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The *Tryphosa* group (Crustacea: Amphipoda: Lysianassoidea: Lysianassidae: Tryphosinae)

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Abstract

The *Tryphosa* group is established within the tryphosine amphipods. It contains eight genera worldwide (*Bruunosa* Barnard & Karaman, 1987; *Glorieusella* **gen. nov.**; *Gronella* Barnard & Karaman, 1991; *Metambasia* Stephensen, 1923; *Pseudonesimus* Chevreux, 1926; *Schisturella* Norman, 1900; *Thrombasia* J.L. Barnard, 1966; and *Tryphosa* Boeck, 1871). As part of the *Tryphosa* group we describe the new genus *Glorieusella* from Madagascar and four new species (*Schisturella rosa* **sp. nov.,** *Thrombasia evalina* **sp. nov.,** *Thrombasia umina* **sp. nov.,** *Thrombasia saros* **sp. nov.**) from eastern Australia.

Key words: Crustacea, Amphipoda, Lysianassidae, Tryphosinae, taxonomy, new genus, new species, *Bruunosa*, *Glorieusella*, *Gronella*, *Metambasia*, *Pseudonesimus*, *Schisturella*, *Thrombasia*, *Tryphosa*

Introduction

In the course of our work on Australian lysianassoid amphipods an interesting group within the subfamily Tryphosinae materialized, referred to here as the '*Tryphosa* group' and consisting of eight genera: *Bruunosa* Barnard & Karaman, 1987; *Glorieusella* **gen. nov.**, *Gronella* Barnard & Karaman, 1991, *Metambasia* Stephensen, 1923, *Pseudonesimus* Chevreux, 1926, *Schisturella* Norman, 1900, *Thrombasia* J.L. Barnard, 1966 and *Tryphosa* Boeck, 1871. The *Tryphosa* group is categorized, among other things, by two strong synapomorphies, the presence of a cap on the accessory flagellum and a constricted inner ramus on uropod 2. Within the group there are three genera (*Gronella*, *Metambasia* and *Tryphosa*) endemic to the North Atlantic Ocean and the North Polar Sea. The other genera are more widespread, occurring also in the Pacific and South Atlantic Oceans. Much of the work on members of the *Tryphosa* group was done by J.L. Barnard (1961, 1962, 1966, 1967) in his studies of deep-sea amphipods.

Here we present a catalogue of the species and genera within the *Tryphosa* group, provide detailed synonymies and distributions, and list details of the type material for each taxon where known. For some species, holotypes or syntypes were never explicitly designated by the original authors, a situation that is particularly prevalent in the older literature. In accordance with the International Code of Zoological Nomenclature (ICZN 1999), in the absence of holotype, syntype, or subsequent lectotype designation, all specimens on which an author establishes a new species collectively constitute the name-bearing type and as such are considered syntypes (Article 72.1.1).

A new genus, *Glorieusella* **gen. nov.** from Madagascar, and four new species, *Schisturella rosa* **sp. nov.,** *Thrombasia evalina* **sp. nov.,** *Thrombasia umina* **sp. nov.** and *Thrombasia saros* **sp. nov.** from eastern Australia, are described. Finally, the genera *Pseudonesimus* and *Thrombasia* are re-established, resulting in new combinations that change the current concept of *Schisturella*.

Material and methods

The descriptions were generated from a DELTA database (Dallwitz 2010) to the tryphosine genera and species of the world. The ***bold italic*** parts of the descriptions are diagnostic characters that distinguish each taxon in at least two respects from every other taxon. Material referred to in this study is lodged in the Australian Museum, Sydney (AM); Canadian Museum of Nature, Ottawa, Canada (CMNC); Field Museum of Natural History, Chicago, Illinois, USA (FMNH); Los Angeles County Museum of Natural History, Los Angeles, California, USA (LACM); Muséum National d'Histoire Naturelle, Paris, France (MNHN); Museum Victoria, Melbourne, Australia (NMV); South African Museum, Cape Town, South Africa (SAM); Universitetets Zoologiske Museum, Copenhagen, Denmark (ZMUC); and Zoologisches Museum Universitet Oslo, Norway (ZMUO). Standard abbreviations on the plates are: A, antenna; E, epistome; EP, epimeron; G, gnathopod; H, head; LB, labium; MD, mandible; MX, maxilla; MP, maxilliped; P, pereopod; T, telson; U, uropod; L, left; R, right.

Taxonomy

Family Lysianassidae

Subfamily Tryphosinae

Tryphosa group

Diagnostic description. Antenna 1 well developed, accessory flagellum forming a cap. Mandible molar columnar with convex triturating surface or proximally setose and distally triturating. Gnathopod 1 subchelate or parachelate. Uropod 2 inner ramus constricted. Telson cleft.

Included genera. The *Tryphosa* group includes 8 genera: *Bruunosa* Barnard & Karaman, 1987; *Glorieusella* **gen. nov.**; *Gronella* Barnard & Karaman, 1991; *Metambasia* Stephensen, 1923; *Pseudonesimus* Chevreux, 1926; *Schisturella* Norman, 1900; *Thrombasia* J.L. Barnard, 1966; and *Tryphosa* Boeck, 1871.

Remarks. This interesting group is highlighted by two synapomorphies: the accessory flagellum forms a cap that covers the callynophore, and the inner ramus on uropod 2 is constricted. The characters defining the genera are mainly confined to gnathopod 1; strongly or weakly subchelate and the condition of the coxa from fully developed to vestigial, tapering or subrectangular.

Two genera, *Gronella* and *Metambasia*, are North Atlantic arctic/boreal endemics. Three of the more widespread genera, *Pseudonesimus*, *Schisturella* and *Thrombasia*, occur in Australian waters.

Within the *Tryphosa* group species gnathopod 1 is either strongly subchelate, subchelate or parachelate and three kinds of gnathopod 1 coxae are found: subrectangular and about as big as the gnathopod 2 coxa; slightly smaller than gnathopod 2 and tapering; or vestigial. There are two forms of the maxilla 1 setal-teeth: either both ST-7 and ST-D have the medial margin mostly or completely serrate or the medial margin is smooth and they are apically serrate or cuspidate. The uropod 3 rami may be either with plumose setae in the adult male and/or female or they have no plumose setae; and the lanceolate inner ramus is either slender or broad. These combinations of characters define the genera in the *Tryphosa* group.

Key to genera

1.	Gnathopod 1 parachelate	2
-	Gnathopod 1 subchelate	3
2.	Gnathopod 1 coxa large, nearly as long as coxa 2, not tapering	*Glorieusella*
-	Gnathopod 1 coxa vestigial	*Metambasia*
3.	Gnathopod 1 coxa large, nearly as long as coxa 2, not tapering	4
-	Gnathopod 1 coxa tapering	5
-	Gnathopod 1 coxa vestigial	6
4.	Mandible molar a triturating, strongly-developed column. Uropod 3 inner ramus slender, distinctly shorter than article 1 of outer ramus, subequal in length to peduncle	*Bruunosa*
-	Mandible molar a triturating, reduced column. Uropod 3 inner ramus broad, subequal in length to article 1 of outer ramus, distinctly longer than peduncle	*Tryphosa*
5.	Antenna 2 peduncle article 3 enlarged in male. Gnathopod 1 carpus slightly longer than propodus	*Thrombasia*
-	Antenna 2 peduncle article 3 not enlarged in male. Gnathopod 1 carpus shorter than propodus	*Gronella*
6.	Gnathopod 1 strongly subchelate; carpus slightly to strongly shorter than propodus; palm transverse to slightly obtuse, convex. Uropod 3 rami without plumose setae	*Pseudonesimus*
-	Gnathopod 1 subchelate; carpus slightly longer than propodus; palm acute, straight to concave. Uropod 3 rami with plumose setae in male	*Schisturella*

Bruunosa Barnard & Karaman, 1987

Bruunosa Barnard & Karaman, 1987: 864.—Barnard & Karaman, 1991: 472.

Type species. *Tryphosa bruuni* Dahl, 1959, original designation.

Included species. *Bruunosa* includes one species: *B. bruuni* (Dahl, 1959).

Diagnostic description. Antenna 1 flagellum article 1 robust seta on distal margin unknown; accessory flagellum forming cap. Antenna 2 flagellum article 3–5 slender, brush setae unknown. Mandibular incisor straight; molar a fully triturating column; palp attached midway. Maxilla 1 ST-7 (?) cuspidate along distomedial margin; ST-D slender, apically cuspidate. Maxilliped outer plate with multiple apical robust setae. Gnathopod 1 subchelate; coxa large, nearly as long as coxa 2, not tapering; carpus slightly longer than propodus; propodus palm acute, straight. Pereopod 4 coxa with weakly developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami without plumose setae in female (male unknown); inner ramus slender, lanceolate. Telson moderately cleft.

Remarks. *Bruunosa* appears to be most similar to *Tryphosa*. They are the only genera in the group to have a subchelate gnathopod 1 with a non-tapering coxa as large as the gnathopod 2 coxa. *Bruunosa* has the carpus of gnathopod 1 longer than the propodus (shorter in *Tryphosa*) and no plumose setae on the rami of the female uropod 3 (present in *Tryphosa*).

Distribution. South Pacific Ocean.

Bruunosa bruuni (Dahl, 1959)

(Fig. 1)

Tryphosa bruuni Dahl, 1959: 223, fig. 9.
Bruunosa bruuni.—Barnard & Karaman, 1987: 864.—Barnard & Karaman, 1991: 472.

Types. Lectotype by present designation, 1 female, about 7 mm (ZMUC CRU-5926).

Type locality. Kermadec Trench, South Pacific Ocean, 6660–6770 m depth.

Habitat. Sand, clay and stones.

Depth range. 6660–6770 m (Dahl 1959).

