these species have a smaller exopodal process on the uropod. Finally, *P. ipy* Jóźwiak & Błażewicz-Paszkowycz, 2011, differs from *P. wurundjeri* in having no ventrodistal spine on the merus of pereopods 1 to 3.

Paragathotanais wurundjeri is the shallowest-recorded species of the genus discovered so far, having been collected on muddy sand at 56 to 120 m depth in the Eastern Bass Strait. All of the other species occur at depths greater than 200 m, and mostly at depths greater than 2000 m.

Genus ***Ozagathus*** gen. nov.

Diagnosis. Agathotanaid with three-articled antennule, apparent five-articled antenna; pereonites wider medially, pleon slightly narrower than pereon; mandibular molar membranous and directed proximally, lacinia mobilis reduced to apophysis; labium with prominent rounded mediodistal processes; maxilliped bases and endites naked; cheliped without pseudocoxa; pereopod coxae unfused; anterior pereopods with carpal spines; dactyli and ungues of posterior pereopods not fused, their carpi with two spines; uropod exopod a fused process on basis, endopod one-segmented, uropods held beneath pleotelson. Female without pleopods. Male with slightly more robust antennule and with poorly-developed pleopods.

Type species. Ozagathus watharongus sp. nov. by monotypy.

Etymology. From "Oz", colloquial slang for "Australia", and "agathus" derived from the prefix to the Family name (male).

Remarks. The new species described below shows all the general features of an agathonataid, but is somewhat intermediate between the previously recognized genera, having the three-articled antennule and reduced uropods typical of *Agathotanais* Hansen, 1913, but an apparently five-articled antenna more typical of *Paragathotanais*. The mouthparts are generally within the range of morphology shown by the Family, although the setulose rounded distal processes on the labium are presently characteristic of *Ozagathus* gen. nov. Whether the tuberculation of the cheliped, a feature not previously described for an agathotanaid, is a generic character is impossible to say at present, particularly in the light of the variable presence of this feature in some genera of the Tanaellidae (see above).

Ozagathus watharongus sp. nov.

Figures 135–137

Material examined. 1 ♀ (J58854), holotype, MSL EG120, Eastern Bass Strait, 11.7 km W of Pt Ricardo, 37°49.54'S 148°30.01'E, 29 m depth, 28 September 1990, coll. Marine Science Laboratories. 1 ♀ (J56381), paratype, MSL-EG 68, Eastern Bass Strait, 13.3 km E of eastern edge of Lake Tyers, 37°51.42'S 148°14.36'E, 121 m depth, 04 June 1991, coll. N. Coleman; 1 ♀ (J23653), paratype, MSL-EG 41, Eastern Bass Strait, 11.7 km W of Pt Ricardo, 37°49.54'S 148°30.01'E, 29 m depth, sand and shell, 28 September 1990, Smith-McIntyre Grab, coll. Marine Science Laboratories. 1 ♀ (J50793), paratype, VC 48 C1, Eastern Bass Strait, 37°21.43'S 149°29.57'E, 40 m depth, 09 May 1998, coll. N. Coleman, Smith-McIntyre Grab. 1 ♀ (J28426), paratype, MSL-EG 121, Eastern Bass Strait, 11.7 km W of Pt Ricardo, 37°49.54'S 148°30.01'E, 29 m depth, sand and shell, 28 September 1990, Smith-McIntyre Grab, coll. Marine Science Laboratories. 17 ♀♀ (J28413), paratypes, MSL-EG 86,

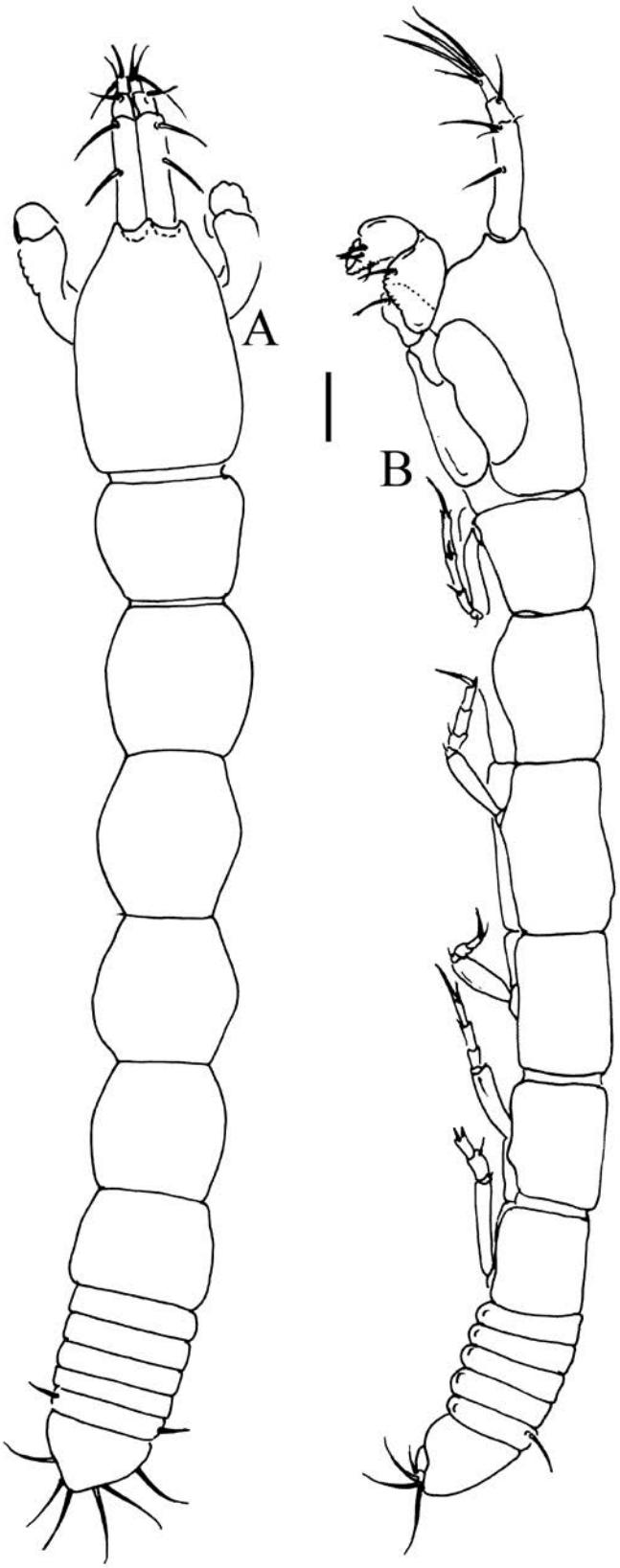

Fig. 135. *Ozagathus watharongus* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 0.1 mm.

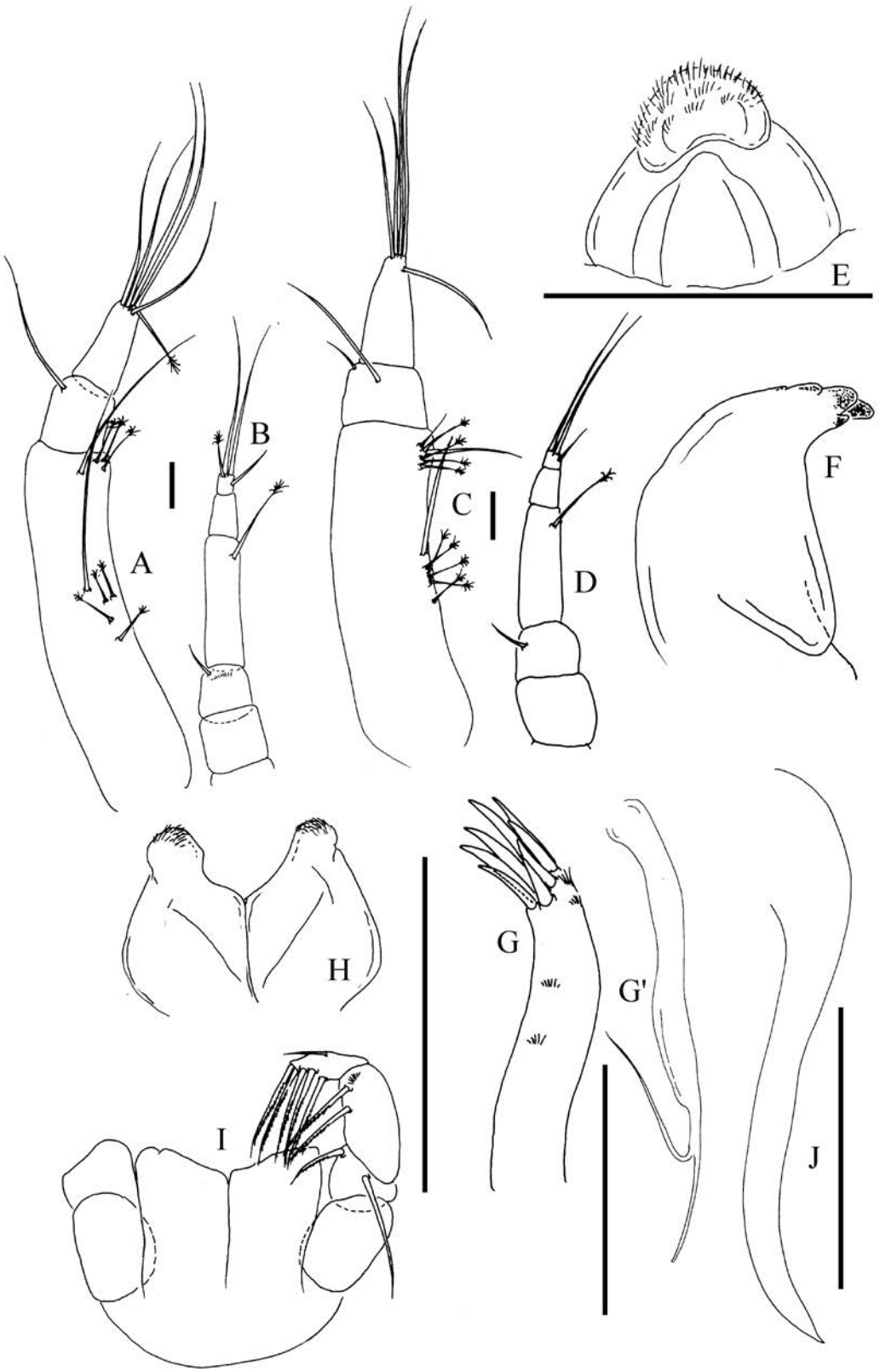

Fig. 136. *Ozagathus watharongus* sp. nov. A, female antennule; B, female antenna; C, male antennule; D, male antenna; E, labrum; F, left mandible; G, maxillule; G', maxillule palp; H, labium; I, maxilliped; J, epignath. Scale = 0.01 mm.

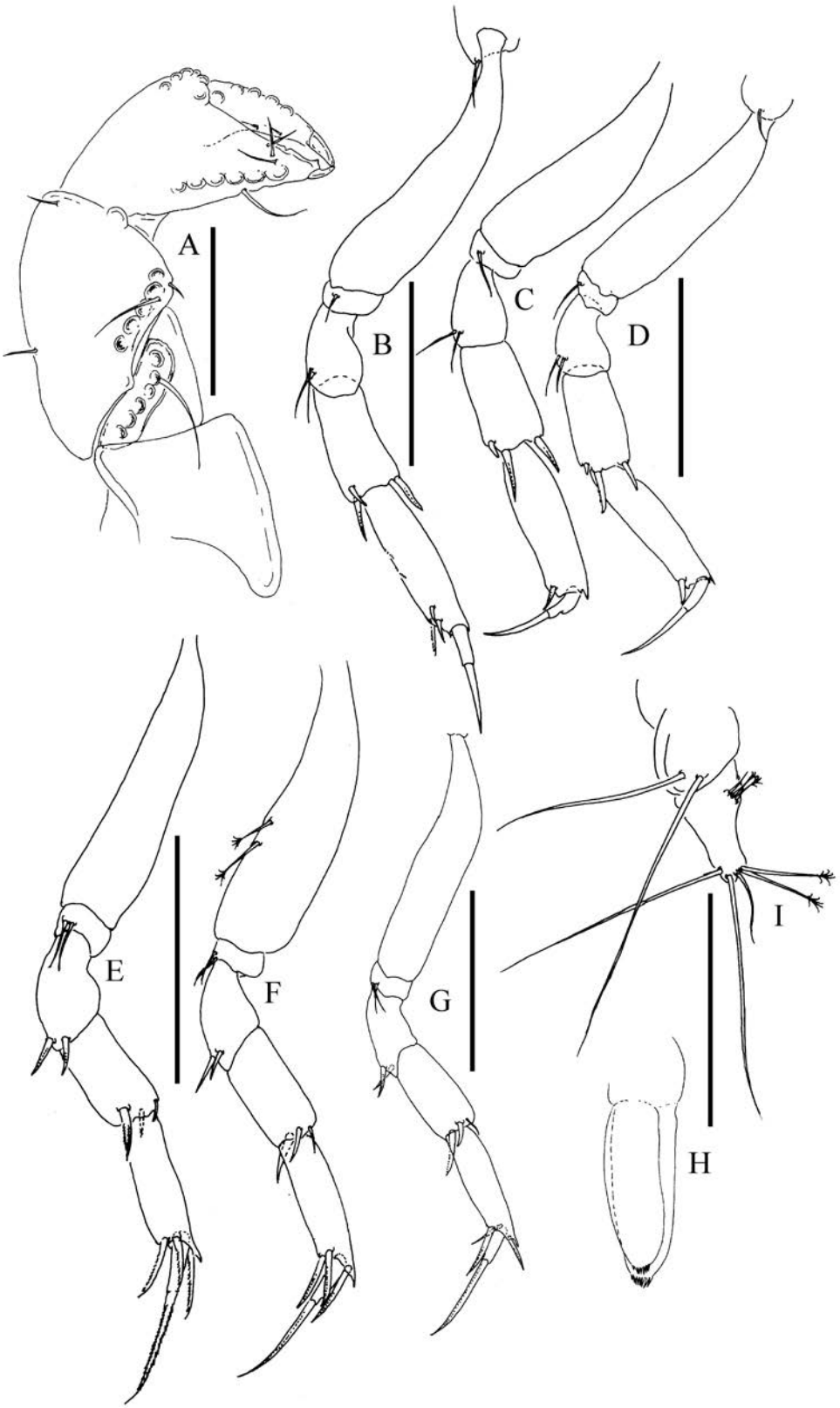

Fig. 137. *Ozagathus watharongus* sp. nov. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, male pleopod; I, uropod. Scale = 0.1 mm.

Eastern Bass Strait, 2.9 km SE of Cape Conran, 37°50.00'S 148°38.54'E, 95 m depth, coarse sand, 04 June 1991, Smith-McIntyre grab, coll. N. Coleman. 30 ♀♀ (J28416), paratypes, MSL-EG 90, Eastern Bass Strait, 7.3 km SSW of Cape Conran, 37°52.39'S 148°42.09'E, 161 m depth, coarse sand, 04 June 1991, Smith-McIntyre grab, coll. N. Coleman. 2 ♀ ♀ (J50792), paratypes, Stn VC 37 C1, Eastern Bass Strait, 38°18.3'S 147°15.25'E, 40 m depth, 10 May 1999, Smith-McIntyre grab, coll. N. Coleman. 19 ♀♀ (J28420), paratypes, MSL-EG 114, Eastern Bass Strait, 2.9 km SE of Cape Conran, 37°50.00'S 148°38.54'E, 29 m depth, coarse sand, February 1991, Smith-McIntyre grab, coll. N. Coleman. 4 ♀♀ (J23525), paratypes, MSL-EG 45, Eastern Bass Strait, 13.3 km E of eastern edge of Lake Tyers, 37°51.44'S 148°14.46'E, 37 m depth, sand and shell, 25 September 1990, Smith-McIntyre grab, coll. Marine Science Laboratories. 22 ♀♀ (J23532), paratypes, MSL-EG 59, Eastern Bass Strait, 9.5 km SW of Cape Conran, 37°52.53'S 148°39.29'E, 48 m depth, sand and shell, 28 September 1990, Smith-McIntyre grab, coll. Marine Science Laboratories.

Description of female. Body (Fig. 135A, B) slender, holotype 1.9 mm long, 8.7 times as long as wide. Cephalothorax subrectangular, tapering in anterior third with slight triangular rostrum, 1.6 times as long as wide, almost as long as pereonites 1 and 2 together, wider than pereon, naked; eyelobes and eyes absent. Pereonites almost barrel-shaped, pereonite 1 widest anteriorly, pereonites 2 to 5 centrally, pereonite 6 posteriorly; pereonites 1 and 5 subequal in length, half as long as cephalothorax; pereonites 2 and 4 just longer than pereonite 1; pereonite 3 longest, 1.3 times as long as pereonite 1; pereonite 6 shortest, 0.8 times as long as pereonite 1 (all pereonites respectively 1.2, 1.0, 0.9, 1.0, 1.1 and 1.3 times as wide as long). Pleon just narrower than pereon, pleonites without pleopods, each 4.5 times as wide as long; pleonite 5 with conspicuous midlateral seta on each side. Pleotelson subpentangular, 0.4 times length of pleon and as wide as long.