Remarks. Dahl (1959) did not explicitly designate a holotype or any syntypes in his original description of the species, but refers to one female and one juvenile. In accordance with the International Code of Zoological Nomenclature (ICZN 1999: Art. 72.1.1) this material collectively constitutes syntypes. The juvenile specimen is now apparently lost and four slides of the female are all that remain of the material. This is re-illustrated by us (Fig. 1), and designated as a lectotype.

Distribution. *South Pacific Ocean*. Kermadec Trench (Dahl 1959).

Glorieusella gen. nov.

Type species. *Thrombasia incerta* Ledoyer, 1986, by monotypy.

Etymology. The name *Glorieusella* refers to the Îles Glorieuses, the type locality of the type species.

Included species. *Glorieusella* includes one species: *G. incerta* (Ledoyer, 1986).

Diagnostic description. Antenna 1 flagellum article 1 lacking robust seta on distal margin; accessory flagellum forming cap. Antenna 2 flagellum articles 3–5 slender, without brush setae on the anterior margin. Mandibular incisor straight; molar (?) with reduced column and convex triturating surface (a button); palp attached midway. Maxilla 1 ST-7 and ST-D unknown. Maxilliped outer plate with (?) single apical robust seta. Gnathopod 1 parachelate; coxa large, nearly as long as coxa 2, not tapering; carpus slightly longer than propodus; propodus palm minute, transverse, straight. Pereopod 4 coxa with weakly developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami without plumose setae in the female (male unknown). Telson weakly cleft.

Remarks. *Glorieusella* and *Metambasia* are the only genera of the *Tryphosa* group that have a minutely parachelate first gnathopod. They are easily separated, as *Glorieusella* has a large, non-tapering gnathopod 1 coxa, whereas *Metambasia* has a vestigial gnathopod 1 coxa.

Distribution. Indian Ocean.

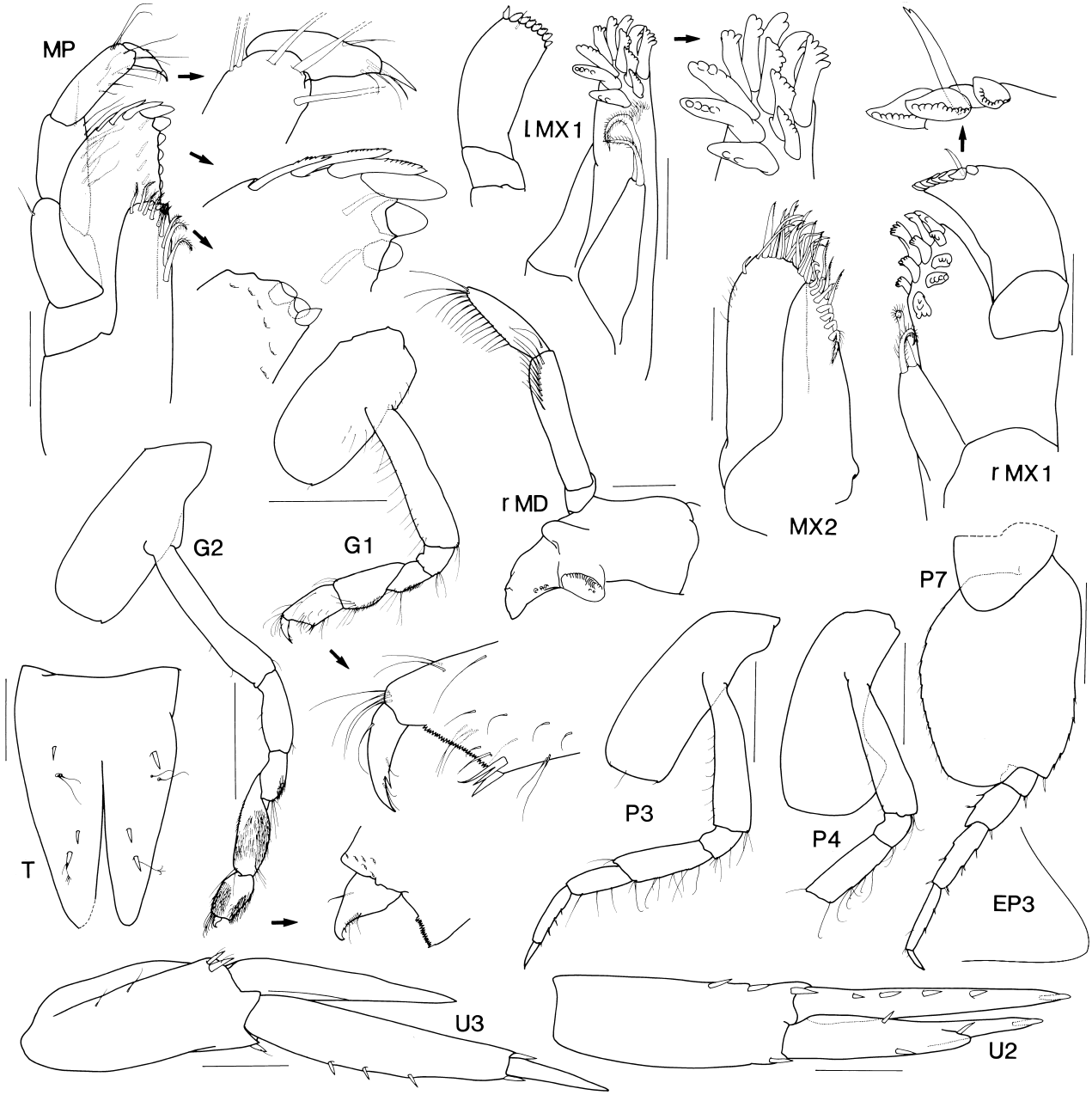

FIGURE 1. *Bruunosa bruuni* (Dahl, 1959), lectotype, female, ZMUC CRU-5926, from the Kermadec Trench; epimeron 3 after Dahl (1959). Scale bars: gnathopods, pereopods, 0.5 mm; remainder 0.1 mm.

Glorieusella incerta (Ledoyer, 1986) comb. nov.

(Fig. 2)

Thrombasia incerta Ledoyer, 1986: 811, fig. 317.
Paralysianopsis incerta.—Lowry & Stoddart, 1995: 102 (key).
? *Schisturella incerta*.—Barnard & Karaman, 1991: 527.

Types. Holotype, female, 4.5 mm, MNHN Am4123.

Type locality. Îles Glorieuses, Indian Ocean (11°31'S 47°24'6"E).

Habitat. Coralline sand.

Depth range. 355–390 m (Ledoyer 1986).

Distribution. *Southwest Indian Ocean.* Îles Glorieuses (Ledoyer 1986).

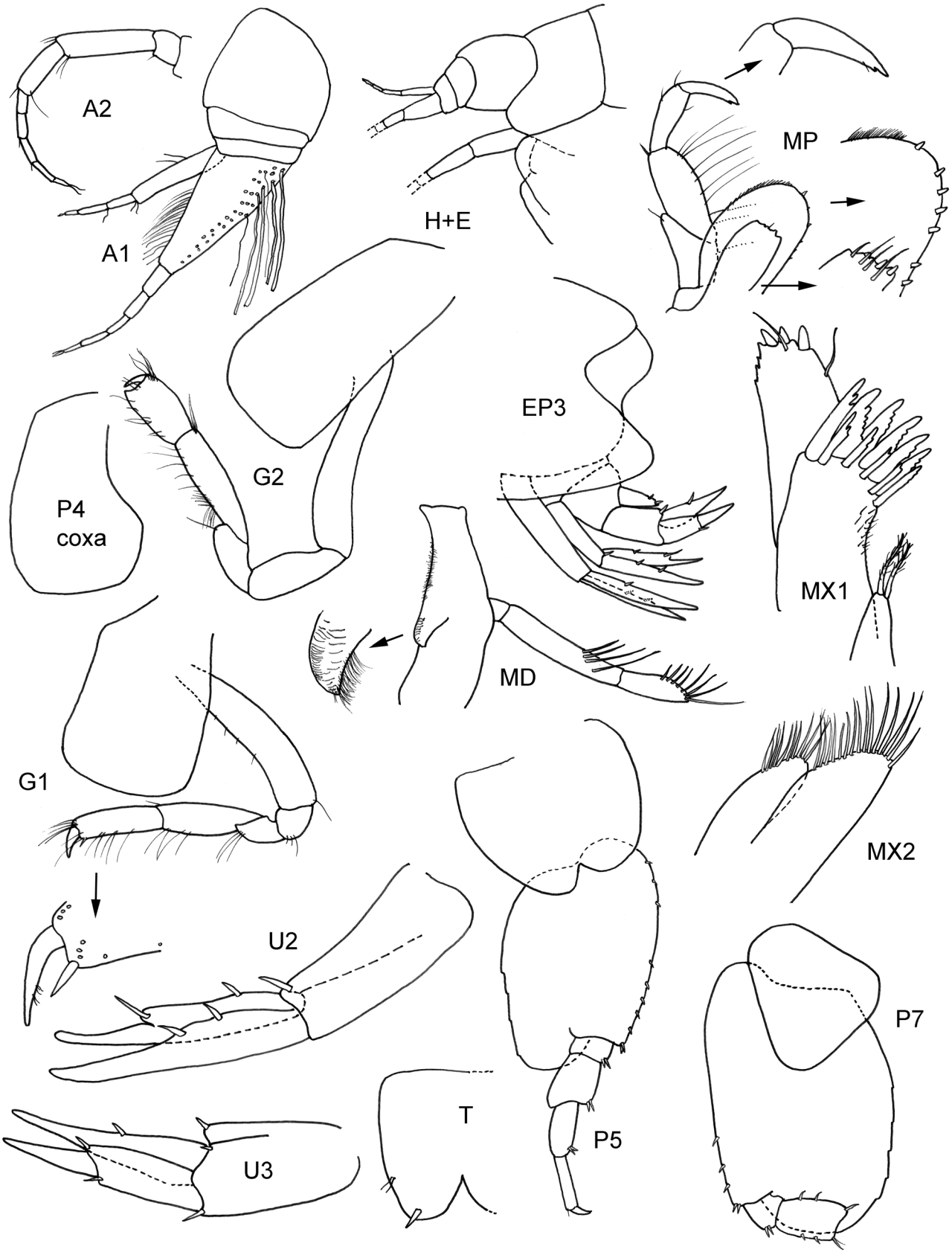

FIGURE 2. *Glorieusella incerta* (Ledoyer, 1986) **comb. nov.**, holotype, female, 4.5 mm (after Ledoyer (1986)).