Antennule (Fig. 136A) of three articles, proximal article 4.2 times as long as wide, 1.35 times as long as distal two articles together, outer margin with mid-length and distal tufts of four penicillate and one simple setae, mid-length seta exceeding tip of proximal article, distal seta exceeding tip of antennule; second article as long as wide, 0.2 times as long as first article, with simple outer distal seta; third article 1.2 times as long as second article, with five simple and one penicillate distal setae.

Antenna (Fig. 136B) of five apparent articles, proximal article totally fused to carapace; second article as long as wide, naked; third article just longer than wide, as long as second article, with fine dorsodistal seta; fourth article longest, 2.2 times as long as second article and nearly four times as long as wide, with subdistal ventral penicillate seta; fifth article one-third as long as fourth, naked; sixth article half as long as fifth, distally with three simple and one penicillate setae.

Labrum (Fig. 136E), compact, rounded, distally setulose. Left mandible (Fig. 136F) with three rounded lobe-like "teeth" on pars incisiva, lacinia mobilis reduced to a similar rounded subdistal tubercle, pars molaris flaccid, blunt, directed proximally. Labium (Fig. 136H) with prominent setose, rounded mediodistal processes. Maxillule (Fig. 136G) with eight distal spines and sparse groups of microtrichia, palp (Fig. 136G') with two distal setae. Maxilla not recovered. Maxilliped (Fig. 136I) palp first article naked, second article with two inner distal setae; third article with two inner setae in distal half; fourth article tapering, with five setae along inner margin to tip, single outer subdistal seta; all palp setae other than the last distally finely denticulate; bases fused, naked; endites distally with rudiment of outer rounded tubercle. Epignath (Fig. 136J) elongate, distally pointed, naked.

Cheliped (Fig. 137A) basis compact, 0.85 times as long as wide, naked; merus subtriangular, outer face with strip of six rounded tubercles and single seta along dorsodistal margin; carpus 1.6 times as long as wide, with two unequal midventral setae, one fine dorsodistal seta and one fine mid-dorsal seta, and strip of five rounded tubercles along ventral margin of outer face; propodus longer than wide with ventral submarginal strip of six rounded tubercles and group of smaller tubercles dorsodistally, fixed finger 0.8 times as long as palm, with one ventral seta, three setae adjacent to cutting edge, small "teeth" centrally and distally on cutting edge; dactylus with rounded tubercles along dorsal margin and proximally on inner face, two blunt tubercles on cutting edge.

Pereopod 1 (Fig. 137B) coxa with seta; basis slightly arcuate, slender, five times as long as wide, naked; ischium compact, with ventral seta; merus 0.3 times as long as basis, ventrodistally with two setae; carpus 1.3 times as long as merus, distally with one dorsal, and one shorter and one longer ventral finely-denticulate spines; propodus 1.5 times as long as carpus, ventrally with subdistal spine and seta; dactylus short and robust, tapering unguis 1.7 times as long as dactylus, both together 0.7 times as long as propodus. Pereopod 2 (Fig. 137C) similar to but somewhat stouter than pereopod 1, basis 3.7 times as long as wide, propodus without subdistal seta but with dorsodistal spine-like apophysis. Pereopod 3 (Fig. 137D), similar to pereopod 2.

Pereopod 4 (Fig. 137E) basis 4.2 times as long as wide; ischium with two ventrodistal setae; merus 0.4 times as long as basis, with two finely-denticulate ventrodistal spines; carpus as long as merus, distally with outer and inner finely-denticulate spines and fine dorsal seta; propodus 1.3 times as long as carpus, distally with three finely-denticulate spines and dorsodistal spine-like apophysis; dactylus about half as long as curved unguis, unguis slender, finely denticulate, both together 1.3 times as long as propodus. Pereopod 5 (Fig. 137F) as pereopod 4, but basis with two penicillate setae. Pereopod 6 (Fig. 137G) as pereopod 4, but basis naked.

Pleopods absent.

Uropods (Fig. 137I) held ventrally beneath pleotelson; basis naked but with slight fused exopod with two distal setae exceeding tip of endopod and visually conspicuous in dorsal view of animal (Fig. 135); endopod of one segment, widest proximally, with one simple and two penicillate setae in proximal half, three simple and two penicillate setae distally.

Distinctions of male. Of similar overall appearance to female; antennule (Fig. 136C) stouter, proximal two articles respectively 3.5 and 0.7 times as long as wide; antenna (Fig. 136D) also slightly stouter, second and third articles shorter than wide, fourth article three times as long as wide; pleopods present (Fig. 137H), somewhat rudimentary, biramous, rami with incomplete articulation with naked basis, each with distal tuft of fine setules.

Etymology. The Wathaurong were another of the indigenous hunter-gatherer tribes of the Melbourne region in the mid-nineteenth century (see under *Paragathotanais wurundjeri* above) (noun in apposition).

Remarks. See above under *Remarks* for the genus. *Ozagathus watharongus* sp. nov. was collected frequently in the Eastern Bass Strait, at depths from 29 to 161 m on coarse or shelly sands.

Family **Akanthophoreidae** Sieg, 1986

Genus ***Gejavis*** gen. nov.

Diagnosis of female. Similar to *Akanthophoreus,* uropods biramous, endopod and exopod two-segmented; molar process tapering with several terminal spines; maxillule endite with nine distal spines; maxilliped basis naked; maxilliped palp article 2 with three inner plumose setae, outer margin naked, article 3 with three plumose and one simple inner setae; cheliped carpus without ventral shield but with rugose dorsla margin, propodus with coarse rugosity; pereopod 1 merus ventrodistally with one seta and one slender spine, carpus with dorsodistal seta, ventrodistally naked; dactyli without groove or small spines; pereopods 4 to 6, unguis of anterior pereopods much longer than dactylus; pereopods 4 to 6, carpus with three spines and one seta. Pleonites with long setae.

Type species. Gejavis corsotos sp. nov. by monotypy.

Etymology. Named cryptically after Dr Graham Gird (G J being his initials, and avis being Latin for a bird) for his invaluable contributions to tanaidacean taxonomy and phylogeny (female).

Remarks. The new species described below shows close affinities to *Akanthophoreus* Sieg, 1986 (see Bird, 2007, for diagnosis and discussion of that genus) and *Chauliopleona* Dojiri and Sieg, 1997, but is distinguished in the comparatively reduced spination of the merus and carpus of pereopod 1, in the simpler conformation of the dactyli of all pereopods, in having the uropod exopod longer than the proximal endopod segment, in the absence of a seta on the maxilliped basis and in the maxilliped palp setation. The new genus differs from *Paraleptognathia* Kudinova-Pasternak, 1981 in that the cheliped is rugose trather than setulose, and is without a ventrodistal carpal shield, pereopod 1 is without the complex spinulation of that genus, and again the conformation of the pereopod dactyli and the uropod rami are distinct. There remain some species currently assigned to *Leptognathia* Sars, 1882 with two-segmented uropod exopods which will presumably be reallocated once the confounded classification of this group of tanaidaceans is resolved better (*Leptognathia sensu stricto* is currently regarded as having a one-segmented uropod exopod, e.g. Larsen & Shimomura, 2007a); again, *Gejavis* gen. nov. is largely distinguished from those species by its pereopod 1 spination and uropod exopod conformation.

The rugosity of the cheliped in the present genus is also distinct from those of other akanthophoreids, although it is not possible at this stage to say whether this feature is a generic or specific characteristic.

Błażewicz-Paszkowycz and Bamber (2011) elevated Sieg's (1986a) subfamily Akanthophoreinae to familial rank to accommodate the genus *Akanthophoreus* (at least), as, despite this genus having its own higher taxon, being the type genus of that subfamily, it had been left unclassified ("Family *incertae sedis*") in a number of recent phylogenetic and taxonomic works on the genus (e.g. Larsen & Wilson, 2002; Bird, 2007). The new genus described here is clearly close to *Akanthophoreus,* and so is placed within the same Family.

Gejavis corsotos sp. nov.

Figures 138–140

Material examined. 1 ♀ (J58562), holotype, CPBS 03S, Western Port off Crib Point, 38°21.65'S 145°15.21'E, 2 m depth, sandy-mud, 13 April 1965, Smith-McIntyre grab, coll. A. J. Gilmour; 1 ♀ (J23596), paratype, Stn MSL-EG 40, Eastern Bass Strait, 11.7 km W. of Pt Ricardo, 37°49.90'S 148°30.01'E, 29 m depth, sand-shell, 28 September 1990, R.V. Sarda, Smith-McIntyre Grab. 1 ♀ (J62057), paratype, Stn. BSS 31, Eastern Bass Strait, 22 km NNE of North Point, Flinders Island, 39°34.3'S 148°04.0'E, 37 m depth, coarse sand, 26 March 1979, dredge, coll. G.C.B. Poore. 1 ♀ (J56376), paratype (dissected), Stn MSL-EG 69, Eastern Bass Strait, 13.3 km E of eastern edge of Lake Tyers, 37°51.7'S 148°14.6'E, 37 m depth, 04 June 1991, coll. N. Coleman, Smith-McIntyre Grab.

Description of female. Body (Fig. 138A, B) elongate, slender, 2.4 mm long, nine times as long as wide. Cephalothorax subrectangular, tapering from mid-length towards anterior, 1.4 times as long as wide, with slight rounded rostrum, naked; eyes absent. Six free cylindrical pereonites; pereonites 1 to 5 about as long as wide, subequal in length and 0.6 to 0.7 times as long as cephalothorax; pereonite 6 shortest, less than half as long as cephalothorax and 1.3 times as wide as long. All pleonites bearing pleopods, each pleonite with one midlateral seta on each side. Pleotelson rounded, almost three times as long as pleonite 5, 1.3 times as wide as long, with paired distal and laterodistal setae.

Antennule (Fig. 139A) of four articles, proximal article 1.9 times as long as wide, 0.6 times as long as last three articles together, with mesial and distal outer tufts of penicillate setae and single inner and outer simple distal setae; second article 1.6 times as long as wide, 0.7 times as long as first article, with one outer distal penicillate seta and single inner and outer simple distal setae; third article half length of second with one outer distal penicillate seta and single inner and outer simple distal setae; distal article more slender, 1.6 times as long as third article, with three simple and one penicillate distal setae and single aesthetasc.

Antenna (Fig. 139B) of six articles, proximal article naked; second article slightly inflated with one small dorsodistal seta; third article half length of second article, with single dorsodistal seta three-times as long as article; fourth article longest, as long as articles 1 to 3 together and 3.5 times as long as wide, with four distal penicillate setae and single simple distal seta exceeding tip of antennule; fifth article 0.4 times as long as fourth, with one distal seta; sixth article 0.25 times as long as fifth, with four distal setae.

Labrum (Fig. 139C) apically blunt, finely setose. Left mandible not recovered; right mandible (Fig. 139D) with bilobed pars incisiva, pars molaris basally stout, tapering, with

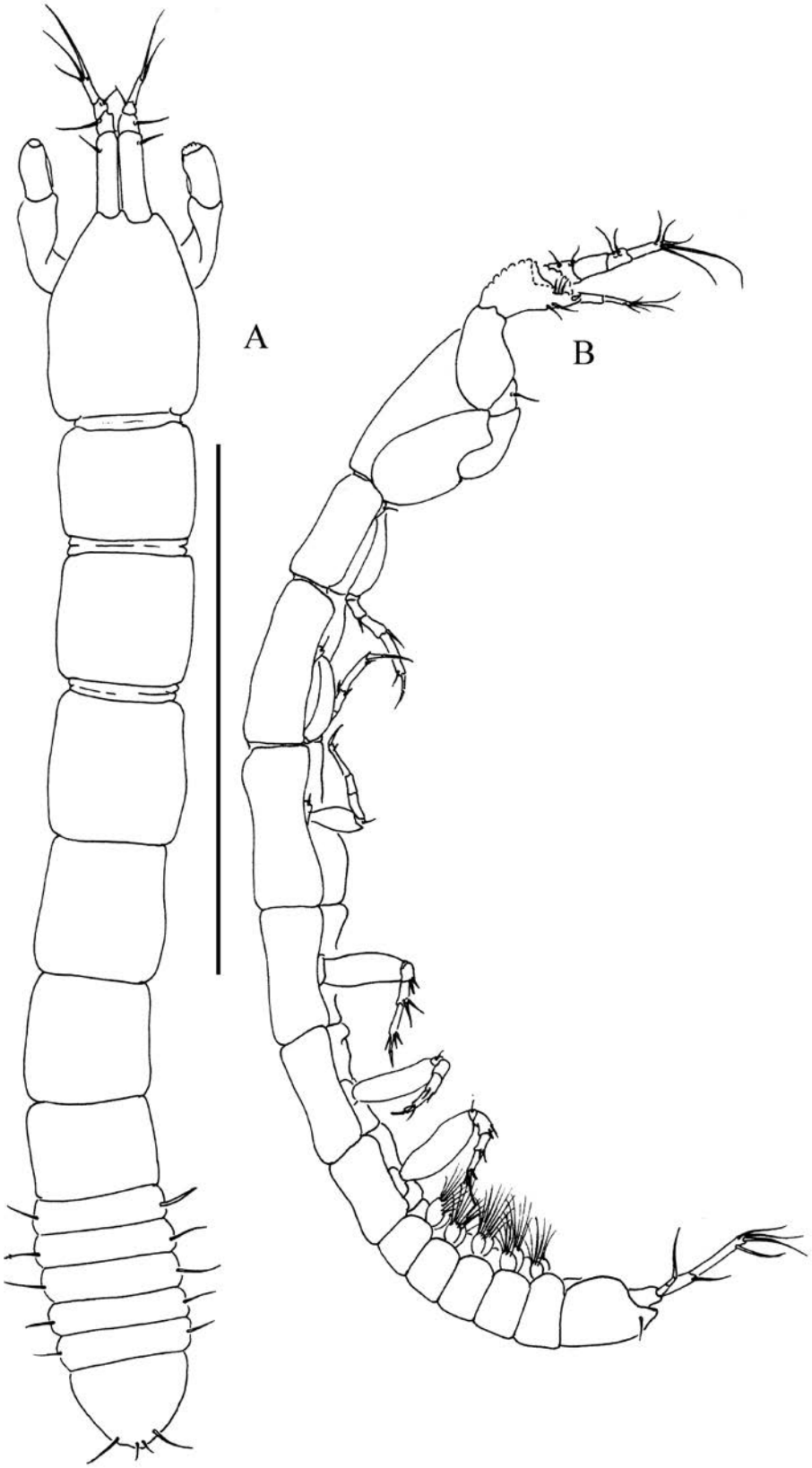

Fig. 138. *Gejavis corsotos* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1 mm.

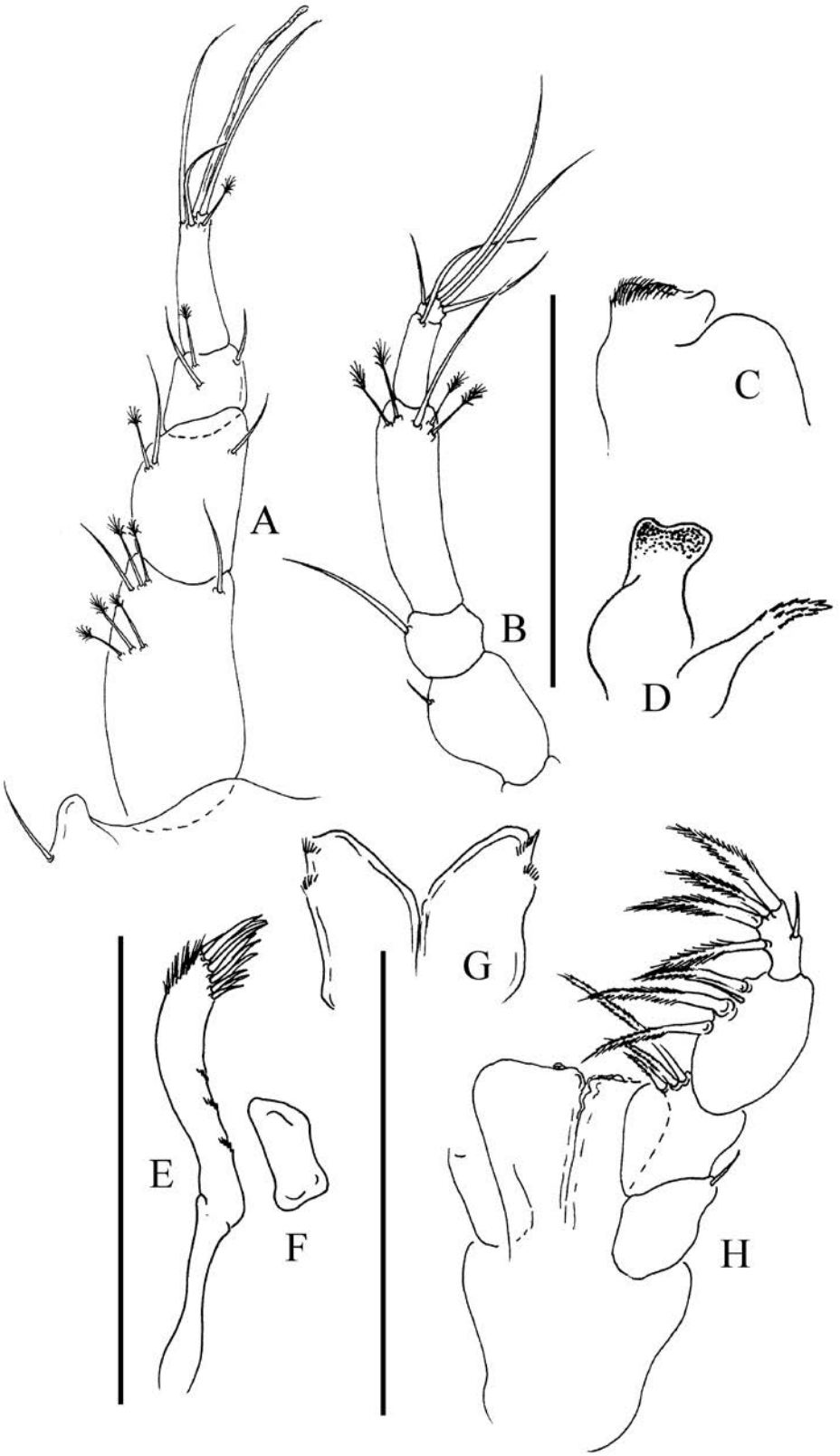

Fig. 139. *Gejavis corsotos* sp. nov., female paratype. A, antennule; B, antenna; C, labrum; D, right mandible; E, maxillule; F, maxilla; G, labium; H, maxilliped. Scale = 0.1 mm.

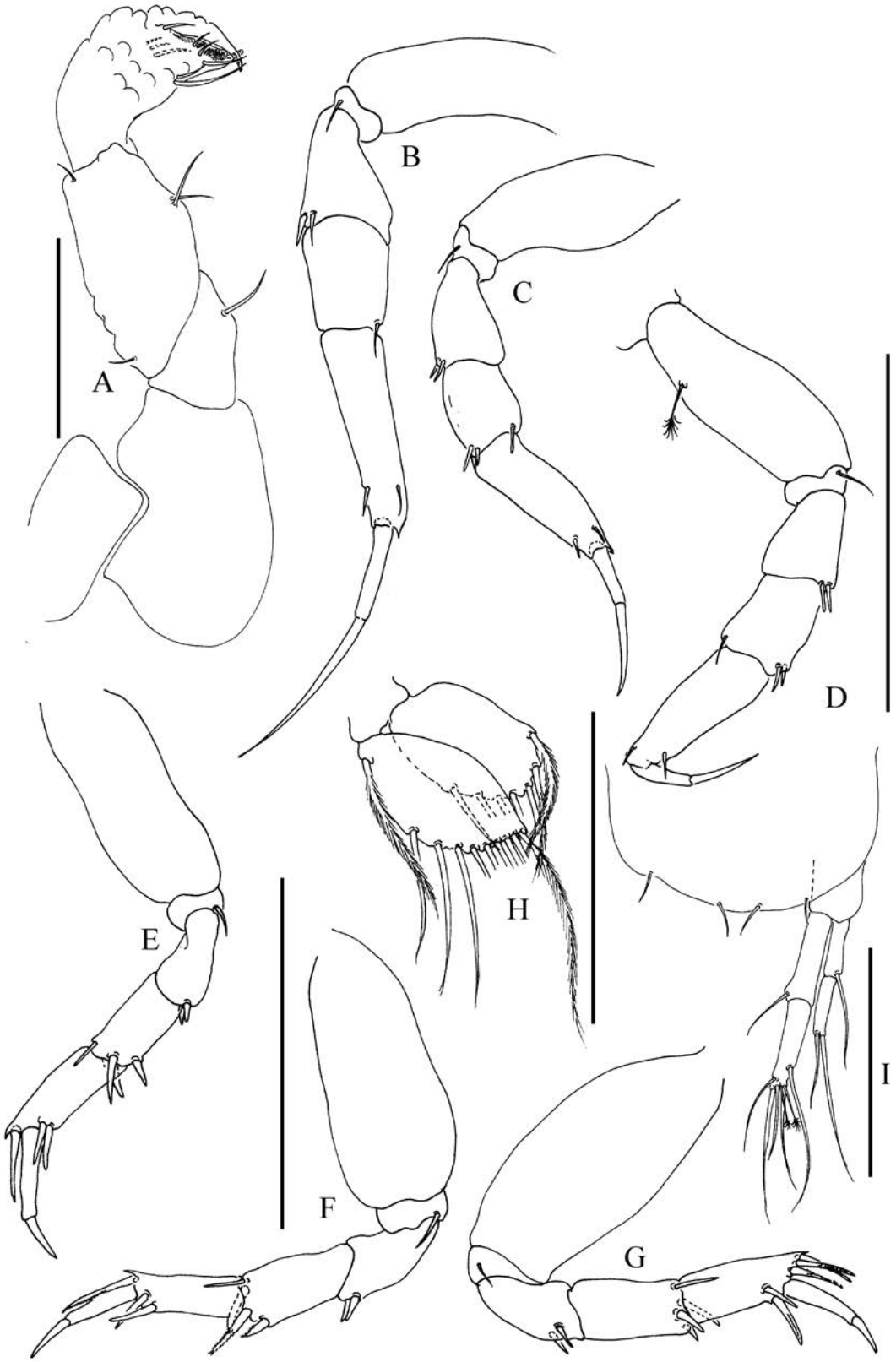

Fig. 140. *Gejavis corsotos* sp. nov., female paratype. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

several distal spinules. Labium (Fig. 139G) with outer distal and subdistal microtrichia. Maxillule (Fig. 139E) with nine distal spines and outer brush of setules, palp damaged. Maxilla (Fig. 139F) quadrangular, simple, naked. Maxilliped (Fig. 139H) endites each with inner-distal rounded tubercle and slightly crenulated distal margin; palp first article with outer distal seta, second and third articles with three inner plumose setae, third article with additional inner simple seta; fourth article with one inner and three distal plumose setae and one outer simple seta; basis naked. Epignath not recovered.

Cheliped (Fig. 140A) basis with large posterior lobe, wider proximally and extended past anterior margin of pereonite 1 ventrally, about 1.8 times as long as wide; merus subtriangular with one mid-ventral seta; carpus twice as long as wide with paired mid-ventral setae and no shield, proximal and distal single dorsal setae, proximal half of dorsal margin coarsely rugose; propodus longer than wide, with coarse rugosity over outer face and along dorsal margin; inner comb-row of three setae; fixed finger short with lamellate cutting edge, two ventral and three inner setae; dactylus with dorsal margin coarsely rugose, cutting edge naked.

Pereopod 1 (Fig. 140B) basis damaged in preparation, curved, about 3.5 times as long as wide; ischium compact with single seta; merus just shorter than carpus with single ventrodistal seta and spine; carpus with dorsodistal seta; propodus 1.9 times as long as carpus, with single dorsal and ventral subdistal setae; dactylus half as long as slender unguis, both together 1.4 times as long as propodus. Pereopod 2 (Fig. 140C) similar to but shorter than pereopod 1; basis 2.5 times as long as wide; merus as long as carpus and with two ventrodistal spines; carpus with one dorsal and two ventral distal spines; unguis 1.7 times as long as dactylus, both together 0.7 times as long as propodus. Pereopod 3 (Fig. 140D) as pereopod 2, but basis with dorsoproximal penicillate seta.

Pereopod 4 (Fig. 140E) basis 2.8 times as long as wide; ischium with one ventral seta; merus wider distally, 0.4 times as long as basis, with two ventrodistal spines; carpus 0.9 times as long as merus, with fine dorsodistal spines and three stouter mid- and ventrodistal spines; propodus with one longer dorsodistal and two shorter ventrodistal spines, all shorter than dactylus; dactylus twice as long as unguis, both together 1.4 times as long as propodus. Pereopod 5 (Fig. 140F) as pereopod 4, but basis broader, 2.4 times as long as wide, and dorsodistal spine on [propodus as long as dactylus. Pereopod 6 (Fig. 140G) as pereopod 5, but propodus with three dorsodistal spines.

Pleopods (Fig. 140H) all alike, with naked basis; endopod shorter than exopod and with seven mainly distal plumose setae; exopod with ten distal and outer plumose setae, proximal seta on ventral margin well-separated from remaining setae, most setae about as long as rami.

Uropod (Fig. 140I) basis naked; exopod of two subequal segments, longer than proximal endopod segment, proximal segment with one distal seta, distal segment with two unequal distal setae; endopod of two subequal segments, proximal segment with one seta, distal segment with one subdistal and four distal simple setae and two distal penicillate setae.

Male. Unknown.

Etymology. From the Greek *korsotos* – "shorn", referring to the relative lack of spines or setae on pereopod 1 of the present species.

Remarks. See above under *Remarks* for the genus. *Gejavis corsotos* sp. nov. was taken from sandy substrata at 2 to 37 m depth, in Western Port and the Eastern Bass Strait.

Family **Tanaopsidae** fam. nov.

Diagnosis. Generally leptognathioid (*sensu lato*) facies, pleon laterally convex and wider than pereon, antennule in female of four longer articles with or without minute distal article, in male with multisegmented flagellum; mandible pars incisiva distally rounded with adjacent serrated incisive margin, molar process either slender and pointed or absent; maxillule endite reflexed through about 90° and with five or six distal spines, one significantly more robust than the others; maxilliped endite flared. Cheliped with triangular, dorsally-inserted sclerite, fixed finger with two ventral setae, bifid terminal spine and bifid or trifid distal denticle on incisive margin. Pereopods 1 to 3 with setae, unguis longer than slender dactylus, both together about as long as or longer than propodus, dactylus with proximal seta; pereopods 4 to 6 with spines on merus, carpus (three in number) and propodus. Pleopods with plumose seta along entire outer margin of exopod, but restricted to distal half of outer margin of endopod; uropods biramous, rami with one or two segments.

Type genus: *Tanaopsis* Sars, 1896

Remarks. The present suprageneric classification of the Paratanaoidea is in a state of flux, owing to recent attempts at phylogenetic resolution involving cladistics, based on meristics and morphometrics (Larsen & Wilson, 2002; Błażewicz-Paszkowycz & Poore, 2008; Bird & Larsen, 2009). The only of these studies to consider the genus *Tanaopsis* were Larsen & Wilson (2002) and Błażewicz-Paszkowycz & Poore (2008), but they were unable to resolve it to a family as defined by their generated clades.

The diagnostic features listed above taken together distinguish members of the genus *Tanaopsis* from all other paratanaoid genera of the leptognathioid *sensu lato* facies; that said, they constitute a diagnosis of the genus itself. Equally, exclusion of the unique features of the cheliped fixed finger does not allow inclusion of any other genera. Further detailed cladistic analyses may associate other genera, which would then require qualifying the familial diagnosis above, removing characters not consistent across all associated genera into the diagnosis of the genus *Tanaopsis*. Bird (2011) suggests possible affinities with *Cristatotanais* Kudinova-Pasternak, 1990 (including *Spinitanaopsis* Larsen, 2005).

It is further the case that *Tanaopsis* itself may not be monophyletic. There appear to be two groups of species, one with a pointed mandibular molar process and two-segmented uropod rami (*T. antarcticus* Lang, 1967; *T. cadieni* Sieg & Dojiri, 1991; *T. curtus* Kudinova-Pasternak 1984; *T. gallardoi* (Shiino, 1970); *T. profunda* Lang, 1967; *T. canaipa* Bamber, 2008 and one of the two species described below), the other without a molar process and with one-segmented uropod rami

(*T. chotkarakde* Bird & Bamber, 2000; *T. kerguelenensis* Shiino, 1979 [mandible unknown]; and one of the two species described below); the latter group also tend to have a more slender antennule. That said, *T. laticaudata* Sars, 1882 is described as being without a mandibular molar (Sars, 1896), but has two-segmented uropod rami. It is at present not possible to distinguish such groups as separate genera, as the type species of *Tanaopsis sensu stricto, T. graciloides* (Lilljeborg, 1864) needs proper redescription based on material from the northwest Atlantic (see Bamber *et al*., 2009).

Genus ***Tanaopsis*** Sars, 1896

Tanaopsis boonwurrungi sp. nov.

Figures 141–143

Material examined. 1 ♀ (J57793), holotype, 1 ♀ (J58563), paratype, dissected, Western Port, off Crib Point, Stn CPBS-N 03, 38°20.57'S 145°15.08'E, 2 m depth, fine sand, 05 April 1965; 1 ♀ (J57792), paratype, Western Port, off Crib Point, Stn CPBS 31N, 38°20.93'S 145°13.62'E, 15 m depth, fine sand with mud, 29 March 1965; all coll. A.J. Gilmour.

Description of female. Body (Fig. 141) slender with widened pleon, holotype 3 mm long, 8.7 times as long as wide. Cephalothorax pear-shaped, widest and laterally-rounded posteriorly, tapering towards anterior with slight rounded rostrum, as long as maximum width, shorter than pereonites 1 and 2 together, naked; eyelobes present, eyes apparently absent in preserved material. Pereonite 1 shortest, 0.4 times as long as cephalothorax, laterally convex; pereonite 2 nearly twice as long as pereonite 1, laterally convex; pereonite 3 (and subsequent pereonites) with parallel sides, 2.5 times as long as pereonite 1; pereonite 4 longest, longer than wide and 3.2 times as long as pereonite 1; pereonite 5 just shorter than pereonite 4, pereonite 6 just longer than pereonite 2 (all pereonites respectively 2.3, 1.4, 1.0, 0.8, 0.9 and 1.2 times as wide as long). Pleon with five free pleonites bearing pleopods; first pleonite trapezoidal, longest, as long as pereonite 1 and 2.7 times as long as wide; each remaining pleonite 0.8 times as long as first pleonite and 3.9 times as wide as long. Pleotelson pentangular, one-quarter length of pleon and 1.7 times as wide as long, with two slender distal spines.

Antennule (Fig. 142A) of five articles (four longer articles plus minute distal article), proximal article 2.1 times as long as wide, just shorter than distal four articles together, outer margin with tufts of three penicillate setae at mid-length and two penicillate and one simple setae distally; second article as long as wide, 0.35 times as long as first article, distally with single inner and outer simple setae and three penicillate setae; third article compact, 0.7 times as long as second article, distally with single inner and outer simple setae; fourth article tapering, nearly twice as long as third article, with single simple distal seta; fifth article (Fig. 142A') minute, with aesthetasc and four simple and one penicillate distal setae.

Antenna (Fig. 142B) of six articles, proximal two articles not recovered; third article longer than wide, with fine dorsodistal seta longer than article and distal microtrichia; fourth article longest, 2.7 times as long as third article, 4.5 times as long as wide, slightly curved, with three simple and three penicillate distal setae; fifth article as long as third with one distal seta; sixth article minute with five distal setae.

Labrum not recovered. Mandibles (Fig. 142C) without lacinia mobilis or pars molaris, pars incisiva with saw-like row of denticulations and rounded distal apophysis, larger on right mandible. Labium (Fig. 142F) with prominent, finely setulose mediodistal processes. Maxillule (Fig. 142D) with five finely-denticulate distal spines, one stouter than the others, and outer tufts of setules, palp not recovered. Maxilla (Fig. 142E) linguiform but basally cupped, with fine marginal setules. Maxilliped palp (Fig. 142G) first article naked, second article with one outer and one inner distal setae; third article with four slender and curved inner setae; fourth with five distal setae and one outer subdistal seta; basis with single seta reaching distal margin of proximal palp article; endite distally naked. Epignath (Fig. 142H) elongate, linguiform, naked.

Cheliped (Fig. 143A) basis 1.6 times as long as wide, naked; merus subtriangular with single ventral seta; carpus stout, 1.2 times as long as wide, with two midventral setae, one mid-dorsal and one dorsodistal setae; propodus stout, as long as wide, fixed finger 0.6 times as long as palm, with two ventral setae, three setae on cutting edge, distal claw with typical inner and outer bifurcate apophyses; dactylus dorsally finely crenulate, with slender spinules along cutting edge and fine proximal seta.

Pereopod 1 (Fig. 143B) longer than others, coxal apophysis (Fig. 143B') large, pointed, with seta; basis slender, 5.7 times as long as wide, naked; ischium compact, naked; merus 0.7 times as long as carpus, wider distally, naked; carpus with single dorsal and ventral distal setae; propodus 1.7 times as long as carpus, with three dorsal subdistal setae, one ventral subdistal seta; dactylus half as long as unguis, unguis slender and as long as propodus. Pereopod 2 (Fig. 143C), coxa rounded with seta; basis 4.3 times as long as wide; ischium with seta; merus 0.7 times as long as carpus, with single ventrodistal seta; carpus with two dorsal and one ventral distal setae; propodus 2.2 times as long as carpus, with two dorsal subdistal setae, one ventral subdistal seta; slender unguis longer than dactylus, both together 1.2 times as long as propodus. Pereopod 3 (Fig. 143D) similar to pereopod 2.

Pereopod 4 (Fig. 143E) basis stout, 2.1 times as long as wide, naked; ischium with two ventrodistal setae; merus as long as carpus, with ventral field of microtrichia and two small distally-denticulate ventrodistal spines; carpus with one dorsodistal seta and three small distally-denticulate ventrodistal spines; propodus 1.6 times as long as carpus, with fields of microtrichia, mid-dorsal penicillate seta, one dorsodistal and two ventrodistal spines all distally finely denticulate; dactylus slender, with fields of microtrichia, 1.5 times as long as unguis, both together 0.9 times as long as propodus. Pereopod 5 (Fig. 143F) as pereopod 4, but basis with two ventral penicillate setae. Pereopod 6 (Fig. 143G) as pereopod 4, but propodus with three dorsodistal spines.