Gronella Barnard & Karaman, 1991

Gronella Barnard & Karaman, 1991: 489.

Type species. *Anonyx groenlandica* Hansen, 1888, original designation.

Included species. *Gronella* includes two species: *G. groenlandica* (Hansen, 1888); *G. lobata* (Chevreux, 1907).

Diagnostic description. Antenna 1 flagellum article 1 lacking robust seta on distal margin; accessory flagellum forming cap. Antenna 2 flagellum articles 3–5 slender, with strong brush setae on the anterior margin. Mandibular incisor curved; molar with reduced column and convex triturating surface (button); palp attached midway. Maxilla 1 ST-7 cuspidate along distomedial margin; ST-D slender, apically cuspidate. Maxilliped outer plate with apical robust setae. Gnathopod 1 subchelate; coxa large, slightly shorter than coxa 2, tapering; carpus shorter than propodus; propodus palm acute or transverse, straight. Pereopod 4 coxa with well developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami with plumose setae in male, absent in female. Telson moderately cleft.

Remarks. *Gronella* appears to be the sister taxon of *Tryphosa*. The only clear distinction between these genera is that *Gronella* has a tapering gnathopod 1 coxa, the setal-teeth of maxilla 1 are less cuspidate and apparently in females the rami of uropod 3 do not develop plumose setae. *Gronella* is also a sister taxon to *Tryphosella* which has a tapering first coxa and also a cap on the accessory flagellum. The main difference between these genera is the constricted inner ramus on uropod 2 that occurs in *Gronella* but not in *Tryphosella*. The other apparent difference is the structure of the maxilla 1 setal-teeth, most noticeable in ST-7 which is serrate along the entire curved medial margin in *Tryphosella* (see Lowry & Stoddart 2011), but serrate distally in *Gronella groenlandica*, with a smooth, straight medial margin. *Tryphosa nana* has setal-teeth more similar to species of *Tryphosella*.

Two species, *Tryphosella propinqua* (Chevreux, 1926) from deep water off Portugal and *Tryphosella spitzbergensis* (Chevreux, 1926) from the Norwegian Arctic, may also belong to *Gronella*. Neither the seta-teeth of maxilla 1 nor the rami of uropod 2 have ever been illustrated or described for *T. propinqua* so that the critical characters which determine its generic status are not known and it cannot be definitely placed in either *Gronella* or *Tryphosella*. Chevreux (1926) shows a cap on the accessory flagellum and a broadly tapering gnathopod 1 coxa in *T. spitzbergensis*. Stephensen (1935) shows a multi-articulated accessory flagellum and a narrowly tapering gnathopod 1 coxa. Neither author illustrated or described uropod 2. Stephensen (1935) was unsure of his identification and his material may well be a different species. Chevreux (1926) indicates the similarity of *T. spitzbergensis* to *Tryphosella schneideri* Stephensen, 1921, which does not have a constricted inner ramus on uropod 2. Until this character is known the species cannot be definitely placed in either *Gronella* or *Tryphosella*.

Distribution. Arctic, northwest boreal Atlantic.

Gronella groenlandica (Hansen, 1888)

(Fig. 3)

Anonyx groenlandicus Hansen, 1888: 72, pl. 2, fig. 5.—Della Valle, 1893: 832.

Orchomenella groenlandica.—G.O. Sars, 1891: 70, pl. 26, fig. 1.—G.O. Sars, 1895: 684.—Stebbing, 1906: 83.—Stephensen, 1912: 528, 585.—Stephensen, 1913: 123.—Shoemaker, 1920: 6.—Stephensen, 1925: 122.—Schneider, 1926: 10.—Derjugin, 1928: 274.—Shoemaker, 1930: 17.—Stephensen, 1932: 357.—Chevreux, 1935: 57.—Schellenberg, 1935: 21.—Stephensen, 1935: 104 (key), 109.—Stephensen, 1942: 474 (table).—Gurjanova, 1951: 284, fig. 152.—Dunbar, 1954: 719.—MacGinitie, 1955: 158.—Shoemaker, 1955: 3.—Bulycheva, 1957: (page unknown).—J.L. Barnard, 1958: 96 (list).—Oldevig, 1959: 22.—Gurjanova, 1964: 279.—Brunel, 1970: 35 (list).—Bousfield, 1973: 147 (key), 287 (list).—Golikov, 1988: (page unknown).—Golikov, 1990: 241.

Orchomene groenlandica.—Bonnier, 1893: 194.

Tryphosa groenlandica.—Norman, 1902: 479 (list).—Stephensen, 1944: 33, fig. 1, 151, table 2.—Watling, 1979: 266, table 1.

Orchomenella grönlandica.—Gurjanova, 1962: 152 (key).

Gronella groenlandica.—Barnard & Karaman, 1991: 489.—Palerud & Vader, 1991: 35.—Tzvetkova & Golikov, 2001: 88.—Stransky & Brandt, 2010: 862, table 5.—Stransky & Svavarsson, 2010: 134, Appendix.

Not *Tryphosa groenlandica* Schellenberg, 1935: 20.—Gurjanova, 1951: 253, fig. 118 (= *Tryphosella groenlandica*).

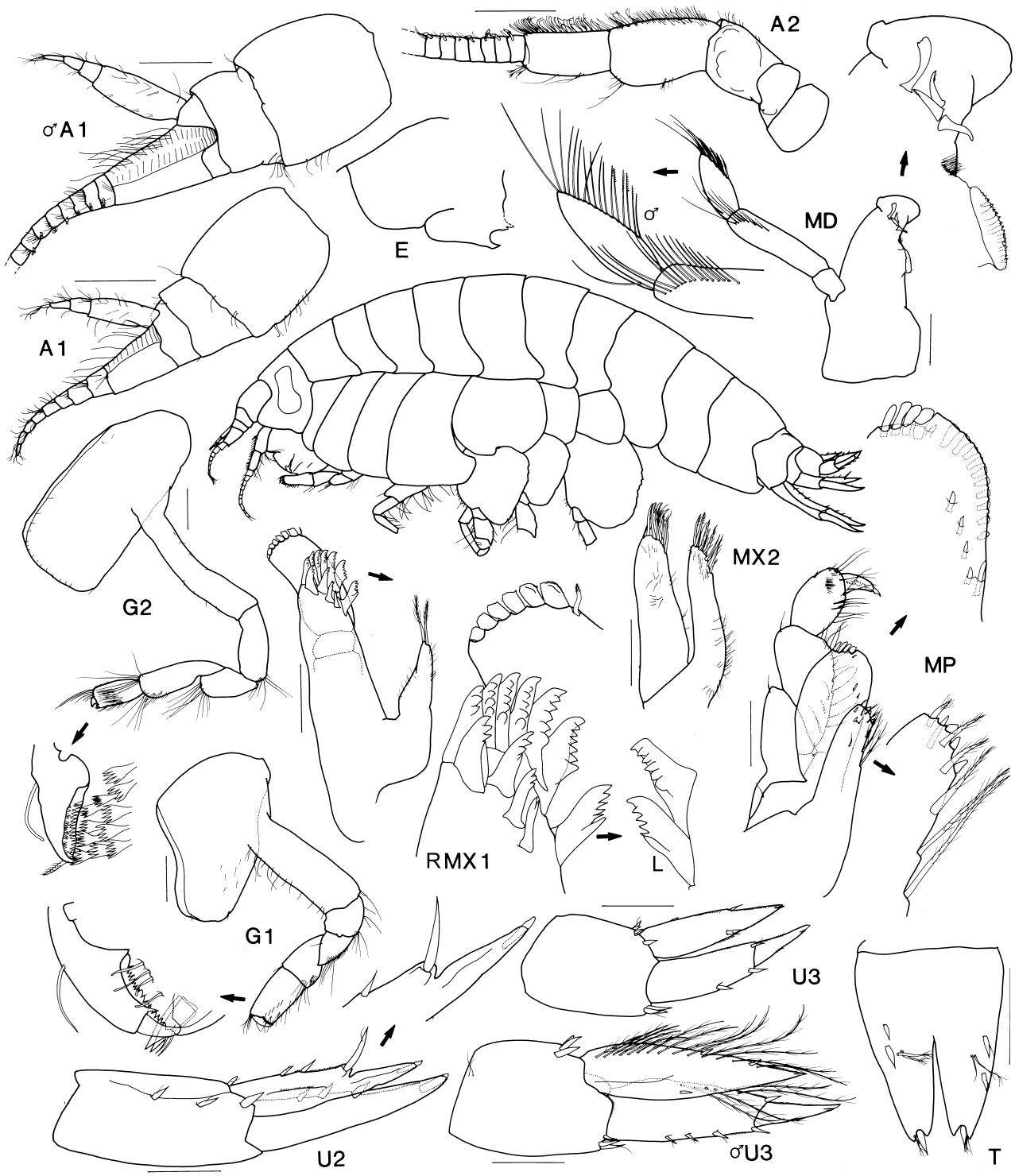

FIGURE 3. *Gronella gronlandica* (Hansen, 1888), female, 6.5 mm, male, 7.5 mm, AM P.9888, from the Bay of Fundy, northwest Atlantic Ocean. Scale bars: antennae, gnathopods, 0.2 mm; remainder, 0.1 mm.