Pleopods (Fig. 143H) all alike, with naked basis, endopod shorter than exopod and with rounded proximal apophysis on inner margin; endopod with inner subdistal plumose seta and 14 plumose setae along the distal half of the outer

margin, exopod without setae on inner margin, outer margin with 27 plumose setae, proximal setae on rami not separated from others.

Uropod (Fig. 143I) biramous, basis naked; exopod and endopod each of one segment, exopod shorter than endopod, with one fine proximal, one shorter and one longer distal setae; endopod with distal penicillate seta on first segment and five simple and one penicillate distal setae on second segment.

Male. Unknown.

Etymology. The Boonwurrung were another of the indigenous hunter-gatherer tribes of the (now) Melbourne region in the mid-nineteenth century (see under *Paragathotanais wurundjeri* above).

Remarks. Sieg and Dojiri (1991) gave a key to the genus *Tanaopsis* for the species then known, in which the present species keys out to the generotype, *T. graciloides* with which they included *T. laticaudata* as a synonym (as had most previous authors). Bamber *et al*. (2009) cast doubt on this synonymy, maintaining the distinction of Sars' Mediterranean species from Lilljeborg's Northeast Atlantic-Subarctic species until a proper redescription of the latter was undertaken; all descriptions and figures referred to in the recent literature for *T. graciloides*, including by Sieg and Dojiri (1991) are from Sars (1882). Bird & Bamber (2000), while describing as new *T. chotkarakde,* also added *T. gallardoi* to the genus. Since then, the only new *Tanaopsis* species that have been described are *T. canaipa* from Queensland and *T. rawhitia* Bird, 2011 from New Zealand.

Tanaopsis boonwurrungi sp. nov. shares the lack of a molar process on the mandible only with *T. graciloides/ laticaudata* and *T. chotkarakde,* and possibly *T. kerguelenensis* (mandible not described, but a species also with one-segmented uropodal rami). *T. boonwurrungi* is immediately distinguished from all of these taxa by its distinctly more slender habitus, with pereonites 4 and 5 longer than wide, and a much more slender cheliped, while *T. chotkarakde* has a lacinia mobilis on the left mandible, and the two European taxa have a two-segmented uropod exopod.

The small distal article on the antennule has only been reported before for a *Tanaopsis* species by Bird (2011), who noted its presence in *T. rawhitia*. While such an article does not appear to have been present in some other more recently or better-described species, viz. *T. kerguelenensis, T. cadieni, T. chotkarakde* or *T. canaipa*, the possibility of its having been overlooked in some of the earlier descriptions cannot be dismissed.

Tanaopsis boonwurrungi was taken only in Western Port at 2 to 15 m depth on fine sand.

Tanaopsis oios sp. nov.

Figures 144–145

Material examined. 1 ♀ (J58547), holotype (on microscope slide), 1 further ♀ (lost), Eastern Bass Strait, 28 km SSW of Marlo, Stn BSS 207, 37°59'S 148°27'E, 51 m depth, muddy sand and fine shell, 30 July 1983; coll. M.F. Gomon & R.S. Wilson.

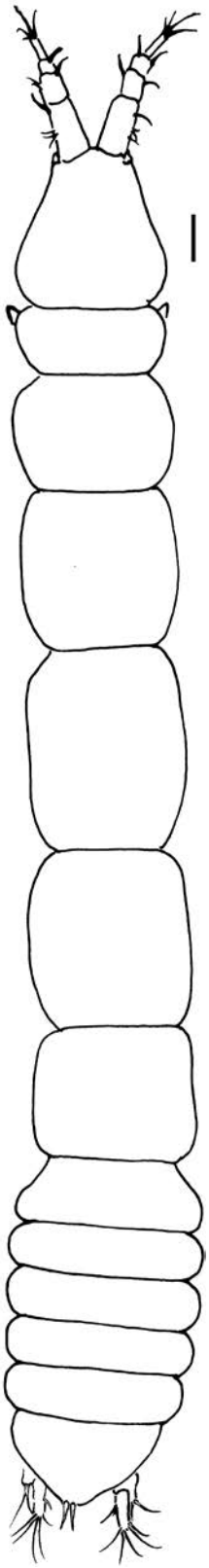

Fig. 141. *Tanaopsis boonwurrungi* sp. nov., female holotype, dorsal view. Scale = 0.1 mm.

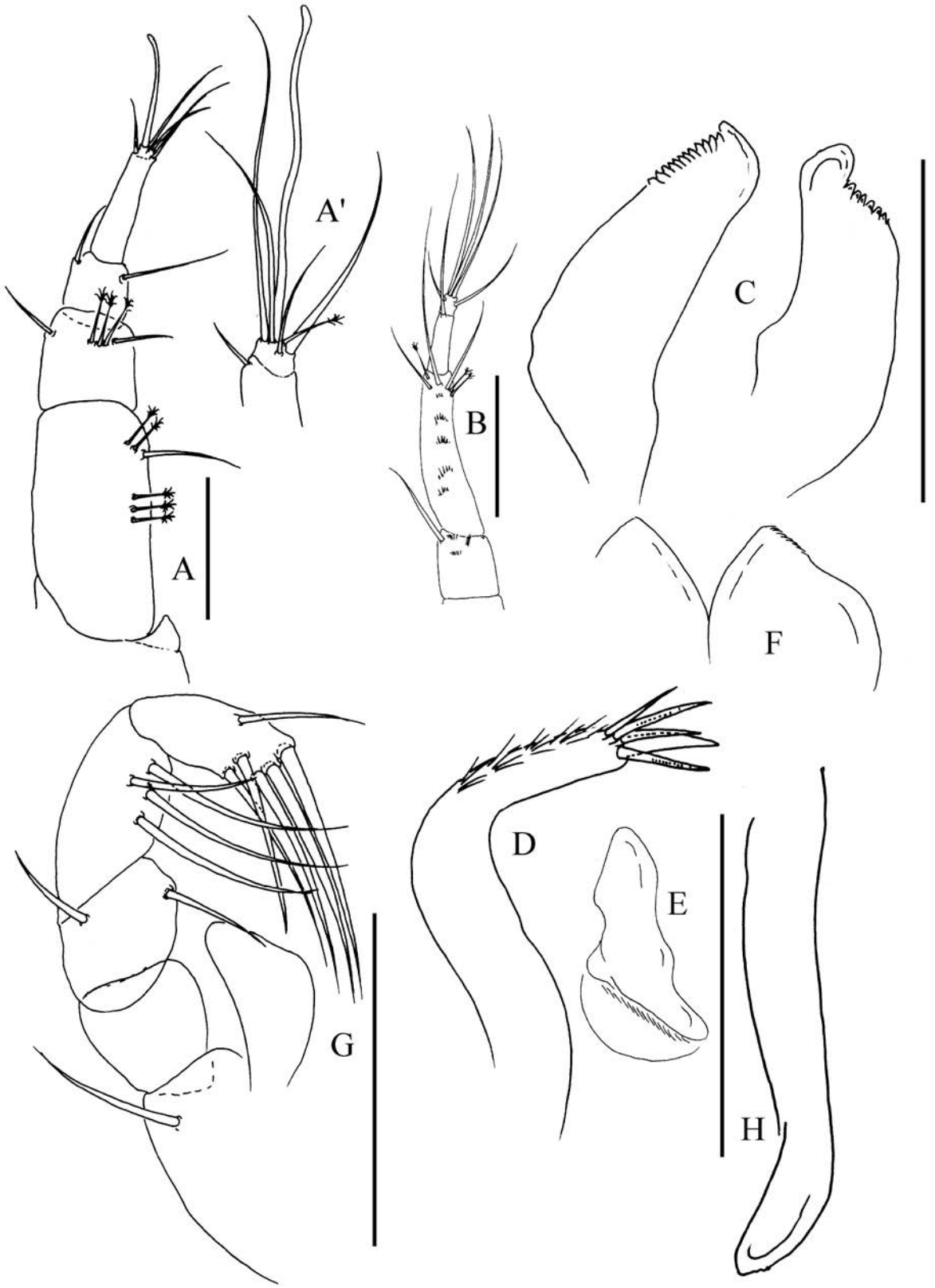

Fig. 142. *Tanaopsis boonwurrungi* sp. nov., female. A, antennule, with A', detail of distal article; B, antenna; C, left and right mandibles; D, maxillule endite; E, maxilla; F, labium; G, maxilliped; H, epignath. Scale line = 0.1 mm.

Fig. 143. *Tanaopsis boonwurrungi* sp. nov., female. A, cheliped; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5; G, pereopod 6; H, pleopod; I, uropod. Scale = 0.1 mm.

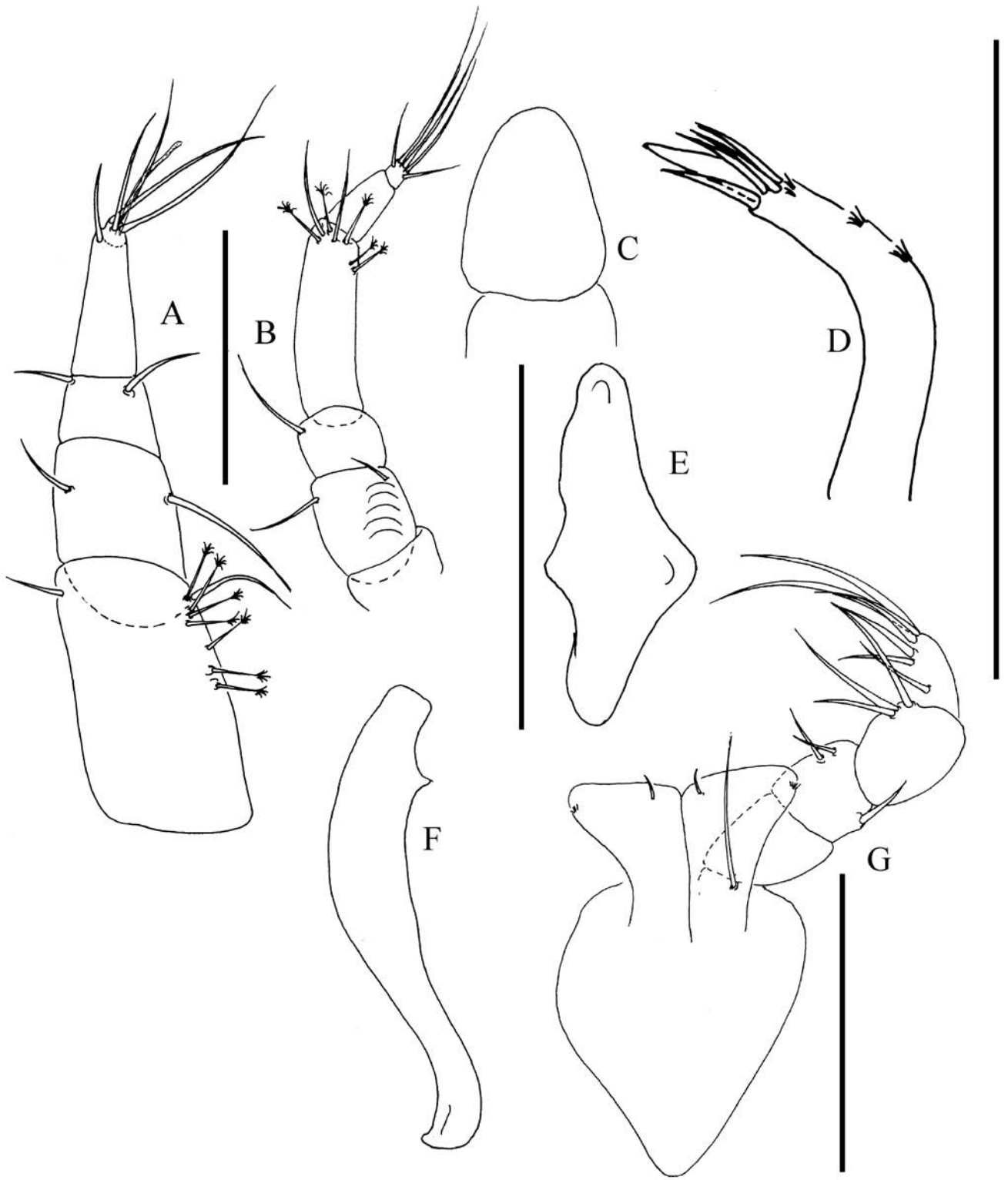

Fig. 144. *Tanaopsis oios* sp.nov. A, antennule; B, antenna; C, labrum; D, maxillule endite; E, maxilla; F, epignath; G, maxilliped. Scale = 0.1 mm.

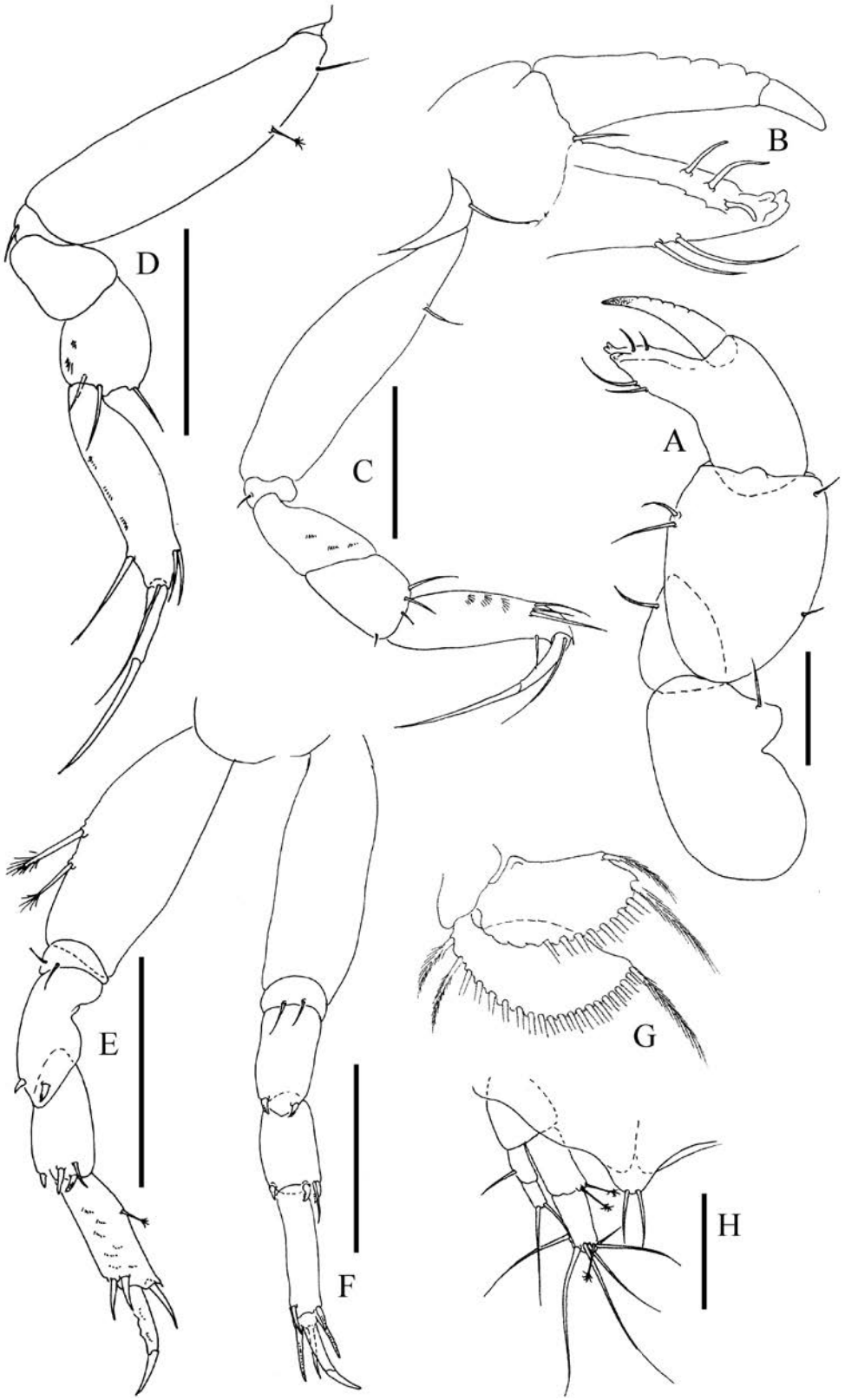

Fig. 145. *Tanaopsis oios* sp.nov. A, cheliped; B, detail of chela; C, pereopod 1; D, pereopod 2; E, pereopod 5; F, pereopod 6; G, pleopod; H, uropod. Scale = 0.1 mm.

Description of female. Body slender with widened pleon, typical for the genus but damaged (not figured).

Antennule (Fig. 144A) of four longer articles but with incipient articulation of minute distal article, proximal article 1.9 times as long as wide, three-quarters as long as distal three articles together, outer margin with tufts of three penicillate setae at mid-length and four penicillate and one simple setae distally, inner margin with simple distal seta; second article 1.25 times as long as wide, 0.6 times as long as first article, subdistally with single inner and outer simple setae; third article compact, 0.4 times as long as second article, distally with single inner and outer simple setae; fourth article tapering, 2.4 times as long as third article, with single simple subdistal seta and four simple distal setae.