Types. Syntypes, 1 specimen SMNH N. Amph. 6780 (original label no. 5479) and 8 specimens SMNH N. Amph. 6781.

Additional material examined. Female, 6.5 mm, male, 7.5 mm, AM P.9888, from the Bay of Fundy, northwest Atlantic Ocean, United States Bureau of Fisheries, 1872 (ex USNM access. no. 35793, originally identified by C. Shoemaker).

Type locality. Egedesminde, Disko Bugt, West Greenland (approximately 68°40'N 52°40'W), 10–20 fathoms [~18–36.5 m], and Sukkertoppen (Sukkertoppen is an icefield which comes down to the sea near Kangâmiut, West Greenland (approximately 65°50'N 53°20'W)), 15–20 fathoms [~27.5–36.5 m].

Habitat. Soft bottom (Stephensen 1912), sandy mud with algae (Shoemaker 1920), clay (Oldevig 1959).

Depth range. 6–140 m (Stephensen 1925, 1935).

Remarks. Hansen (1888) specified that his description was based on an adult female (6.5 mm) and adult male (7.4 mm) from the syntype series.

Distribution. *Arctic*. Coasts of Greenland (Hansen 1888, Stephensen 1912); North Norway (Sars 1891, Norman 1902); Spitsbergen (Chevreux 1935); Beaufort Sea (Shoemaker 1920, MacGinitie 1955, Shoemaker 1955); White Sea (Derjugin 1928, Golikov 1988); Laptev Sea (Golikov 1990); Kara, East-Siberian and Chukchi Seas (Tzvetkova & Golikov 2001). *Boreal North Atlantic.* Bay of Fundy, Canada (Shoemaker 1930); Ungava Bay, Canada (Dunbar 1954); Gulf of St Lawrence (Brunel 1970).

Gronella lobata (Chevreux, 1907)

Orchomenella lobata Chevreux, 1907: 1, figs 1–3.—Chevreux, 1935: 57, pl. 10, figs 7, 8, pl. 11, fig. 1.—Stephensen, 1935: 104 (key), 105, fig. 17.—Stephensen, 1944: 151, table 2.—Gurjanova, 1962: 151 (key).
Orchomene lobatus.—Barnard & Karaman, 1991: 508.
? *Gronella lobata*.—Palerud & Vader, 1991: 35.—Lörz, 2000: 21.

Types. Syntypes, 2 specimens, MNHN Am7584 (on 8 slides) and MNHN Am7585 (on 3 slides)

Type locality. Cross Bay, west of Spitsbergen, 0–320 m depth, *Princess Alice* station 2522.

Depth range. 0–320 m (Chevreux 1907).

Remarks. The largest of the syntypes, a 7 mm ovigerous female, was illustrated and described by Chevreux (1907).

Distribution. *Arctic.* Cross Bay, west of Spitsbergen (Chevreux 1907); Mellemfjord, West-Greenland (Lörz 2000).

Metambasia Stephensen, 1923

Metambasia Stephensen, 1923: 76.—Dahl, 1959: 217.—J.L. Barnard, 1969: 304, 306, 309, 311, 315 (keys), 350.—Barnard & Karaman, 1991: 503.

Type species. *Metambasia faeroensis* Stephensen, 1923, by monotypy.

Included species. *Metambasia* includes one species: *M. faeroensis* Stephensen, 1923.

Diagnostic description. Antenna 1 flagellum article 1 lacking robust seta on distal margin; accessory flagellum forming cap. Antenna 2 flagellum articles 3–5 slender in female, article 3 enlarged in male; articles 4–5 without brush setae on the anterior margin. Mandibular incisor slightly curved; molar with reduced column and convex triturating surface (button); palp attached midway. Maxilla 1 ST-7 serrate along the entire curved medial margin; ST-D slender, apically cuspidate. Maxilliped outer plate with apical robust setae. Gnathopod 1 parachelate; coxa vestigial; carpus longer than propodus; propodus palm minute, acute. Pereopod 4 coxa with well developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami plumose setae present in male, absent in female. Telson moderately cleft.

Remarks. See remarks under *Glorieusella.*

Distribution. North Atlantic Ocean.

Metambasia faeroensis Stephensen, 1923
(Fig. 4)

Metambasia faeroensis Stephensen, 1923: 76, figs 15, 16.—J.L. Barnard, 1958: 95 (list).—Lincoln, 1979: 40.—Palerud & Vader, 1991: 38.—Barnard & Karaman, 1991: 503.—Sainte-Marie, 1991: 217, appendix 1.

Types. Syntypes, 1 male and 1 female, both 6 mm, ZMUC CRU-6388; many specimens, ZMUC CRU-6389, from Thor Stn 78. 8 specimens from Thor stn 99, 7 females (all with oostegites?) 5–6 mm, 1 adult male, about 8 mm, ZMUC CRU-6390.

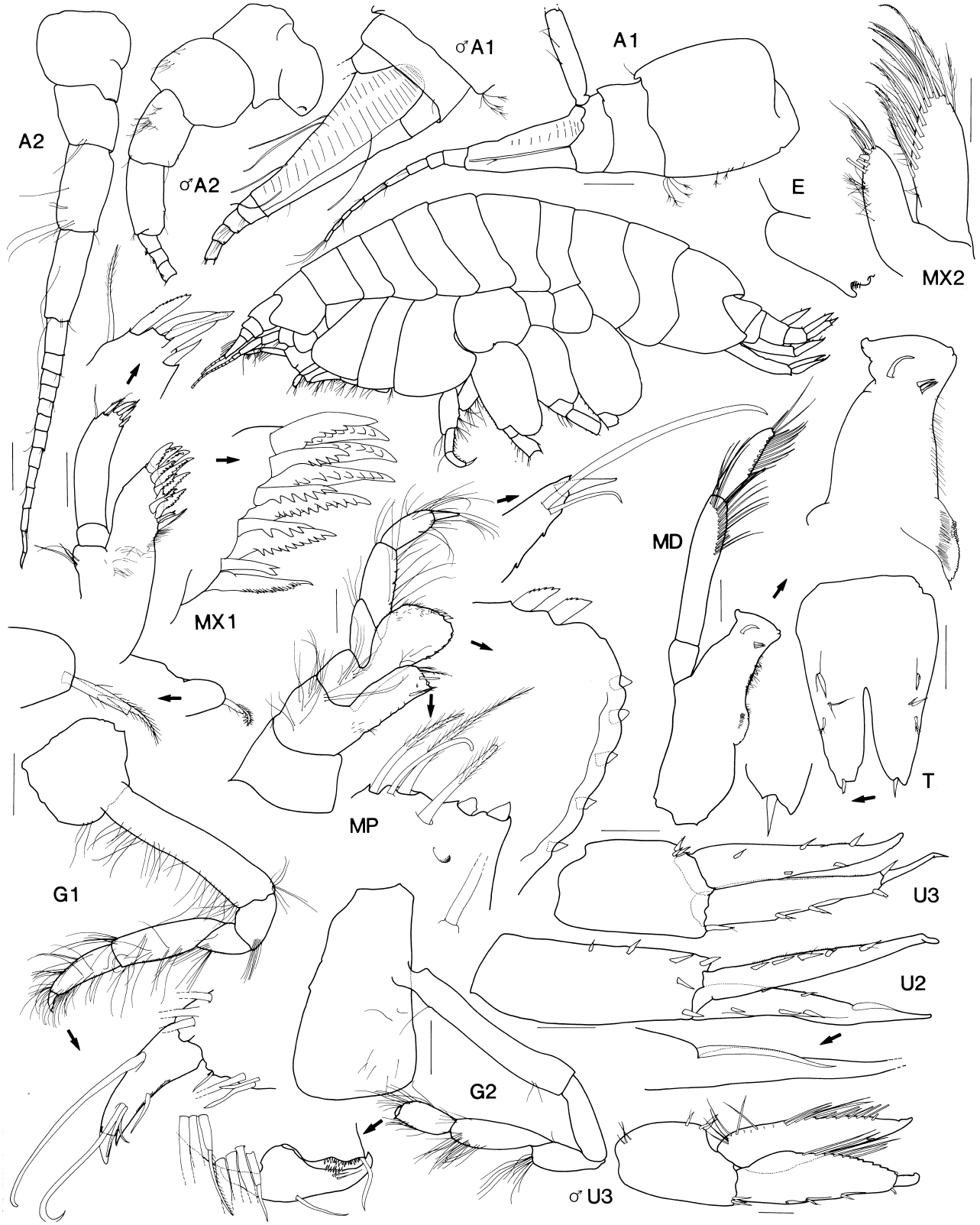

FIGURE 4. *Metambasia faeroensis* Stephensen, 1923, syntype, female, 6 mm, syntype male, 6 mm, ZMUC CRU-6388, south-west of the Faeroe Islands. Scale bars: gnathopods, 0.2 mm; remainder, 0.1 mm.

Type locality. South-west of the Faeroe Islands north-east Atlantic Ocean at 835 m depth (61°07'N 9°30'W), and 900 m depth (61°05'N 9°35'W).

Depth range. 835–900 m (Stephensen 1923).

Remarks. This species appears to have only been collected once, at two separate stations, with a limited distribution near the Faeroe Islands (Stephensen 1923). It is extremely distinctive with a parachelate gnathopod 1 and vestigial gnathopod 1 coxa. In the original description of the species Stephensen (1923) specified that his description and illustrations were based on a 6 mm ovigerous female and an 8 mm adult male from the syntypes series.