Antenna (Fig. 144B) of six articles, proximal article compact, naked; second article as long as wide, 2.5 times as long as first article, with single dorsodistal and ventrodistal setae and microtrichia; third article shorter than wide, 0.6 times as long as second article, with fine dorsodistal seta longer than article; fourth article longest, three times as long as third article, three times as long as wide, slightly curved, with two simple and five penicillate distal setae; fifth article just longer than third, naked; sixth article minute with five distal setae.

Labrum (Fig. 144C) acorn-shaped, naked. Mandibles and labium not recovered. Maxillule (Fig. 144D) with five distal spines, one stouter than the others, and outer tufts of setules, palp not recovered. Maxilla (Fig. 144E) linguiform but medially expanded, naked. Maxilliped palp (Fig. 144F) first article naked, second article with one outer and two inner distal setae; third article with three inner distal setae; fourth with six inner to distal setae, distal two much longer than the others; basis seta not seen; endite distally with inner seta and setules below outer corner. Epignath (Fig. 144G) elongate, linguiform, distally hooked, naked.

Cheliped (Fig. 145A) with rounded basis 1.9 times as long as wide, single dorsodistal seta; merus subtriangular with single ventral seta; carpus stout, 1.4 times as long as wide, with two midventral setae, one mid-dorsal and one dorsodistal setae; propodus stout, 1.5 times as long as wide, fixed finger 0.7 times as long as palm, with two ventral setae, three setae on cutting edge, distal claw with typical inner and outer bifurcate rounded apophyses (Fig. 145B); dactylus dorsally coarsely crenulate.

Pereopod 1 (Fig. 145C) without coxal apophysis, coxa with seta; basis 3.6 times as long as wide, with dorsoproximal simple seta; ischium compact, with ventral seta; merus one-third as long as basis, wider distally, with sparse microtrichia; carpus 0.9 times as long as merus, with three dorsal and single ventral distal setae; propodus 1.9 times as long as carpus, with three dorsal subdistal setae, one ventral subdistal seta, sparse dorsal microtrichia and dorsodistal spine-like apophysis; dactylus with longer proximal seta, half as long as slender unguis, both together 1.3 times as long as propodus. Pereopod 2 (Fig. 145D) basis 3.5 times as long as wide, dorsally with one simple seta and one penicillate seta in proximal half; ischium with seta; merus as long as carpus, naked; carpus with two dorsal and one ventral distal setae and sparse microtrichia; propodus 2.4 times as long as carpus, with two dorsal subdistal setae, one longer ventral subdistal seta exceeding tip of dactylus, and sparse microtrichia; dactylus with longer proximal seta, slender unguis 1.7 times as long as dactylus, both together as long as propodus. Pereopod 3 (not figured) similar to pereopod 2.

Pereopod 4 similar to pereopod 5, but basis without penicillate setae. Pereopod 5 (Fig. 145E) basis relatively stout, 2.3 times as long as wide, with two midventral penicillate setae; ischium with two ventrodistal setae; merus, carpus and propodus subequal in length; merus with two small distally-denticulate ventrodistal spines; carpus with one inner distal seta and three small distally-denticulate ventrodistal spines; propodus with fields of microtrichia, mid-dorsal penicillate seta, one dorsodistal and two ventrodistal spines finely denticulate in distal half; dactylus with fields of microtrichia, 1.5 times as long as unguis, both together 0.9 times as long as propodus. Pereopod 6 (Fig. 145F) as pereopod 5, but basis without penicillate setae, propodus with three dorsodistal spines.

Pleopods (Fig. 145G) all alike, with naked basis, endopod shorter than exopod and with rounded proximal apophysis on inner margin; endopod with inner subdistal plumose seta and nine outer plumose setae in distal half; exopod without setae on inner margin, outer margins with 21 plumose setae, proximal seta not separated from others.

Uropod (Fig. 145H) biramous, basis naked; exopod and endopod each of two subequal segments; exopod distinctly longer than proximal endopod segment, proximal segment with one and distal segment with one shorter and one longer distal setae; endopod with two distal penicillate setae on first segment and five simple and one penicillate distal setae on second segment.

Male. Unknown.

Etymology. From the Greek *oios* – alone, singular, as only one specimen from a remote part of the Bass Strait remains.

Remarks. Of the previously-described species of *Tanaopsis* with two clear segments in both uropod rami, only three have the uropod exopod exceeding the length of the proximal endopod segment. In comparison with *T. oios* sp. nov., *T. graciloides sensu* Lang, 1967 has a much less slender cheliped basis, the rugosity on the cheliped dactylus not restricted to the distal half; a more slender antennal article 4, and fewer distal setae on anterior pereopod carpi. *T. laticaudata* has a more compact cheliped carpus, the rugosity of the cheliped dactylus more extensive, fewer distal setae on anterior pereopod carpi, and is without the long ventral seta on the propodus of pereopod 2. *T. cadieni* has a more slender antennal article 4, has a triangular coxal apophysis on pereopod 1, and is without the long ventral seta on P2 propodus.

T. oios was only found in the Eastern Bass Strait to the east of the Gippsland Lakes, at 51 m depth on shelly muddy sand.

Family **Colletteidae** Larsen & Wilson, 2002

Genus ***Parafilitanais*** Kudinova-Pasternak, 1989

Parafilitanais vadosus sp. nov.

Figures 146–148

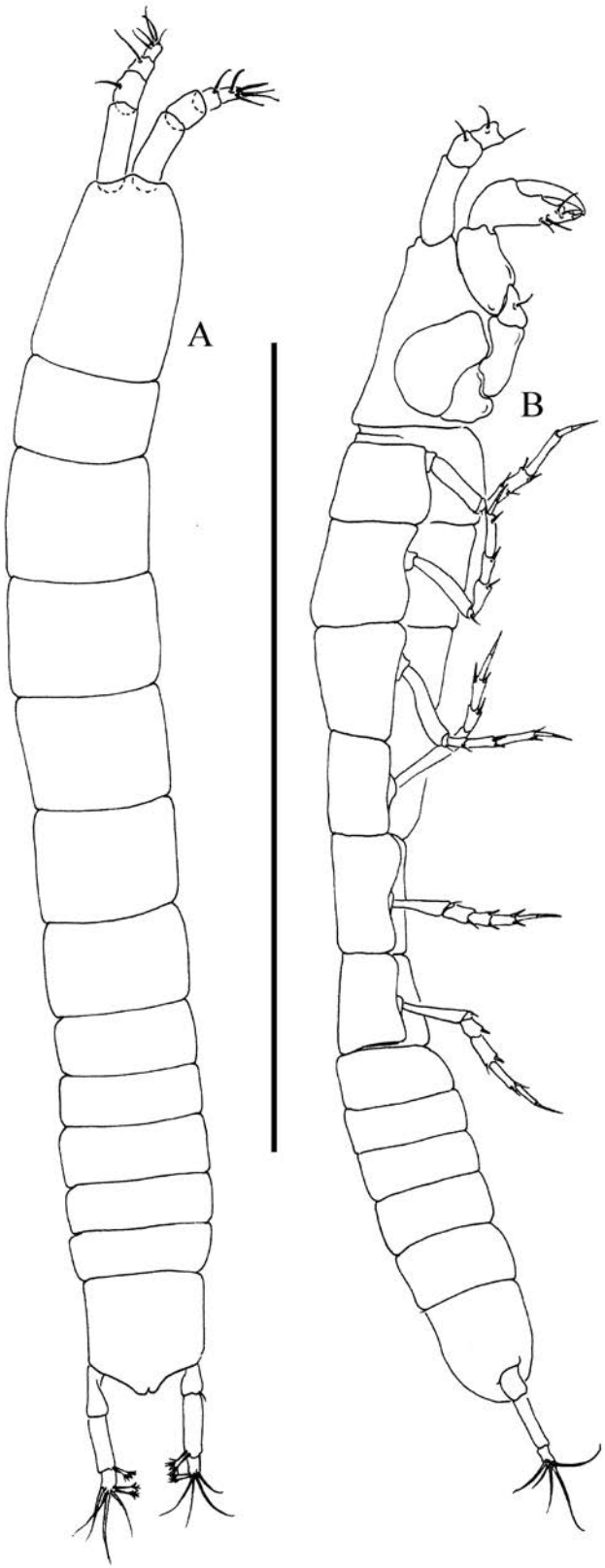

Fig. 146. *Parafilitanais vadosus* sp. nov., female holotype. A, dorsal view; B, lateral view. Scale = 1 mm.

Material examined. 1 ♀ (J56378), holotype, Stn MSL-EG 41, Eastern Bass Strait, 11.7 km W of Pt Ricardo, 37°49.90'S 148°30.02'E, 29 m depth, 28 September 1990, coll. Marine Sciences Laboratory. Smith-McIntyre grab. 1 ♂ (J28486), paratype dissected, Stn MSL-EG 113, Eastern Bass Strait, 2.9 km SE. of Cape Conran, 37°50.00'S 148°36.90'E, 29 m depth, coarse sand, February 1991, coll. N. Coleman, Smith-McIntyre grab. 1 ♀ (J56375), paratype, Stn MSL-EG 29, Eastern Bass Strait, 10.4 km ESE of eastern edge of Lake Tyers, 37°52.52'S 148°12.55'E, 38 m depth, 25 September 1990, coll. Marine Sciences Laboratory. Smith-McIntyre grab.

Description of female (Fig. 146A, B). Body slender, holotype 1.45 mm long, nearly nine times as long as wide. Cephalothorax subrectangular, slightly narrower anteriorly with slight triangular rostrum, as long as wide, about as long as pereonites 1 and 2 together, naked, eyes absent. Pereonites 1 and 6 shortest, 0.43 times as long as cephalothorax; pereonites 2 to 5 subequal, pereonite 2 slightly longest, 1.4 times as long as cephalothorax, (all pereonites respectively 1.6, 1.2, 1.3, 1.3, 1.3 and 1.6 times as wide as long). Pleon with five free subequal cylindrical pleonites without pleopods; each pleonite 2.7 times as wide as long. Pleotelson pentangular, one-third length of pleon and as wide as long, with blunt distal apex.

Antennule (Fig. 147A) of four articles, proximal article just over twice as long as wide, just shorter than distal three articles together, with simple distal seta; second article about 1.3 times as long as third article, with one simple and two penicillate outer distal setae; third article with two simple inner distal setae; fourth article 1.4 times as long as third, with five simple and two penicillate distal setae.

Antenna (Fig. 147B) of six articles, proximal article compact, naked, fused to cephalothorax; second article stout, as long as wide, with dorsodistal seta; third longer than wide, with fine dorsodistal seta; fourth article longest, three times as long as third article, 5.4 times as long as wide, curved, with two simple and four penicillate distal setae; fifth article 0.3 times as long as fourth with one distal seta; sixth article minute with four distal setae.

Labrum not recovered. Left mandible (Fig. 147C) with subtriangular, crenulate pars incisiva and linguiform, crenulate lacinia mobilis, right mandible (Fig. 147D) without lacinia mobilis; pars molaris of both mandibles tapering abruptly with fine tooth-like protrusions around distal margin. Labium (Fig. 147F) simple, distally slender, naked. Maxillule (Fig. 147E) with nine finely-denticulate distal spines, palp not recovered. Maxilla not recovered. Maxilliped (Fig. 147G) palp first and second articles with microtrichia on outer margin, second article with two shorter and one stout longer inner setae; third article with two inner setae in distal half of article; fourth with four inner to distal setae, and one outer subdistal seta; bases fused, naked; endites distally with outer microtrichia and inner rounded tubercle. Epignath not recovered.

Cheliped (Fig. 147H) basis twice as long as wide, naked, posterior lobe small, sclerite large; merus with one ventral seta; carpus rounded, 1.2 times as long as wide, wider proximally, with one dorsodistal and two mid-ventral setae; propodus elongate, 1.4 times as long as wide, with two ventral setae, one inner and one outer mid-distal setae adjacent to dactylus articulation; fixed finger with three setae alongside

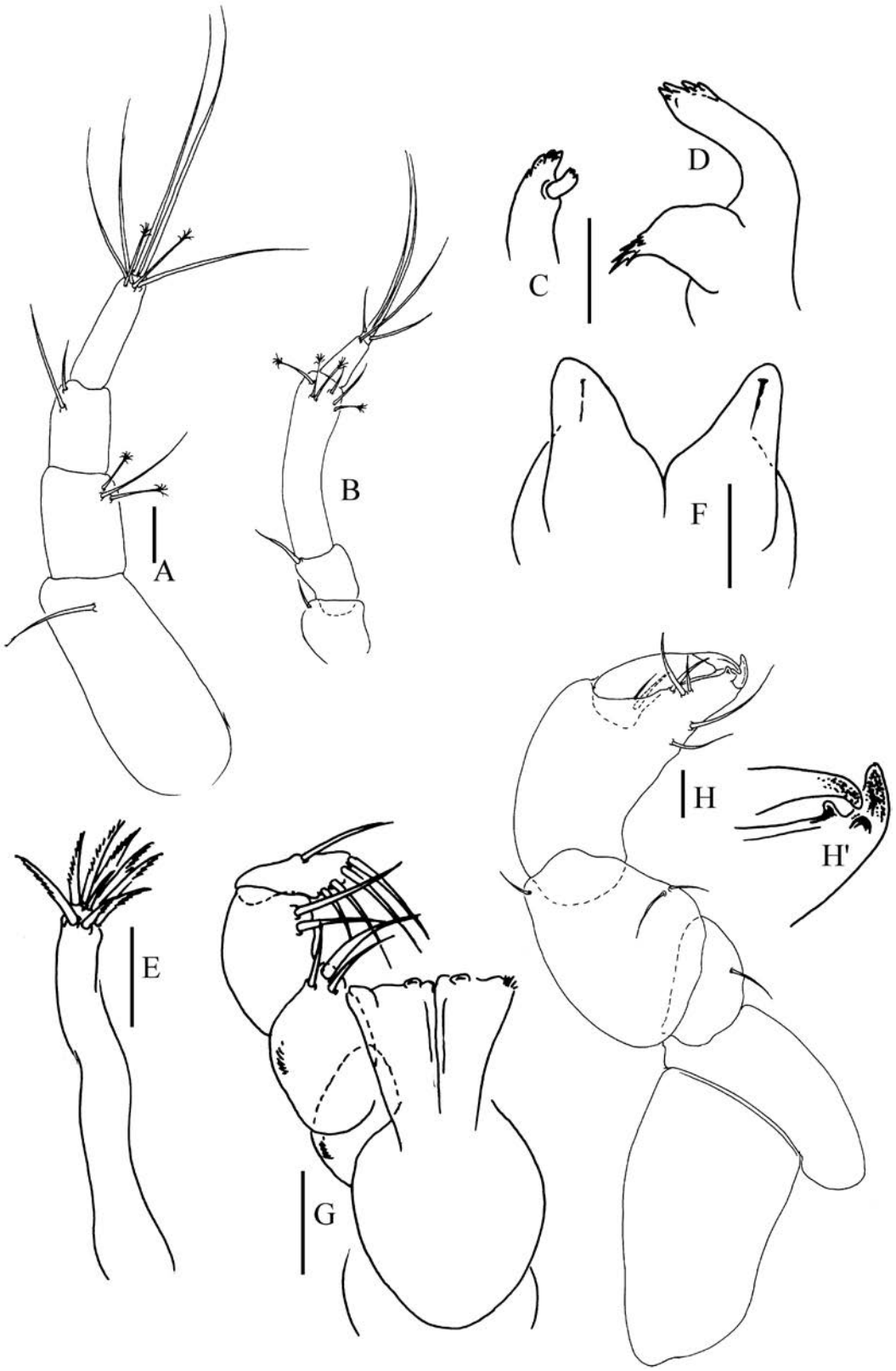

Fig. 147. *Parafilitanais vadosus* sp. nov., female paratype. A, antennule; B, antenna; C, left mandible, distal; D, right mandible; E, maxillule endite; F, labium; G, maxilliped; H, cheliped with H', detail of tips of chela fingers. Scale = 0.1 mm.

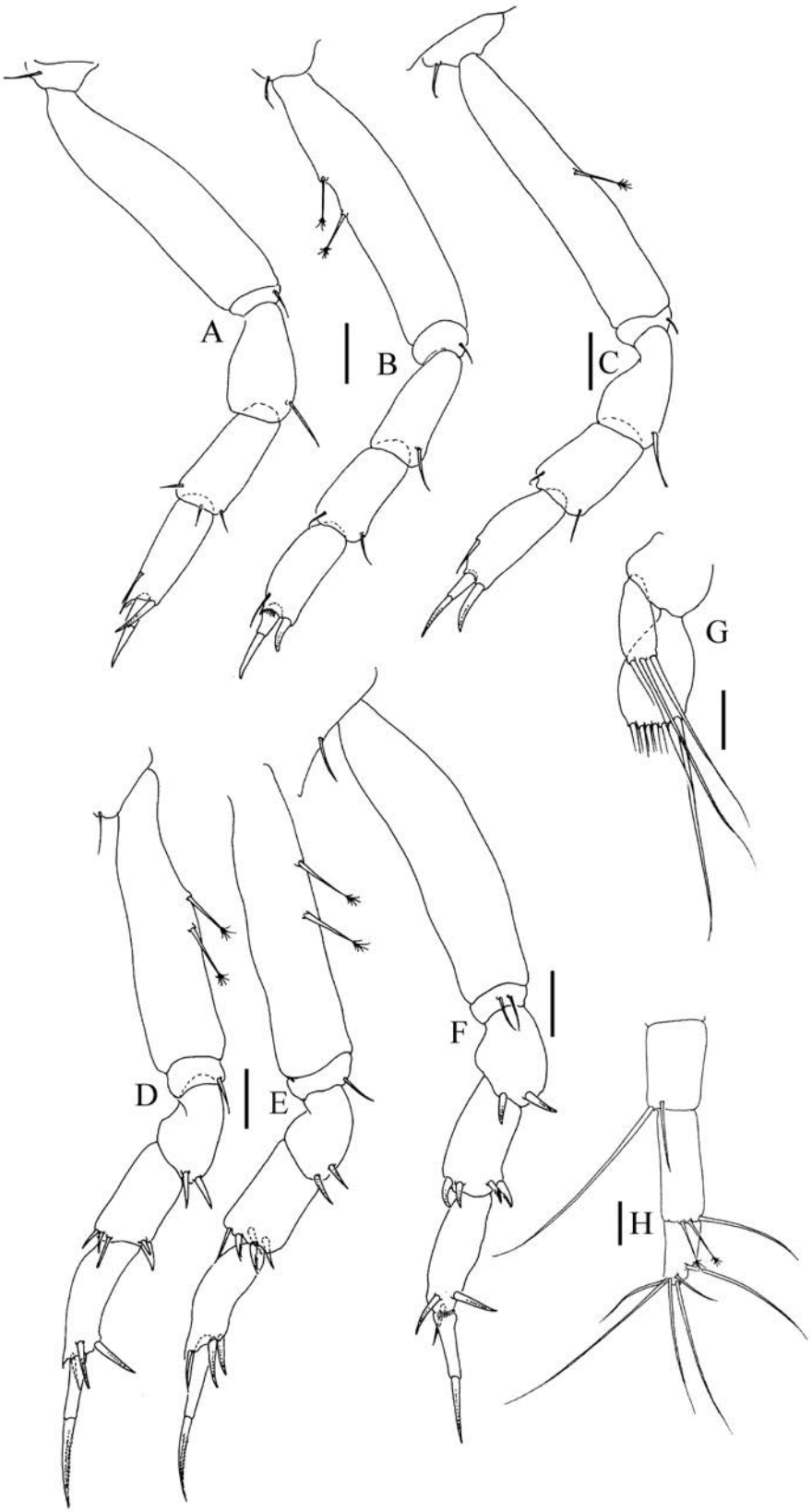

Fig. 148. *Parafilitanais vadosus* sp. nov., female paratype. A to F, pereopods 1 to 6 respectively; G, pleopod; H, uropod. Scale = 0.1 mm.

cutting edge, distal spine with two adjacent tooth-like tubercles (Fig. 147H'); dactylus naked, shorter than fixed finger.

Pereopod 1 (Fig. 148A) coxa with simple seta; basis four times as long as wide, naked; ischium compact with one ventral seta; merus, carpus and propodus subequal in length, merus with one slender ventrodistal spine, carpus with three fine distal setae, propodus with subdistal dorsal seta, dorsodistal spine-like apophysis, distal microtrichia and distal spine with denticulations in distal half; dactylus shorter than unguis, both together two-thirds as long as propodus. Pereopods 2 (Fig. 148B) similar to pereopod 1, but basis with two dorsal penicillate setae, merus just longer than carpus; pereopod 3 (Fig. 148C) similar to pereopod 2, basis with one penicillate seta.

Pereopod 4 (Fig. 148D) coxa with seta, basis four times as long as wide with two penicillate setae; ischium with one ventral seta; merus just shorter than carpus, with two ventrodistal distally-denticulate spines; carpus with two fine dorsodistal setae, and one dorsodistal and two ventrodistal short, curved spines; propodus 1.3 times as long as carpus, with dorsodistal seta and spine-like apophysis, and two ventrodistal distally-denticulate spines; dactylus half as long as laterally-denticulate unguis, both together 1.2 times as long as propodus. Pereopod 5 (Fig. 148E) as pereopod 4, but carpus with four distal spines and one dorsodistal seta; pereopod 6 (Fig. 148F) as pereopod 5, but ischium with two setae, unguis as long as dactylus.

Pleopods absent.

Uropod (Fig. 148H) uniramous, basis 1.5 times as long as wide, with one shorter and one longer outer distal ("exopodal") setae, longer seta exceeding distal tip of endopod; proximal segment of endopod about twice as long as basis, 2.5 times as long as wide, with one simple and two penicillate distal setae; distal segment half as long as proximal segment, with one subdistal and five distal setae.

Male similar to female, but with pleopods: pleopod (Fig. 148G) basis naked, endopod half as long as exopod, rami with four and seven distal setae respectively.

Etymology. From the Latin *vadosus* – shallow, this species being by far the shallowest recorded for the genus.

Remarks. The morphology of this species accords entirely with the diagnosis of the genus *Parafilitanais* as given by Larsen (2002), including the proportions of the cheliped and the pereopods, and the structure of the uropod, but excepting his statement that the fourth to sixth pereopod are without a coxa: coxae are present and unfused in this genus, as shown by the present specimen and by Larsen's (loc. cit.) figures 1A and 1L.

Of the three previously-described species of the genus (see Larsen, 2005), *Parafilitanais vadosus* sp. nov. has a proportionately shorter pereonite 1 than does *P. caudatus* Kudinova-Pasternak, 1989, a proportionately longer pleon than does *P. similis* Kudinova-Pasternak, 1990, and is without the distally-flattened pleotelson and the extended cheliped dactylus of *P. mexicana* Larsen, 2002. In addition, the present species is distinct from all of the other three in having the distal segment of the uropod endopod about half as long as the proximal segment (>0.7 times in the others), and in the proportionately shorter dactylus and unguis of the anterior pereopods.

Parafilitanais vadosus was taken at 29 to 38 m depth in the Eastern Bass Strait. The previous species were all recorded in deep waters, *P. caudatus* at 3660 m in the Indian Ocean, *P. similis* at 750 m in the Pacific Ocean, and *P. mexicana* at 625–2030 m in the Gulf of Mexico.

Genus ***Bascestus*** gen. nov.

Diagnosis. Female of leptognathioid (*sensu lato*) facies, elongate. Cephalothorax longer than wide, eyelobes and eyes absent. Pleonite epimera each with long seta. Antennule four-articled; antenna six-articled, fourth article longest, curved, without secondary articulation. Mandibular molar proximally broad, tapering, distally with numerous fine teeth; right mandible incisor not crenulate, but distally concave with adjacent stout teeth; left incisor with few distal crenulations, lacinia mobilis narrow, linguiform. Maxilliped bases fused, naked, endites not fused, distally with single rounded tubercle and small inner seta. Cheliped attached by distally rectangular sclerite, basis narrower posterior to this attachment; propodus with two ventral setae. Pereopods 1 to 3 with one seta on ischium; pereopods 2 to 6 with compound (denticulate in their distal half) spines on merus, carpus and propodus; pereopods 2 and 3 merus ventrodistally with one seta and one compound spine, pereopods 4 to 6 carpus with three spines and one seta. Ungues of anterior pereopods longer than dactyli; ungues of posterior pereopods distinct, shorter than dactyli, both articles with fine ventral denticulation. Pleopods present, functional; rami rounded, with plumose setae extending along outer margin. Uropod biramous, basis without distal apophyses, rami slender, endopod and exopod of two segments.

Male much less elongate than female, antennule of five articles; other appendages similar to those of female, mouthparts functional.

Etymology. From "Bass" as in Bass Strait, and the Greek (but with Latin pronunciation) *cestus* – a reinforced boxing glove, alluding to the nodulose chela of at least the type-species of this genus (male).

Type species: *Bascestus melmackenziae* sp. nov.

Remarks. The species described below shows morphological affinities with such genera as *Leptognathiella* Hansen, 1913, *Leptognathioides* Bird & Holdich, 1984, *Stenotanais* Bird & Holdich, 1984, and *Kanikipa* Bird, 2011, without conforming to any single one of these. Thus the mandibular structure, particularly the right incisor and the tapering molar, resemble those of the first three of these three genera, the last two of which also show some ventrodistal carpal expansion to accommodate the reflexion of the chela; the linguiform lacinia mobilis of the left mandible is also consistent with most species of these four genera, while the molar dentition resembles that of *Leptognathiella* and *Stenotanais*. The presence on the merus of the anterior pereopods of a ventrodistal seta and a ventrodistal spine is consistent with *Leptognathioides* and *Kanikipa* (but also the nototanaid genus *Tanaissus* and the agathotanaid genus *Paragathotanais*), while denticulation of the posterior dactyli accords with *Stenotanais* and *Akanthophoreus inter alia* (the latter also having a similar mandibular molar morphology).

Thus, there is no particular characteristic of *Bascestus* gen. nov. that distinguishes it from a number of others once allocated to the Leptognathiidae *sensu* Sieg, 1976b, but their combination in the present taxon is unique and excludes it from any of those genera. In having sexual dimorphism possibly limited to the antennular structure and habitus proportions, the present genus is further distinct from many other "leptognathiid" genera (in a number of which males remain unknown).

Since the insightful work of Bird and Holdich (1984), which highlighted the distinctions of a number of these genera previously subsumed into *Leptognathia* Sars, 1882, and sensibly discussed the relative merits of different characters for distinguishing different taxon levels, these taxa have been moved variously into such families as the Anarthruridae Lang, 1971, thence to the Colletteidae (*Leptognathiella* and *Leptognathioides*), the Akanthophoreidae (*Akanthophoreus*) or currently *incertae sedis sensu* Larsen and Wilson (2002) (*Stenotanais, Kanikipa*). Owing to its apparent affinities as described above, we choose at present to place *Bascestus* in the Colletteidae *sensu* Larsen and Wilson (2002).

Bascestus melmackenziae sp. nov.

Figures 149–151

Material. 1 ♀ (J23600), holotype, Eastern Bass Strait, 3.2 km S of Cape Conran, Stn MSL-EG 55, 37°50.38'S 148°43.28'E, 49 m depth, sand and shell, 28 September 1990, coll. Marine Science Laboratories, Smith-McIntyre Grab. 2 ♀♀ (J56380), paratypes, Eastern Bass Strait, 13.3 km E of eastern edge of Lake Tyers, Stn MSL-EG 68, 37°51.42'S 148°14.36'E, 37 m depth, 04 June 1991, coll. N. Coleman, Smith-McIntyre Grab. 1 ♂ (J28484), allotype, Eastern Bass Strait, 13.3 km E of eastern edge of Lake Tyers, Stn MSL-EG 69, 37°51.42'S 148°14.36'E, 37 m depth, 04 June 1991, coll. N. Coleman, Smith-McIntyre Grab.

Description of female. Body (Fig. 149C) slender, 12 times as long as wide, holotype 2 mm long. Cephalothorax parallel-sided in posterior half, narrowing anteriorly, 1.8times as long as wide, with slight rounded rostrum; eyelobes and eyes absent. Pereonites all rectangular, pereonite1 half as long as cephalothorax, as long as wide; pereonites 2 to 5 subequal in length, 1.4 times as long as pereonite 1, longer than wide; pereonite 6 shortest, 0.9 times as long as pereonite 1 (all pereonites respectively 1.0, 0.7, 0.8, 0.8, 0.7 and 1.1 times as wide as long). Pleon over three as long as pereonite 6; pleonites subequal in length, 2.8 times as wide as long, all bearing pleopods and single mid-lateral setae; pleotelson subpentangular, longer than two preceding pleonites, as wide as long, with single midlateral setae and two pairs of distal setae.

Antennule (Fig. 150A) shorter than cephalothorax, four–articled; article 1 nearly three times as long as wide, 0.9 times as long as articles 2 to 4 combined, with subdistal outer pair of penicillate setae, and single outer simple distal seta; article 2 slightly overlapping proximal part of article 3, twice as long as wide, less than half as long as article 1, with single inner and outer simple subdistal setae and tuft of five dorsodistal setae; article 3 slightly overlapping proximal part of article 4, 1.7 times as long as wide, 0.6 times as long as article 2, with single inner and outer simple subdistal setae; article 4 as long as article 2, five times as long as wide, with three simple and two penicillate subdistal setae and two longer simple distal setae.

Antenna (Fig. 150C), six–articled, article 1 short and annular, naked; article 2 about as long as wide, distally with single shorter dorsal and longer lateral setae; article 3 just shorter than article 2, with dorsodistal seta; article 4 twice as long as articles 2 and 3 combined, 4.5 times as long as wide, curved, distally with two simple and three penicillate setae; article 5 one-third as long as article 4, with long distal seta; article 6 very small, with five distal setae.

Labrum (Fig. 150D) rounded, hood-shaped, distally setose. Mandibles stout; left mandible (Fig. 150E) with distally-crenulate incisor and narrow, simple lacinia mobilis, molar proximally stout, tapering, tip with six or seven slender spine-like teeth; right mandible (Fig. 150F) incisor distally concave with few stout teeth; molar as on left mandible. Labium (Fig. 150H) simple, each side with single subdistal spinule. Maxillule (Fig. 150G) endite slightly sigmoid, with one distal seta and five terminal and two subterminal spines; palp and maxilla not recovered. Maxilliped (Fig. 150I) bases rounded, fused, naked; palp article 1 naked, article 2 with two inner distal setae and one outer distal seta; article 3 with three stout inner setae; article 4 with five distal and one outer subdistal setae; endites not fused, distally with rounded tubercle and inner seta. Epignath not recovered.

Cheliped (Fig. 149D, 151A) basis *in situ* proximally well-anterior of anterior margin of pereonite 1 ventrally, attached by distally rectangular sclerite; basis narrower posterior to this attachment, with rounded posterior free margin, twice as long as wide, with small dorso-subdistal seta; merus subtriangular, with ventral seta; carpus twice as long as wide, with three dorsoproximal and two mid-ventral setae, ventrodistally with slight expansion of margins into which chela can reflect; propodus longer than wide, with two ventral setae and comb-row of four simple setae, dorsal margin and mid-lateral face with rows of rounded nodules in distal half, and with inner ventral submarginal crenulate ridge; fixed finger cutting edge with three proximal denticulations and three adjacent setae; dactylus with several dorsal nodules and one small proximal seta.

Pereopod 1 (Fig. 151B) basis relatively stout, 2.5 times as long as wide, with one mid-dorsal simple seta; ischium with one seta about half as long as merus; merus distally expanded, 0.4 times as long as basis, 1.4 times as long as distal width, ventrodistally with one shorter seta and one compound spine almost as long as carpus; carpus 1.1 times as long as merus, rectangular, with two short ventrodistal spinules and inner and outer compound distal spines; propodus 1.5 times as long as carpus, with one compound ventrodistal spine, one distal seta as long as dactylus, and dorsodistal spinulation; dactylus half as long as unguis, both together as long as propodus. Pereopod 2 as pereopod 3. Pereopod 3 (Fig. 151C) similar to pereopod 1, but basis with mid-dorsal penicillate seta, carpus with single ventral, inner and outer compound distal spines.

Pereopod 4 (Fig. 151D) basis 2.4 times as long as wide; ischium with two setae; merus 0.3 times as long as basis, with two ventrodistal compound spines; carpus 1.3 times as long as merus, with with single ventral, inner and outer compound distal spines and simple dorsodistal seta; propodus 1.1 times as long as carpus, with one dorsodistal seta and two ventrodistal

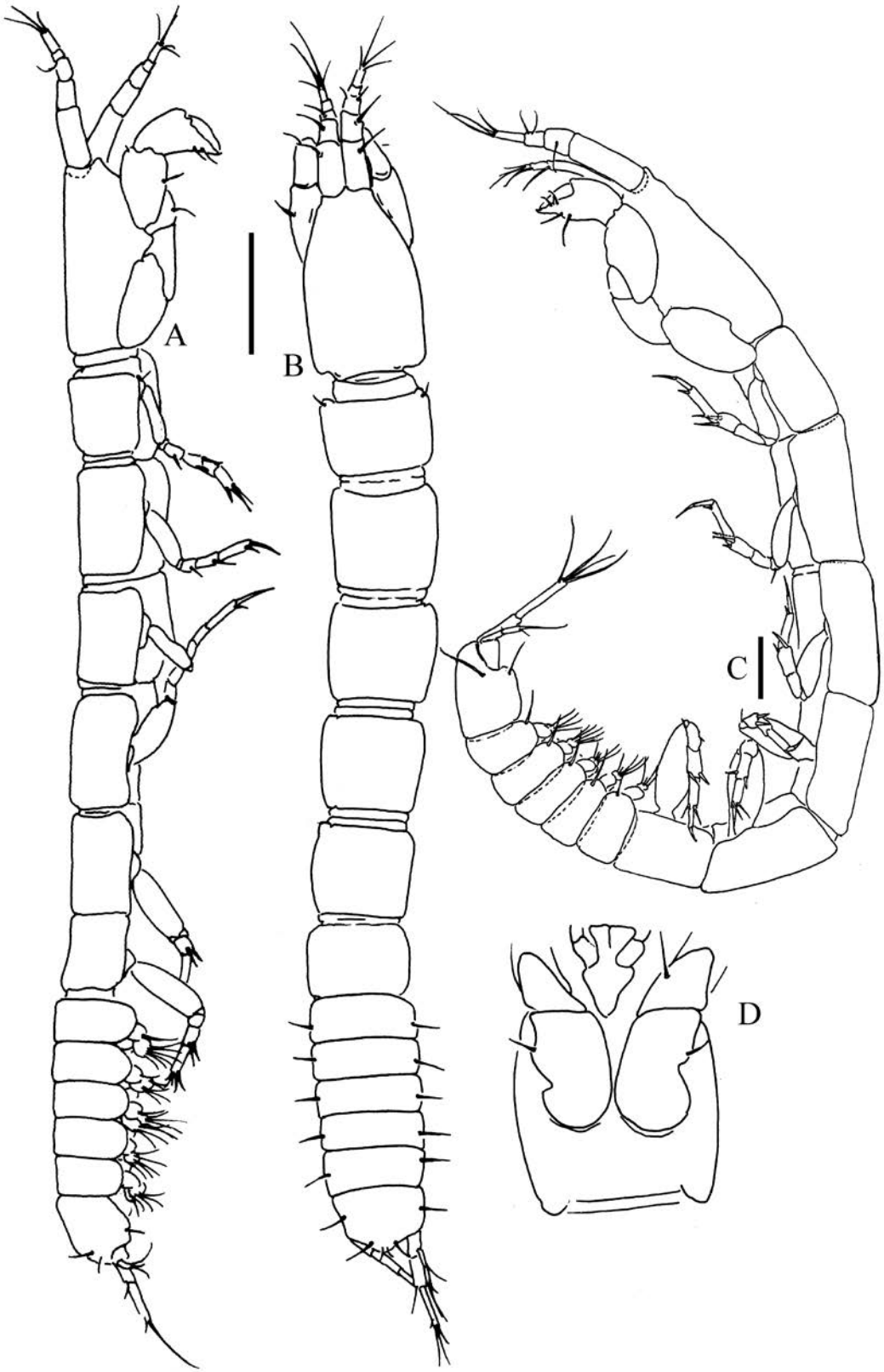

Fig 149. *Bascestus melmackenziae* sp. nov. A, male, lateral; B, male, dorsal; C, holotype female, lateral; D, cephalothorax, ventral, showing attachment of chelipeds. Scale = 0.1 mm.