Pseudonesimus Chevreux, 1926

Pseudonesimus Chevreux, 1926: 3.—Chevreux, 1935: 13.—J.L. Barnard, 1961: 50.
Aristiopsis J.L. Barnard, 1961: 30.—J.L. Barnard, 1969: 299, 306, 310, 311, 314 (key), 324.—Barnard & Karaman, 1991: 467. (type species *Aristiopsis tactius* J.L. Barnard, 1961, original designation).
Schisturella.—J.L. Barnard, 1969: 361 (in part).—Barnard & Karaman, 1991: 526 (in part).

Type species. *Pseudonesimus abyssi* Chevreux, 1926, by monotypy.

Included species. *Pseudonesimus* includes seven species: *P. abyssi* Chevreux, 1926; *P. cedrosianus* (J.L. Barnard, 1967); *P. parachelatus* (Ledoyer, 1986); *P. robustus* (J.L. Barnard, 1961); *P. tacitus* (J.L. Barnard, 1961); *P. tasmanensis* J.L. Barnard, 1961; *P. zopa* (J.L. Barnard, 1966).

Diagnostic description. Antenna 1 flagellum article 1 lacking robust seta on distal margin; accessory flagellum forming cap. Antenna 2 flagellum articles 3–5 slender in female and (?) male, with weak brush setae on the anterior margin or brush setae absent. Mandibular incisor curved; molar with reduced column and convex triturating surface (button); palp attached midway. Maxilla 1 ST-7 serrate along the distomedial margin; ST-D slender, apically cuspidate. Maxilliped outer plate with apical robust setae. Gnathopod 1 subchelate; coxa vestigial; carpus subequal or slightly longer than propodus; propodus palm transverse, convex. Pereopod 4 coxa with well developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami without plumose setae. Telson moderately to slightly cleft.

Remarks. *Pseudonesimus* was originally described by Chevreux (1926) to accommodate the north Atlantic species *Pseudonesimus abyssi*. *Aristiopsis* was later described by Barnard (1961) for *Aristiopsis tacitus*. Barnard did not associate *A. tacitus* with *Pseudonesimus*, and did not draw any comparison between the two genera in his assessment of their relationships with other taxa. Thus, *Pseudonesimus* remained a monotypic genus (with two subspecies) for more than 40 years until it was eventually placed in the synonymy of *Schisturella* by Barnard (1967) where it has since remained.

Based on the lack of a robust seta on the distal margin of antenna 1 flagellum article 1, the relative length of the gnathopod 1 carpus and propodus, the strongly subchelate, transverse and convex gnathopod 1 palm, and the cleftness of the telson we consider *Pseudonesimus* to be distinct from *Schisturella*, and congeneric with *Aristiopsis*. In accordance with the Principle of Priority (ICZN 1999: Article 23) *Aristiopsis* thus becomes a junior synonym of *Pseudonesimus*.

Distribution. Atlantic and Pacific Oceans.

Pseudonesimus abyssi Chevreux, 1926
(Fig. 5)

Pseudonesimus abyssi Chevreux, 1926: 3, fig. 2.—Chevreux, 1935: 14, pl. 10, fig. 3.—Schellenberg, 1955: 191.—J.L. Barnard, 1958: 98 (list).—Belloc, 1960: 7.
Schisturella abyssi.—J.L. Barnard, 1967: 72, figs 31, 32 (key).—Barnard & Karaman, 1991: 527.—Thurston, 2000: 360, table 5.—Larsen, 2007: 14 (key).

Types. Chevreux's description mentions just one specimen, a (?) juvenile male, 6 mm. A specimen registered as MNHN Am7587, on 7 slides corresponds with the type locality and has "sp. nov." labeled on the slides.

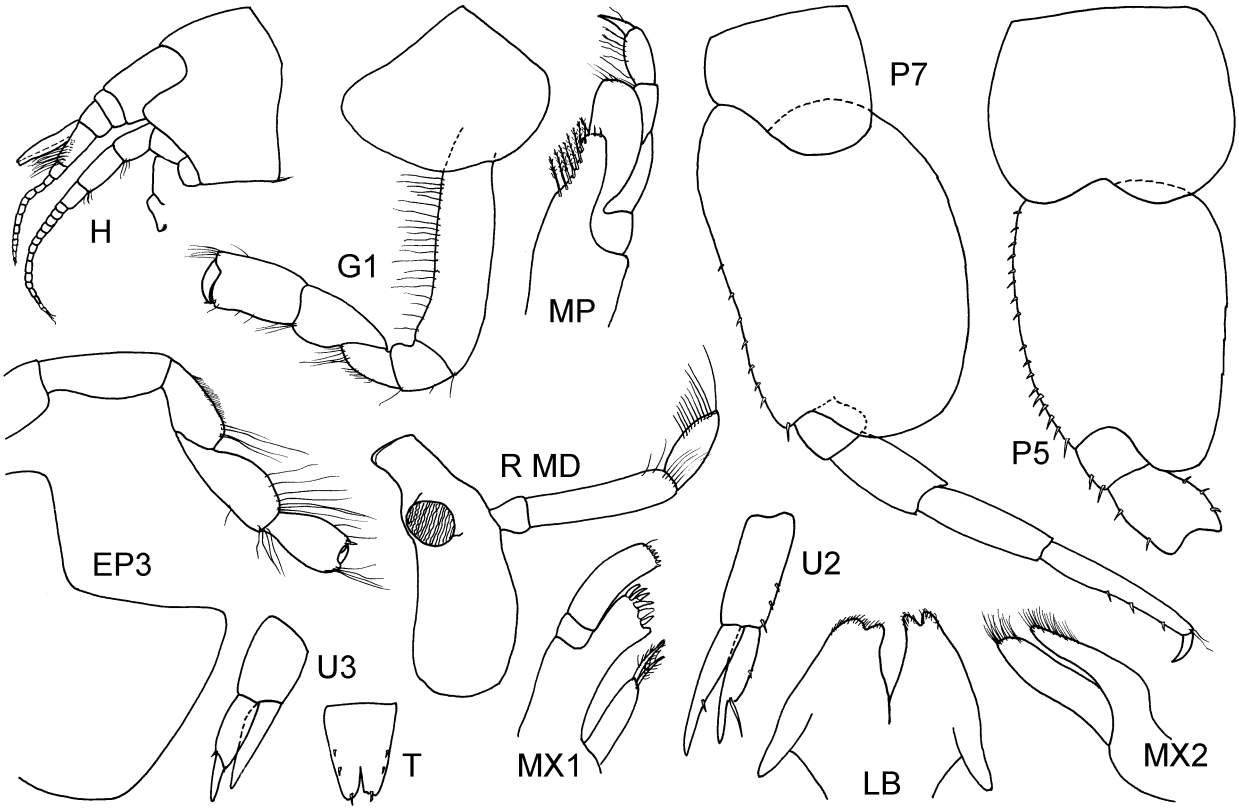

FIGURE 5. *Pseudonesimus abyssi* Chevreux, 1926, (?) juvenile male, 6.0 mm (after Chevreux, 1926).

Type locality. Gulf of Gascony, 4380 m, *Globigerina* ooze, *Princesse Alice* stn 2964.

Habitat. *Globigerina* ooze.

Depth range. 2706–4380 m (Chevreux 1926, J.L. Barnard 1967)

Distribution. *Northeast Atlantic Ocean.* Gulf of Gascony (Chevreux 1926). *Northeastern Pacific Ocean*. Cedros Trench (J.L. Barnard 1967).

***Pseudonesimus cedrosianus* (J.L. Barnard, 1967) comb. nov.**

Schisturella robusta cedrosiana J.L. Barnard, 1967: 72 (key), 77, fig 35.—Barnard & Ingram, 1990: 31 (key).—Larsen, 2007: 14 (key).

Types. Holotype, male, 6.8 mm, LACM CR 1960-078.9 (originally AHF 6028).

Type locality. Cedros Trench, off Baja California (27°54'25"N 115°40'00"W), 1720–1748 m depth.

Habitat. Unknown.

Depth range. 1720–1748 m (J.L. Barnard 1967).

Remarks. This species differs from *P. robustus* (J.L. Barnard, 1961) by the more acute lateral cephalic lobes, the more broadly rounded epimeron 3, and uropod 3 peduncle which is twice as long as wide in this species, but only 1.5 × longer than wide in *P. robustus*.

Distribution. *Eastern Pacific Ocean*. Cedros Trench (J.L. Barnard 1967).

***Pseudonesimus parachelatus* (Ledoyer, 1986) comb. nov.**

Schisturella parachelata Ledoyer, 1986: 804, fig. 314.
Aristiopsis parachelata.—Barnard & Karaman, 1991: 467.

Types. Holotype, female, 6.5 mm, immature (oostegites without setae), MNHN Am4116.

Type locality. Between Mayotte and le banc du Geyser (11°59'48"S 45°42'6"E), 3450 m.

Depth range. 3450–3716 m (Ledoyer 1986).

Remarks. *Pseudonesimus parachelatus* is one of two species previously belonging to the genus *Aristiopsis*, placed in the synonymy of *Pseudonesimus* here.

Distribution. *Southwest Indian Ocean*. Mozambique Channel between Mayotte and Îles Glorieuses (Ledoyer 1986).

Pseudonesimus robustus (J.L. Barnard, 1961) comb. nov.

(Figs 6–8)

Ambasiopsis robustus J.L. Barnard, 1961: 30, fig. 1.
Schisturella robusta.—J.L. Barnard, 1966: 71 (key).—Barnard & Karaman, 1991: 527.—Larsen, 2007: 14 (key).
Schisturella robusta robusta.—J.L. Barnard, 1967: 72 (key).—Barnard & Ingram, 1990: 31 (key).—Barnard & Karaman, 1991: 527.—Hendrycks & Conlan, 2003: 2333, fig. 13.

Types. Holotype, male, 10 mm, ZMUC CRU-1976.

Type locality. Off Fiordland, South Island, New Zealand (44°18'S 166°46'E), clay, 3580 m depth.