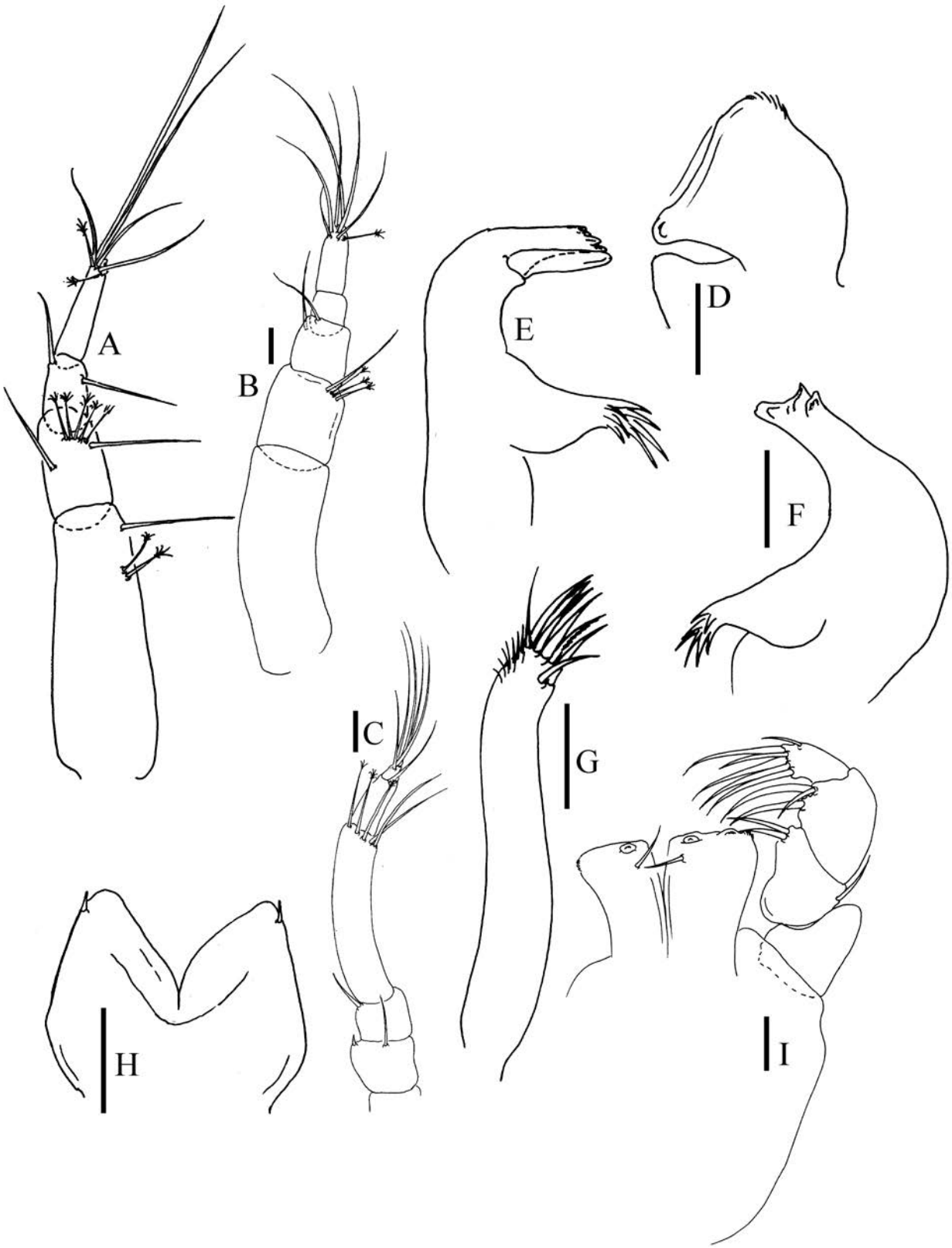

Fig 150. *Bascestus melmackenziae* sp. nov. A, female antennule; B, male antennule; C, antenna; D, labrum; E, left mandible; F, right mandible; G, maxillule endite; H, labium; I, maxilliped. Scale = 0.01 mm.

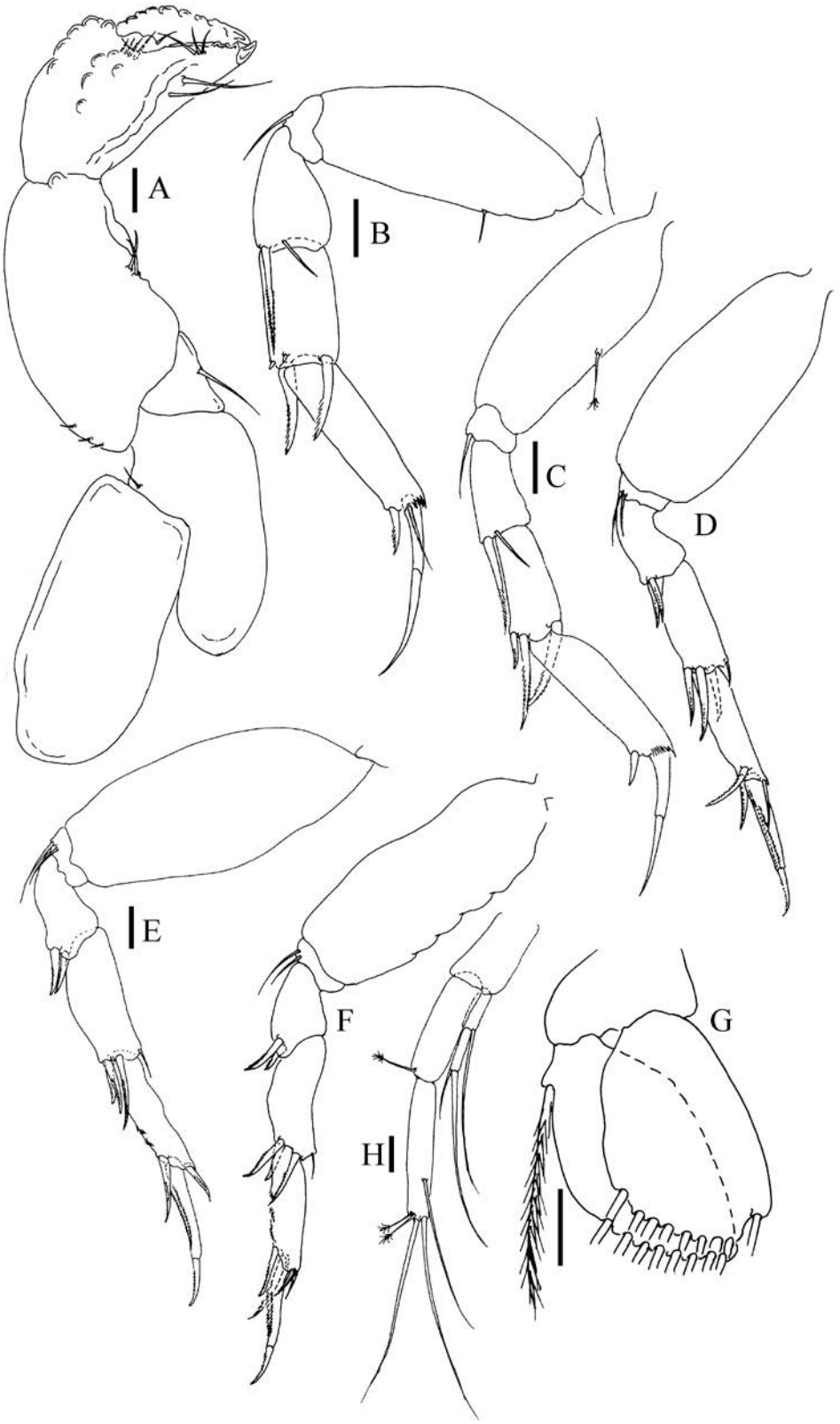

Fig 151. *Bascestus melmackenziae* sp. nov. A, cheliped ; B, pereopod 1 ; C, pereopod 3; D, pereopod 4 ; E, pereopod 5 ; F, pereopod 6 ; G, pleopod ; H, uropod. Scale = 0.01 mm.

compound spines; dactylus semicircular in cross-section, ventral edges finely denticulate; unguis half as long as dactylus, ventrally finely denticulate, dactylus and unguis together 1.2 times as long as propodus. Pereopod 5 (Fig. 151E) similar to pereopod 4, propodus with microtrichia. Pereopod 6 (Fig. 151F) similar to pereopods 4 and 5 but basis with dorsal undulation, propodus with two dorsodistal setae.

Pleopods all similar (Fig. 151G), basal article naked; endopod and exopod rami rounded, all setae plumose; endopod with eight outer to distal setae and one inner subdistal seta, proximal outer margin naked; exopod with eight outer to distal setae and separated outer proximal seta.

Uropod (Fig. 151H) slender, nearly twice as long as pleotelson; basal article twice as long as wide, naked, without distal apophyses; exopod two-segmented, shorter than proximal article of endopod, segments subequal in length, with one distal seta on proximal segment, two unequal distal setae on distal segment; endopod two–segmented, proximal segment shorter and with one penicillate distal seta, distal article with one subdistal and two distal simple setae and two distal penicillate setae.

Distinctions of male. Body (Fig. 149A, B) smaller and less elongate than that of female, length 0.9 mm, 10 times as long as wide. Cephalothorax similar to that of female, 1.7 times as long as wide, tapering anteriorly. Pereonites more or less rectangular; pereonite 1 half as long as cephalothorax; pereonites 2 to 5 subequal in length although progressively shorter, about 1.2 times as long as pereonite 1, not longer than wide; pereonite 6 shortest, 0.9 times as long as pereonite 1; pereonites respectively 1.3, 1.0, 1.1, 1.0, 1.1 and 1.4 times as wide as long. Pleon as long as pereonites 4 to 6 inclusive, pleonites 2.8 times as wide as long.

Antennule (Fig. 150B) five–articled, shorter than cephalothorax; peduncle article 1 stout, three times as long as wide, naked; peduncle article 2 compact, 0.4 times as long as article 1, 1.3 times as long as wide, with three penicillate and one simple ventrodistal setae; article 3 as long as wide, 0.6 times as long as article 2, with two dorsodistal simple setae; flagellum of two segments, proximal segment just longer than wide, 0.75 times as long as peduncle article 3, naked; second segment twice as long as wide, as long as peduncle article 3, with four simple and one penicillate subdistal setae and two simple distal setae.

Mouthparts, chelipeds, pereopods, pleopods and uropods similar to those of female.

Etymology. Named after Melanie Mackenzie of the Museum Victoria in gratitude for her diligent and uncomplaining assistance with the material and data of the collections.

Remarks. The characters of this species are discussed above under the generic remarks. The rugose tuberculation of the cheliped may be a specific rather than generic character as it is known to show intrageneric variation in other paratanaoid taxa (see discusison under *Araphura*). *Bascestus melmackenziae* sp. nov. was taken from depths of 37 to 49 m in the Eastern Bass Strait.

Tanaidomorpha *incertae sedis*

Species 33

Figure 152

Material examined. 6 mancae (manca 1) (J51791), Stn VC30 C1, Victoria, Central Bass Strait, 38°35.53'S, 146°07.51'E, 40 m depth, 11th May 1998, Smith-McIntyre grab, coll. N. Coleman.

Description. Body (Fig. 152) glabrous, small, eight times as long as wide, length of all specimens 1.4 mm. Cephalothorax subrectangular, wider than long, with branchial chambers expanded as lateral rounded flanges over cheliped attachment; rostrum straight, smooth, with anterior margin of carapace protruding either side of rostrum as rounded lobes. Pereonite 1 trapezoidal, 0.8 times as long as cephalothorax, anteriorly 1.4 times as wide as pereonite length, posteriorly 0.8 times as wide as pereonite length; pereonites 2 and 3 rectangular, 0.75 times as wide as long, pereonite 2 almost as long as cephalothorax, pereonite 3 just shorter than pereonite 1; pereonites 4 and 5 hexagonal, pereonite 4 as wide as long and as long as pereonite 3, pereonite 5 about 1.5 times as wide as long and about half length of cephalothorax; pereonite 6 short, one-quarter as long as pereonite 5 and four times as wide as long. Pleon laterally convex, first four pleonites 5.2 times as wide as long, fifth pleonite as long as pereonite 6 and four times as wide as long. Pleotelson semicircular, twice as long as each anterior pleonite and twice as wide as long.

Antennule apparently of three articles. Posterior pereopods with prickly tubercles on carpus. Uropods biramous, each ramus of one segment.

Remarks. These specimens are all at the manca 1 stage, with a highly reduced pereonite 6, hardly longer than pleonite 1, and no pereopod 6. Their morphology shows no similarity to any known genus; in particular, the lobate structure of the cephalothorax is highly unusual, yet appears unlikely to be a juvenile character. The presence of prickly tubercles on the posterior pereopods suggests that this taxon may belong in the Typhlotanaidae (but see *Bassoleptochelia* above). Without knowledge of the adult, it is at present not possible to assign this taxon to any category lower than Suborder, and it may well represent a distinct Family. "Species 33" is a Museum Victoria collection reference number.

Discussion

While the Bass Strait has been the subject of unusually extensive and intensive sampling, from which the collections analyzed here have arisen, it remains remarkable that we now know of 65 species in 43 genera from this area (Appendix 2), of which 57 species and eight genera have proven to be new to science (and at present are all endemic except for *Remexudes toompani*). The extraordinarily high diversity of this assemblage is the more remarkable because the habitats are not very diverse, being predominantly sandy substrata and thus with limited niche diversity. That the Bass Strait is not unique in this respect (although Australia may be) is demonstrated by the comparatively similarly high levels of tanaidacean diversity discovered from much briefer surveys elsewhere in Australia, such as Esperance

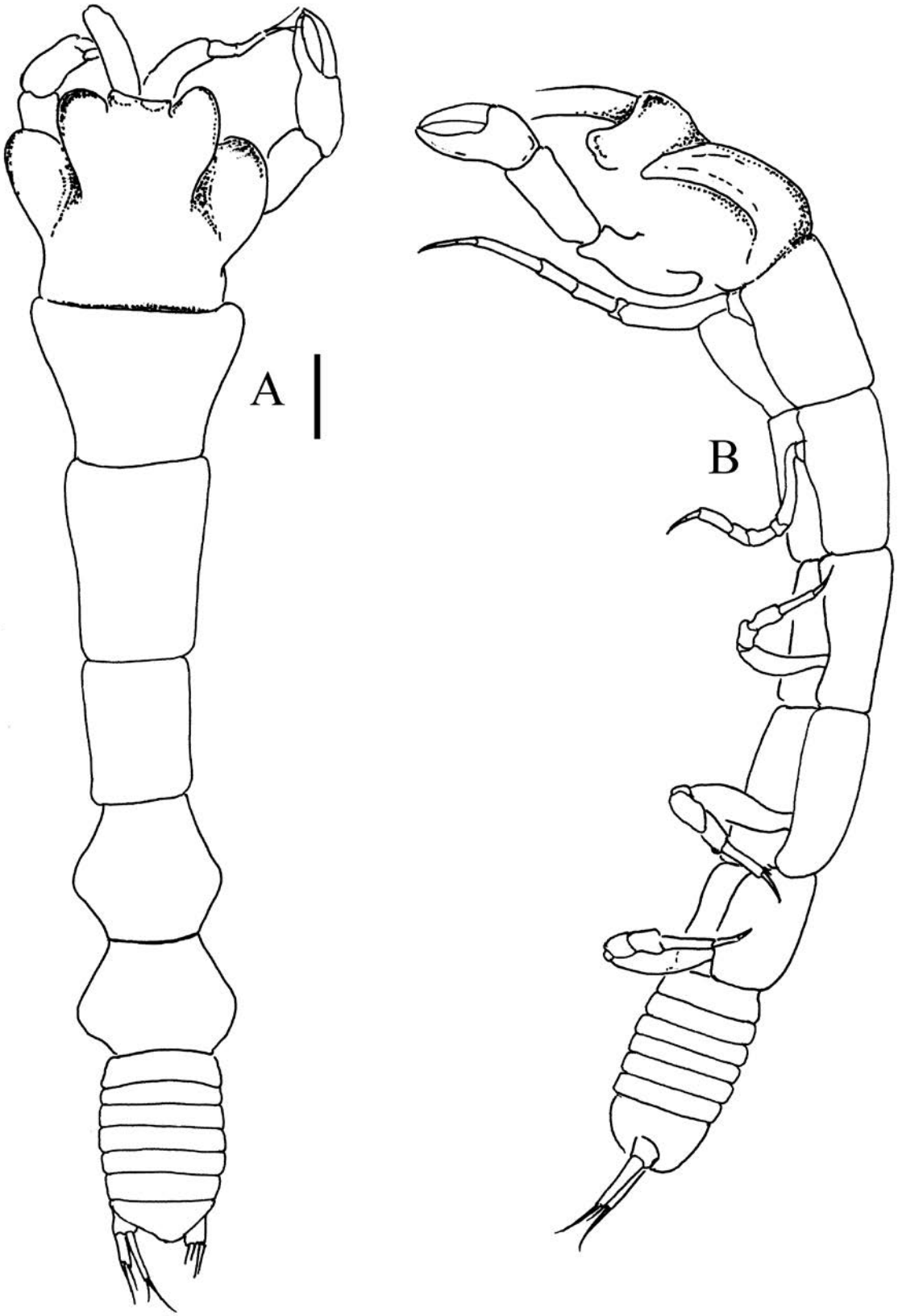

Fig. 152. Tanaidomorpha *incertae sedis* Species 33, manca. A, dorsal view ; B, lateral view. Scale line = 0.1 mm.

(Bamber, 2005) and Moreton Bay (Bamber, 2008), again both areas with predominantly sandy substrata.

Of those nine species from the Bass Strait known from elsewhere in Australia, two, *Indoapseudes macabre* and *Paratanais vetinari*, are also known from southwestern Australia, somewhat consistent with the predominant current flow coming from the west. All but one of the remainder are also found in the adjacent territory of New South Wales, and two extend as far as Brisbane (Queensland).

At the generic level, those described as new for the Bass Strait are currently endemic (other than *Remexudes*). *Whiteleggia* and *Pseudowhiteleggia,* both with a fairly long history in the literature, and *Remexudes* are so far restricted to the southeastern corner of Australia. The typhlotanaid genus *Antiplotanais* now contains three species, all from Australia, from southern Western Australia, Victoria and southern Queensland. The at-present more-numerous genus *Bathytanais* is almost exclusively Australian, being represented by seven species in Australian waters (from all coasts) but also, enigmatically, one species in Hong Kong.

On a somewhat more widespread basis, the genera *Spinosapseudes* and *Metapseudes* are now both known from two species only, with some zoogeographic consistency, one of each genus being from the Bass Strait and the other from New Zealand waters. A similar distributional association appears to be shown within *Araphura* (and *Araphuroides*?): while overall these genera are relatively widespread in their distribution, the morphology of the species from the Bass Strait, with nodulose chelipeds, is also found only in species from New Zealand and the sub-Antarctic South Shetland Islands. A similar Antarctic/sub-Antarctic link is to be found in the Mirandotanaidae.

The two pagurapseudid genera recorded above, both well-represented in the eastern half of Australia, show diversity and similar distributions throughout Australasia to Micronesia and also with one (*Macrolabrum*) or five (*Pagurapseudes*) species in the western Indian Ocean. A similar distribution is shown by the four known species of *Indoapseudes*, and by the genus *Pakistanapseudes*, five species of which have now been found in the Bass Strait, which contributes to a surprisingly high diversity in Australia, (belying the derivation of the generic name) with some nine of the 18 species recorded globally in the Pakistanapseudinae coming from Australian waters.

There are thus some consistent trends within the zoogeography of the Bass Strait taxa, at both regional and wider scales.

However, the origins of this Australian diversity are not easy to explain. A process of original evolution and subsequent radiation is occasionally suggested as a source of high diversity. An early stage in such a process may be exhibited by the presently Australian-endemic family Whiteleggiidae. Yet speculation over associations with the tanaidacean faunas of other parts of what was Gondwana must await better study of the faunas of South Africa and India, for examples. Interestingly, there appears little association with the tanaidacean fauna of Antarctica, where such families as the Leptocheliidae appear to be absent. The converse hypothesis of colonization and subsequent allopatric speciation and radiation is equally well-supported by the distributions of such taxa as the Pakistanapseudinae and the Pagurapseudidae with their links through Australasia and the Indian Ocean together with an apparent greatest diversity in Australia itself.

It remains the case that such hypotheses will remain speculative until more is known about the tanaidacean faunas from other, as yet understudied (or at least unpublished) regions of Australia, such as the tropical waters of northern Queensland, the Gulf of Carpentaria and the north coast of Australia, and northern Western Australia, with their extensive coral-reef habitats, as well as the Great Australian Bight in the south. Fortunately, information on the tanaidaceans of neighbouring regions is, in some cases, improving markedly, with valuable recent work from New Zealand waters by Bird (2008; 2011) and some from Micronesia (Bamber, 2009 and references therein).

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Appendix 1. Sample registration numbers for *Kalliapseudes obtusifrons* material examined.

Crib Point, Western Port, Victoria

J48195 8 ♀ (2 brooding), 6 ♂, 1 juvenile
J48207 15 ♀ (6 brooding), 4 ♂, 2 juveniles
J48219 5 ♀ (1 brooding, 2 with oostegites), 1 ♂
J48228 6 ♀ (1 brooding), 2 juveniles
J48375 1 ♀ with oostegites, 1 ♂
J48383 1 ♂
J48388 7 ♀ (4 brooding), 2 ♂, 16 juveniles
J48389 5 brooding ♀, 10 juveniles
J48393 3 ♀ (2 brooding), 2 ♂, 1 juvenile
J48398 2 brooding ♀, 1 ♂, 5 juveniles
J48399 2 brooding ♀, 3 juveniles
J48402 4 ♀ (1 brooding), 2 juveniles
J48409 1 brooding ♀, 2 juveniles
J48416 4 ♀ (2 brooding, 1 with oostegites), 4 ♂, 2 juveniles
J48418 1 ♀, 1 ♂

Hastings, Western Port, Victoria

J66425 79 ♀ (24 brooding, 28 with oostegites), 41 ♂, 21 juveniles
J66520 1 brooding ♀
J66665 9 ♀, 2 ♂, 2 juveniles
J66918 1 ♀
J67235 3 ♀, 1 ♂
J67281 1 ♀, 1 ♂

Port Phillip Bay, Victoria

J43615 1 ♀
J43616 1 brooding ♀, 1 juvenile
J43617 1 ♀
J43618 1 brooding ♀, 1 ♂
J43619 1 ♀, 1 ♂
J43620 1 brooding ♀
J43621 1 ♀
J43623 1 ♂
J43624 1 ♀, 1 ♂
J43662 3 ♀, 2 ♂, 13 juveniles
J43076 1 ♂
J43080 1 ♀, 1 ♂
J43081 1 ♂

Gippsland, E. Bass Strait

J28079 9 ♀ (3 with oostegites), 5 ♂, 7 juveniles
J28114 18 ♀ (4 brooding, 7 with oostegites), 6 ♂
J28102 8 ♀ (2 brooding), 6 ♂, 2 juveniles
J28110 28 ♀ (4 with oostegites), 3 ♂
J28098 1 ♀ with oostegites

East of Wilson's Promontory

J50781 2 ♀ (1 brooding), 1 ♂
J50782 2 juveniles
J50783 1 ♀, 4 juveniles
J50784 1 ♀, 1 juvenile
J50785 44 ♀ (6 brooding), 9 ♂, 6 juveniles
J50786 3 ♀, 2 ♂
J50787 9 ♀ (2 brooding, 2 with oostegites), 4 ♂, 3 juveniles
J50788 2 ♀ (1 brooding), 1 ♂
J50789 9 ♀, 4 ♂, 1 juvenile
J50790 13 ♀, 3 juveniles
J50791 3 ♀

Appendix 2. Full species list of Tanaidacea from Bass Strait, with provenance elsewhere in Australia, if any.

ORDER TANAIDACEA DANA, 1849

Suborder Apseudomorpha Sieg, 1980(a)
Superfamily Apseudoidea Leach 1814

Family Apseudidae Leach 1814

Subfamily Apseudinae Leach 1814
Genus *Apseudes* Leach 1814
Apseudes abditospina (Błażewicz-Paszkowycz & Bamber, 2007) **comb. nov.**
Apseudes poorei Błażewicz-Paszkowycz & Bamber, 2007
***Apseudes quasimodo* sp. nov.**
Genus *Apseudopsis* Norman 1899
Apseudopsis tuski (Błażewicz-Paszkowycz & Bamber, 2007) **comb. nov.**
Genus *Spinosapseudes* Guţu 1996(a)
Spinosapseudes colobus Błażewicz-Paszkowycz & Bamber, 2007
Genus *Bunakenia* Guţu 1995(a)
***Bunakenia labanticheiros* sp. nov.**
Genus *Paradoxapseudes* Guţu 1991
***Paradoxapseudes paneacis* sp. nov.**
***Paradoxapseudes attenuata* sp. nov.**

Subfamily Pugiodactylinae Guţu 1995(b)
Genus *Pugiodactylus* Guţu 1995(b)
Pugiodactylus syntomos Błażewicz-Paszkowycz & Bamber, 2007

Family Whiteleggiidae Guţu 1972
Genus *Whiteleggia* Lang 1970
Whiteleggia multicarinata (Whitelegge, 1901) [also New South Wales[1]]
Genus *Pseudowhiteleggia* Lang, 1970
Pseudowhiteleggia typica Lang, 1970 [also New South Wales[1]]

Family Kalliapseudidae Lang 1956(b)

Subfamily Kalliapseudinae Guţu 1972
Genus *Kalliapseudes* Stebbing 1910
Kalliapseudes obtusifrons (Haswell 1882) [also New South Wales[2]]

Family Metapseudidae Lang 1970

Subfamily Metapseudinae Lang 1970
Genus *Cyclopoapseudes* Menzies, 1953
Subgenus *Exopoapseudes* **subgen. nov.**
***Cyclopoapseudes (Exopoapseudes) plumosa* sp. nov.**
Genus *Labraxeudes* Błażewicz-Paszkowycz & Bamber, 2007(b)
Labraxeudes heliodiscus Błażewicz-Paszkowycz & Bamber, 2007
Genus *Metapseudes* Stephensen 1927
Metapseudes wilsoni Błażewicz-Paszkowycz & Bamber, 2007

Family Parapseudidae Guţu 1981

Subfamily Pakistanapseudinae Guţu 2008 **new rank**
Genus *Pakistanapseudes* Băcescu 1978
Pakistanapseudes bassi Błażewicz-Paszkowycz & Bamber, 2007
***Pakistanapseudes lucifer* sp. nov.**
Pakistanapseudes perulpa Błażewicz-Paszkowycz & Bamber, 2007 [also Queensland[7]]
***Pakistanapseudes taylorae* sp. nov.**
***Pakistanapseudes* sp. nov. C**

Subfamily Parapseudinae Guţu 1981 **new rank**
Genus *Parapseudes* Sars, 1882
***Parapseudes blandowskii* sp. nov.**
Genus *Saltipedis* Guţu 1995(b)
Saltipedis nugoris Błażewicz-Paszkowycz & Bamber, 2007
***Saltipedis floccus* sp. nov.**
Genus *Remexudes* Błażewicz-Paszkowycz & Bamber, 2007
Remexudes toompani Błażewicz-Paszkowycz & Bamber, 2007 [also Queensland[7]]

Family Pagurapseudidae Lang 1970

Subfamily Hodometricinae Guţu 1981
Genus *Indoapseudes* Băcescu 1976(a)
Indoapseudes macabre Bamber, 2005 [also south-western Australia[3]]
Genus *Similipedia* Guţu 1989
Similipedia diarris Błażewicz-Paszkowycz & Bamber, 2007

Subfamily Pagurapseudinae Lang, 1970
Genus *Pagurapseudes* Whitelegge 1901
***Pagurapseudes victoriae* sp. nov.**
***Pagurapseudes kimbla* sp. nov.**
Genus *Macrolabrum* Băcescu, 1976(b)
***Macrolabrum tangaroa* sp. nov.**
***Macrolabrum sarda* sp. nov.**
***Macrolabrum haikung* sp. nov.**

Suborder Tanaidomorpha Sieg, 1980(a)
Superfamily Paratanaoidea Lang, 1949

Family Paratanaidae Lang, 1949

Subfamily Paratanaidinae Lang, 1949
Genus *Paratanais* Dana, 1952
Paratanais malignus Larsen, 2001 [also New South Wales[4]]
***Paratanais tanyherpes* sp. nov.**
Paratanais vetinari Bamber, 2005 [also south-western Australia[3]]

Subfamily Bathytanaidinae Larsen & Heard, 2001
Genus *Bathytanais* Beddard, 1886
Bathytanais bathybrotes (Beddard, 1886(a)) [also south-western Australia[5] and Queensland[6]]
Bathytanais fragilis Larsen & Heard, 2001
***Bathytanais parageios* sp. nov.**

Family Leptocheliidae Lang, 1973
Genus *Leptochelia* Dana, 1849
***Leptochelia billambi* sp. nov.**
Genus *Araleptochelia* gen. nov.
***Araleptochelia macrostonyx* sp. nov.**
Genus *Pseudoleptochelia* Lang, 1973
***Pseudoleptochelia occiporta* sp. nov.**
Genus *Bassoleptochelia* gen. nov.
***Bassoleptochelia verro* sp. nov.**

Family Tanaellidae Larsen & Wilson, 2002
Genus *Araphura* Bird & Holdich, 1984
***Araphura pygmothymos* sp. nov.**
***Araphura yarra* sp. nov.**
***Araphura doutagalla* sp. nov.**
Genus *Araphuroides* Sieg, 1886
***Araphuroides stabastris* sp. nov.**
***Araphuroides batmania* sp. nov.**
***Araphuroides sala* sp. nov.**
Genus *Inconnivus* gen. nov.
***Inconnivus billibunteri* sp. nov.**

Family Mirandotanaidae Błażewicz-Paszkowycz & Bamber, 2009
Genus *Pooreotanais* Błażewicz-Paszkowycz & Bamber, 2009
Pooreotanais gari *Błażewicz-Paszkowycz* & Bamber, 2009

Family Typhlotanaidae Sieg, 1984
Genus *Typhlotanais* Sars, 1882 *sensu lato*
***Typhlotanais herthio* sp. nov.**
Genus *Antiplotanais* Bamber, 2008
***Antiplotanais actuarius* sp. nov.**
Genus *Hamatipeda* Błażewicz-Paszkowycz, 2007
***Hamatipeda sima* sp. nov.**
Genus *Paratyphlotanais* Kudinova-Pasternak & Pasternak, 1978
***Paratyphlotanais colouros* sp. nov.**
Genus *Peraeospinosus* Sieg, 1986
***Peraeospinosus tanytrix* sp. nov.**
Genus *Meromonakantha* Sieg, 1986
***Meromonakantha anarsios* sp. nov.**

Family Nototanaidae Sieg 1976

Subfamily Nototanainae Sieg 1976
Genus *Tanaissus* Norman & Scott, 1906
***Tanaissus giraffa* sp. nov.**
Genus *Protanaissus* Sieg, 1983
***Protanaissus huberti* sp. nov.**

Family Agathotanaidae Lang 1971
Genus *Paragathotanais* Lang, 1971
***Paragathotanais wurundjeri* sp. nov.**
Genus *Ozagathus* gen. nov.
***Ozagathus watharongus* sp. nov.**

Family Akanthophoreidae Sieg, 1986
Genus *Gejavis* gen. nov.
***Gejavis corsotos* sp. nov.**

Family Tanaopsidae fam. nov.
Genus *Tanaopsis* Sars, 1896
***Tanaopsis boonwurrungi* sp. nov.**
***Tanaopsis oios* sp. nov.**

Family Colletteidae Larsen & Wilson, 2002
Genus *Parafilitanais* Kudinova-Pasternak, 1989
***Parafilitanais vadosus* sp. nov.**
Genus *Bascestus* gen. nov.
***Bascestus melmackenziae* sp. nov.**

Family *incertae sedis*
"Species 33"

[1] Lang, 1970
[2] Drumm & Heard, 2006
[3] Bamber, 2005
[4] Larsen, 2001
[5] Lang, 1972
[6] Bamber, 2008
[7] Błażewicz-Paszkowycz & Bamber, 2007