Material examined. 1 female, 9.0 mm, NMV J46957, from off Freycinet Peninsula, Tasmania, Australia (42°0.20'S 148°37.70'E), 720 m, coarse shelly sand, WHOI epibenthic sled, 27 July 1986, M.F. Gomon et al, RV *Franklin* stn slope 46; 6 specimens, NMV J46958, from off Freycinet Peninsula, Tasmania, Australia (42°0.20'S 148°37.70'E), 720 m, coarse shelly sand, WHOI epibenthic sled, 27 July 1986, M.F. Gomon *et al*., RV *Franklin* stn slope 46; 4 specimens, NMV J46959, from off Freycinet Peninsula, Tasmania, Australia (42°2.20'S 148°38.70'E), 800 m, coarse shelly sand, WHOI epibenthic sled, 27 July 1986, M.F. Gomon et al, RV *Franklin* stn slope 45; 1 specimen, NMV J46960, from off Freycinet Peninsula, Tasmania, Australia (42°2.20'S 148°38.70'E), 800 m, coarse shelly sand, WHOI epibenthic sled, 27 July 1986, M.F. Gomon et al, RV *Franklin* stn slope 45.

Description. Based on female, 9.0 mm, NMV J46957. *Head* lateral cephalic lobe subtriangular, apically subacute; eyes apparently absent. *Antenna 1* peduncular article 1 without anterodistal lobe; article 2 without anterodistal lobe; accessory flagellum present, forming cap partially covering callynophore, terminal article not offset; flagellum with strong 2-field callynophore, robust setae absent from proximal articles; calceoli absent. *Antenna 2* peduncular article 3 short, articles 3 to 5 not enlarged, articles 4–5 with brush setae on the anterior margin; flagellum short, calceoli absent. *Epistome/upper lip* separate; epistome less produced than upper lip, straight; *upper lip produced, rounded apically. Mandible* molar with reduced column and convex strongly triturating surface. *Maxilla 1* outer plate setal-tooth 7 present, left and right symmetrical, not cuspidate; palp distal margin with apical robust setae. *Maxilliped* basis without recurved hook; outer plate with 2 long, broad apical robust setae.

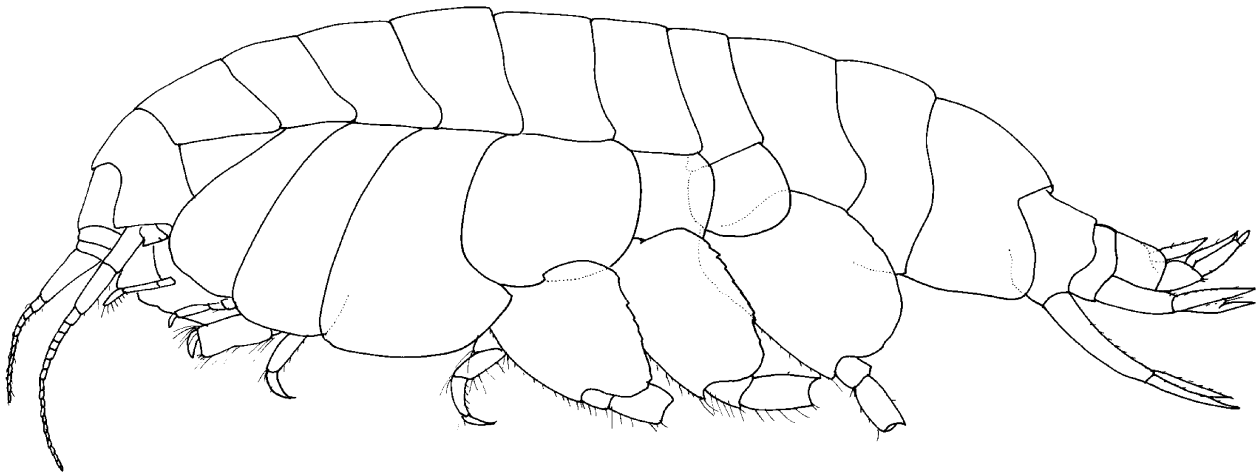

FIGURE 6. *Pseudonesimus robustus* (J.L. Barnard, 1961), female *habitus*, 9.0 mm, NMV J46957.

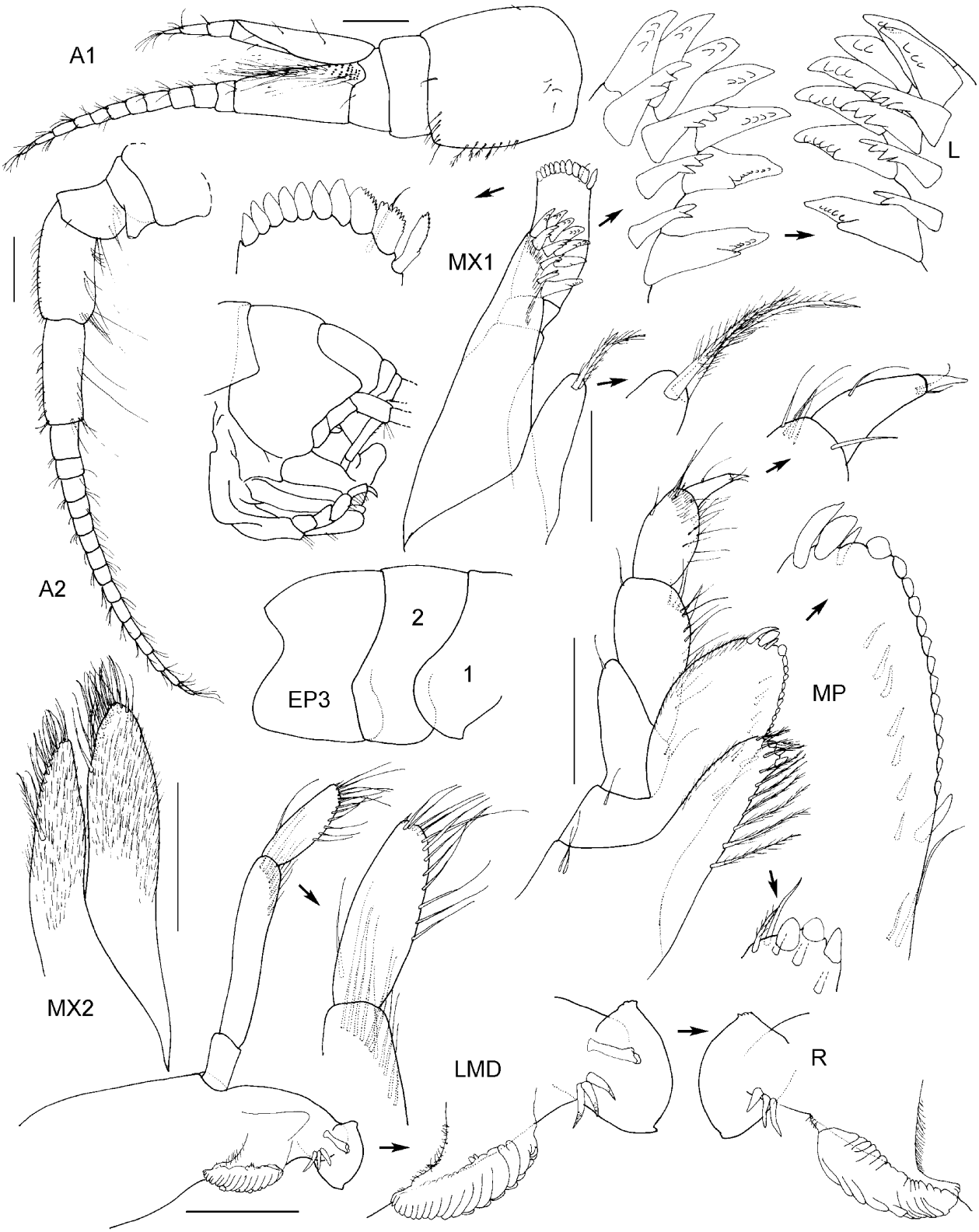

FIGURE 7. *Pseudonesimus robustus* (J.L. Barnard, 1961), female, 9.0 mm, NMV J46957, from off the Freycinet Peninsula, Tasmania, Australia. Scale bars: 0.2 mm.

Pereonites 1–7 dorsally smooth. *Gnathopod 1* slightly chelate; coxa reduced, significantly shorter than coxa 2, subquadrate; basis moderately setose along anterior margin; ischium short; carpus short, subequal in length to propodus, without posterior lobe; propodus small, sparsely setose along posterior margin, slightly obtuse, entire, straight. *Gnathopod 2* propodus palm transverse. *Pereopod 4* coxa without distinct lateral ridge. *Pereopod 5* coxa

without distinct lateral ridge, without umbo; basis longer than broad, without photophore, not posteroproximally excavate, posterior margin not serrate, posterior margin without mid-central spine, without posteroventral lobe or spine. *Pereopod 7* basis posterodistally produced less than halfway along merus, not posterodistally excavate.

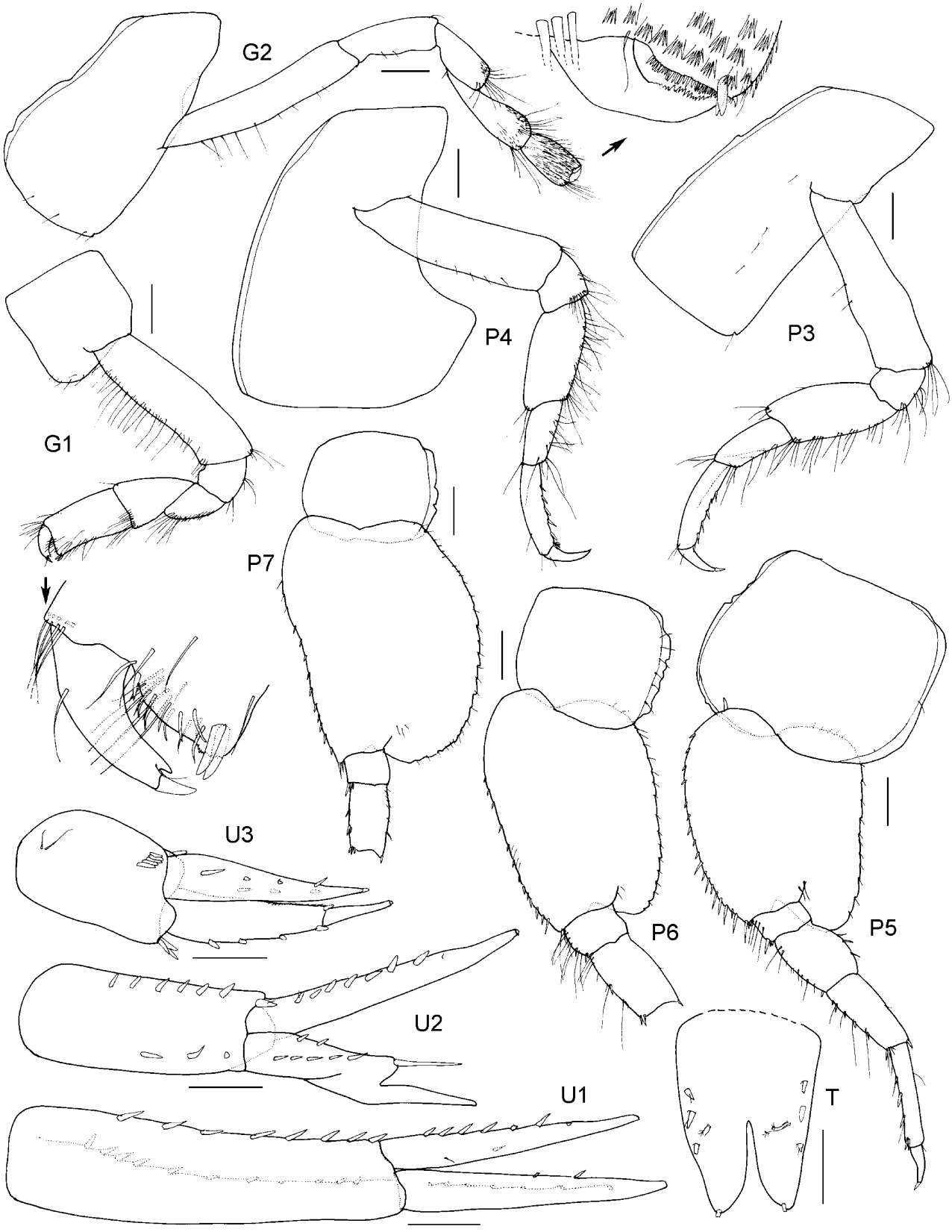

FIGURE 8. *Pseudonesimus robustus* (J.L. Barnard, 1961), female, 9.0 mm, NMV J46957, from off the Freycinet Peninsula, Tasmania, Australia. Scale bars: 0.2 mm.

Pleonites 1–3 without mid-dorsal carina, not produced dorsodistally. *Epimeron 3 posterior margin smooth, posteroventral corner narrowly rounded. Urosomite 1 n*ot projecting over urosomite 2, dorsally straight. *Uropod 2* inner ramus with constriction. *Uropod 3* stout; peduncle without dorsolateral flange; inner and outer rami well developed, outer ramus article 2 short, without plumose setae on rami. *Telson* moderately cleft, with dorsal robust setae per lobe, with 2 tiny apical robust setae on each lobe.

Sexually dimorphic characters. None known.

Depth range. 720–3580 m (J.L. Barnard 1961; this study).

Remarks. This is the first record of this species in Australian waters. It has previously been recorded from the west coast of the New Zealand South Island.

Distribution. *South Pacific Ocean.* Tasman Sea: southwest coast of New Zealand (J.L. Barnard 1961); east coast of Tasmania (this study).

Pseudonesimus tacitus (J.L. Barnard, 1961) comb. nov.

(Fig. 9)

Aristiopsis tacitus J.L. Barnard, 1961: 31, fig. 2. ?—J.L. Barnard, 1964: 4, fig. 1.
? *Aristiopsis tacita*.—J.L. Barnard, 1967: 53, fig. 22.

Types. Holotype, female, 7 mm. ZMUC CRU-8336.

Type locality. Tasman Sea (44°18'S 166°46'E), 3580 m, clay.

Habitat. Marine clay.

Depth range. 791–3580 m (J.L. Barnard 1961, 1967).

Remarks. This species was originally recorded from the Tasman Sea just off the coast of the south island of New Zealand. It has since been recorded from the west coast of North America in the Cedros Trench and the Gulf of Panama (Barnard 1964, 1967). Morphologically, both North American populations recorded correspond closely with the Tasman Sea population; however specimens collected from the Panama Trench have a larger dactylus on gnathopod 2 than those from the Tasman Sea, while those from the Cedros Trench have a shorter, stouter maxilliped palp.

Distribution. *South Pacific Ocean.* Tasman Sea (44°18'S 166°46'E) (J.L. Barnard 1961). *North Pacific Ocean*. Gulf of Panama (J.L. Barnard 1964); Cedros Trench (J.L. Barnard 1967).

Pseudonesimus tasmanensis J.L. Barnard, 1961

Pseudonesimus abyssi tasmanensis J.L. Barnard, 1961: 50, fig. 19.
Schisturella abyssi tasmanensis.—Barnard & Karaman, 1991: 527.—Larsen, 2007: 14 (key).

Types. Holotype, 1 juvenile female, 10 mm, ZMUC CRU-8345.

Type locality. Tasman Sea (45°51'S 164°32'E), 4400 m, Globigerina ooze.

Habitat. Globigerina ooze.

Depth range. 4400 m (J.L. Barnard 1961).

Remarks. Previously considered a subspecies of *P. abyssi*, it may be distinguished from that taxon by having a small tooth on the posteroventral corner of epimeron 3.

Distribution. *South Pacific Ocean.* Tasman Sea (45°51'S 164°32'E) (J.L. Barnard 1961).

Pseudonesimus zopa (J.L. Barnard, 1966) comb. nov.

Schisturella zopa J.L. Barnard, 1966: 71 (key), 72, fig. 20.—J.L. Barnard, 1967: 72 (key).—Barnard & Ingram, 1990: 30 (key).—Barnard & Karaman, 1991: 527.—Larsen, 2007: 14 (key).

Types. Holotype, ?male, 2.9 mm, LACM CR 1954-091.1 (originally AHF 5413).

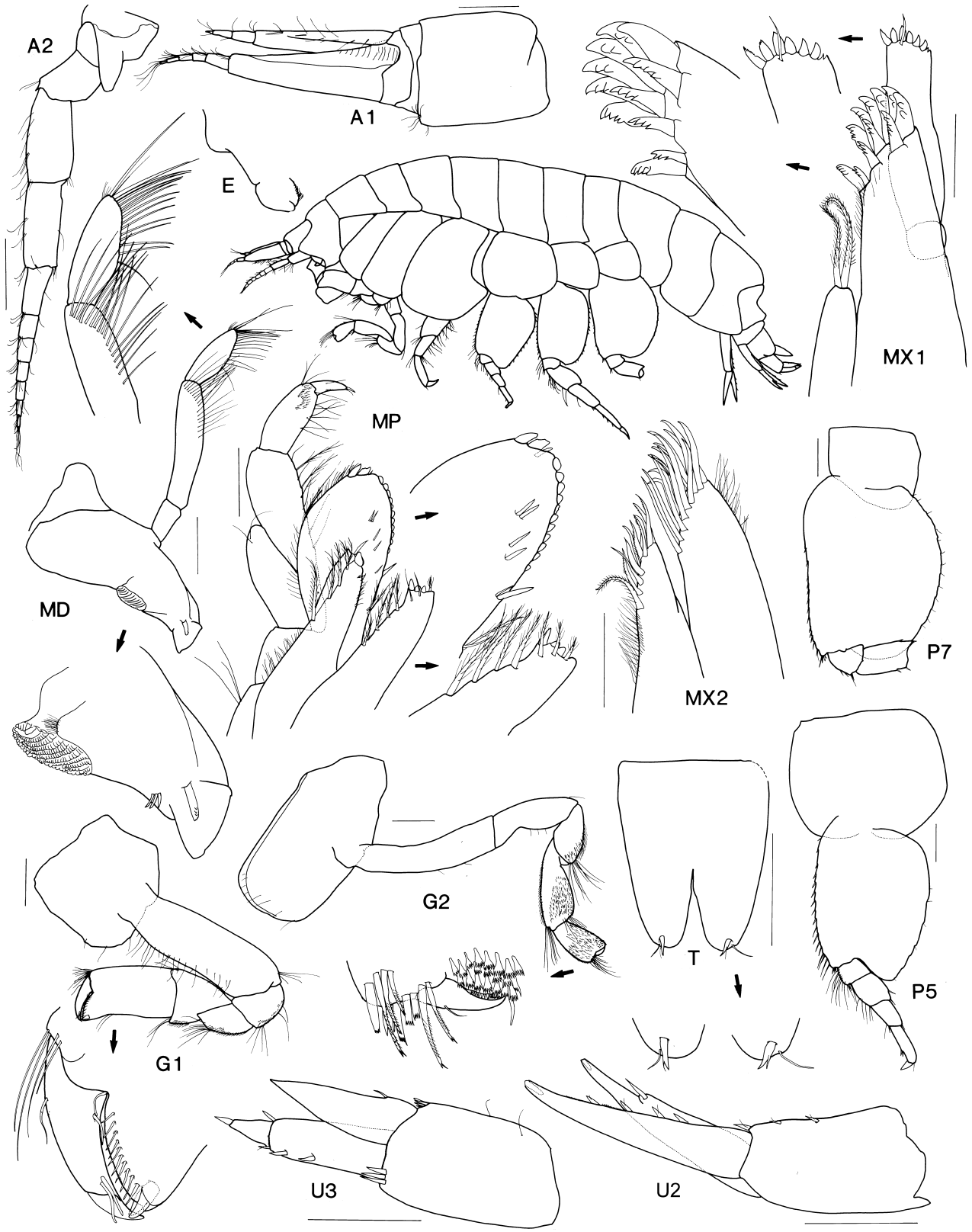

FIGURE 9. *Pseudonesimus tacitus* (J.L. Barnard, 1961), holotype, female, 7mm, ZMUC CRU-8336, Tasman Sea. *Habitus* after J.L. Barnard, 1961. Scale bars: MX1, MX2, 0.1 mm; remainder, 0.2 mm.

Type locality. Catalina Canyon (33º22'30"N 118º36'38"W), 914 m.
Depth range. 914 m (J.L. Barnard 1966).

Remarks. Based on the lack of a robust seta on the distal margin of the antenna 1 flagellum article 1 and the transverse, convex gnathopod 1 propodus palm, we are removing this species from *Schisturella* to *Pseudonesimus*.

Distribution. *Northeast Pacific Ocean*. Catalina Canyon, USA (J.L. Barnard 1966).

Schisturella Norman, 1900

Schisturella Norman, 1900: 208.—Gurjanova, 1951: 212.—Gurjanova 1962: 193.—J.L. Barnard, 1966: 70 (in part).—J.L. Barnard, 1967: 71 (in part).—J.L. Barnard, 1969: 299, 303, 304, 306, 309, 310, 312, 314 (keys), 361 (in part).—Barnard & Ingram, 1990: 29 (in part).—Barnard & Karaman, 1991: 526 (in part).

Type species. *Tryphosa pulchra* Hansen, 1888, monotypy.

Included species. *Schisturella* includes seven species: *S. adversicola* (K.H. Barnard, 1925); *S. cocula* J.L. Barnard, 1966; *S. dorotheae* (Hurley, 1963); *S. hansgeorgi* Larsen, 2007; *S. pulchra* (Hansen, 1888); *S. rosa* **sp. nov.;** *S. spinirama* Hendrycks & Conlan, 2003.

Diagnostic description. Antenna 1 flagellum article 1 with robust seta on distal margin; accessory flagellum forming cap. Antenna 2 flagellum articles 3–5 slender, or article 4 slightly swollen in male; articles 4–5 with brush setae on the anterior margin. Mandible incisor curved; molar with reduced column and convex triturating surface (button); palp attached midway to distally. Maxilla 1 ST-7 serrate along distomedial margin; ST-D slender, serrate along distomedial margin. Maxilliped outer plate multiple apical robust setae present. Gnathopod 1 subchelate; coxa vestigial; carpus subequal to or longer than propodus; propodus palm acute, straight or slightly concave. Pereopod 4 coxa with well-developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami with plumose setae in adult male, present or absent in adult female. Telson moderately to deeply cleft.

Remarks. Based on the diagnostic characters presented here, there are three main morphological characters that distinguish *Schisturella* from *Pseudonesimus*: the long robust seta present distally on the first article of the antenna 1 flagellum (absent in *Pseudonesimus*); the gnathopod 1 carpus length, which is subequal to or longer than the propodus (shorter in *Pseudonesimus*) and the shape and orientation of the gnathopod 1 palm which is acute and straight or slightly concave (convex in *Pseudonesimus*).

Distribution. Arctic, Atlantic, and Pacific Oceans.

?Schisturella adversicola (K.H. Barnard, 1925)

Lakota adversicola K.H. Barnard, 1925: 327.—J.L. Barnard, 1967: 38 (table 1).
Chironesimus adversicola.—Schellenberg, 1926: 219, fig. 13.—J.L. Barnard, 1962: 22, fig. 2.
Schisturella adversicola.—J.L. Barnard, 1967: 38 (table 1), 72 (key).—Griffiths, 1975: 149.—Griffiths, 1976: 56 (key).—Larsen, 2007: 14 (key).

Types. Syntypes, one male, one non-ovigerous female, SAM A2812.

Type locality. 40 miles north-east of Cape Point, South Africa, 560–700 fathoms.

Depth range. 564–4961 m (Schellenberg 1926, J.L. Barnard 1962).

Remarks. *Schisturella adversicola* is a poorly known species. The described characters are insufficient to place it in a genus with any degree of confidence. For this reason it tentatively remains in *Schisturella* until it is redescribed based on better morphological information.

Distribution. *South Atlantic Ocean.* Off Cape Point, South Africa (K.H. Barnard 1925, Schellenberg 1926); Cape Basin, South Africa (J.L. Barnard 1962).

Schisturella cocula J.L. Barnard, 1966

Schisturella cocula J.L. Barnard, 1966: 71 (key), 72, figs 18, 19.—J.L. Barnard, 1967: 72 (key).—Barnard & Ingram, 1990: 30 (key).—Barnard & Karaman, 1991: 527.—Larsen, 2007: 14 (key).

Types. Holotype, male, 6.7 mm, LACM CR 1958-159.1 (originally AHF 589).

Type locality. Off Point Conception, California, USA (34º25'05"N 120º26'45"W), 162 m.

Depth range. 162 m (J.L. Barnard 1966).

Distribution. *Northeast Pacific Ocean*. Off Point Conception, California, USA (J.L. Barnard 1966).

Schisturella dorotheae (Hurley, 1963)

Anonyx dorotheae Hurley, 1963: 115, figs 38, 39.

Schisturella dorotheae.—Steele & Brunel, 1968: 1039.—Barnard & Ingram, 1990: 29, 30.—Barnard & Karaman, 1991: 527.—Larsen, 2007: 14 (key).

Types. Holotype, LACM CR 1953-028.1 (originally AHF Slides L.34).

Type locality. 16.9 miles east-north-east of east end of Catalina Island light (33º24'01"N 118º00'00"W), 68 fathoms [124 m], shelly sand and a few rocks.

Habitat. Benthic, **s**helly sand.

Depth range. 124–360 m (Hurley 1963).

Distribution. *Northeast Pacific Ocean.* Off Catalina Island, California, USA (Hurley 1963).

Schisturella hansgeorgi Larsen, 2007

Schisturella hansgeorgi Larsen, 2007: 7, figs 4–7, 14 (key).

Types. Holotype**,** male, 7.4 mm, FMNH 13757. Paratypes: 1 male, 3 males 5.1–6.3 mm, 2 males 5.4 and 5.2 mm (dissected), 2 specimens, 4.2, 6.2 mm (in very bad condition) FMNH 12862.

Type locality. Juan de Fuca Ridge, Endeavour Segment (47°56.793'N 129°05.838'E), 2213 m depth.

Habitat. Hydrothermal vents.

Depth range. 2213 m (Larsen 2007).

Distribution. *Northeast Pacific Ocean.* Juan de Fuca Ridge (Larsen 2007).

Schisturella pulchra (Hansen, 1888)

(Fig. 10)

Tryphosa pulchra Hansen, 1888: 78, pl. 2 figs 6, 6e.—Stephensen, 1912: 582.

Schisturella pulchra.—Norman, 1900: 208.—Stebbing, 1906: 719.—Stephensen, 1923: 75.—Shoemaker, 1930: 13, figs 3-6.—Gurjanova, 1935: 537.—Schellenberg, 1935: 18, fig. 3.—Stephensen, 1944: 25.—Gorbunov, 1946: 43.—Gurjanova, 1951: 212, fig. 79.—J.L. Barnard, 1958: 98.—Oldevig, 1959: 11.—Gurjanova, 1962: 197, figs 63A, B.—Gurjanova, 1964: 272.—J.L. Barnard, 1966: 71 (key).—J.L. Barnard, 1967: 72 (key).—Brunel, 1970: 36.—Bousfield, 1973: 287.—Watling, 1979: 266 (table 1).—Just, 1980: 7 (table 2).—? Sekiguchi & Yamaguchi, 1983: 8, figs 5a, b.—Barnard & Ingram, 1990: 30 (key). —Barnard & Karaman, 1991: 527.—Palerud & Vader, 1991: 42.—Vader & Johnsen, 2001: 489, figs 1, 2.—Tzvetkova & Golikov, 2001: 89.—Larsen, 2007: 14 (key).

Ambasia pulchra.—Stebbing, 1906: 52 (in part).

Types. Syntypes, 3 specimens, SMNH N. Amph. 517 and SMNH N. Amph. 9945.

Additional material examined. 3 males**,** AM P.35526, from Baie des Isle, Gulf of St Lawrence, Canada (49º10'N 58º15'W), 19 August 1965.

Type locality. Greenland: Sukkertoppen, 100 fathoms [182 m]; Christianshaab 15–30 fathoms (27.5–55 m); and Egedesminde, 80–100 fathoms [146–182 m].

Habitat. Marine, hard (stony) to soft (clay) bottoms.

Depth range. 27–2240 m (Hansen 1888, Gurjanova 1962).

Remarks. Hansen (1888) based his description of the species on an adult female (15 mm) from the syntypes series.

Distribution. *Arctic.* Coasts of Greenland (Hansen 1888, Schellenberg 1935, Stephensen 1944); Kara Sea

(Gurjanova 1935); Northern Norway and Svalbard (Vader & Johnsen 2001). *North Atlantic Ocean.* Northwest of Shetland (Norman 1906); Gulf of St Lawrence (Shoemaker 1930). *North Pacific Ocean.* Sea of Okhotsk (Gurjanova 1962); ? Enshu-nada and Kumano-nada, Japan (Sekiguchi & Yamaguchi 1983).

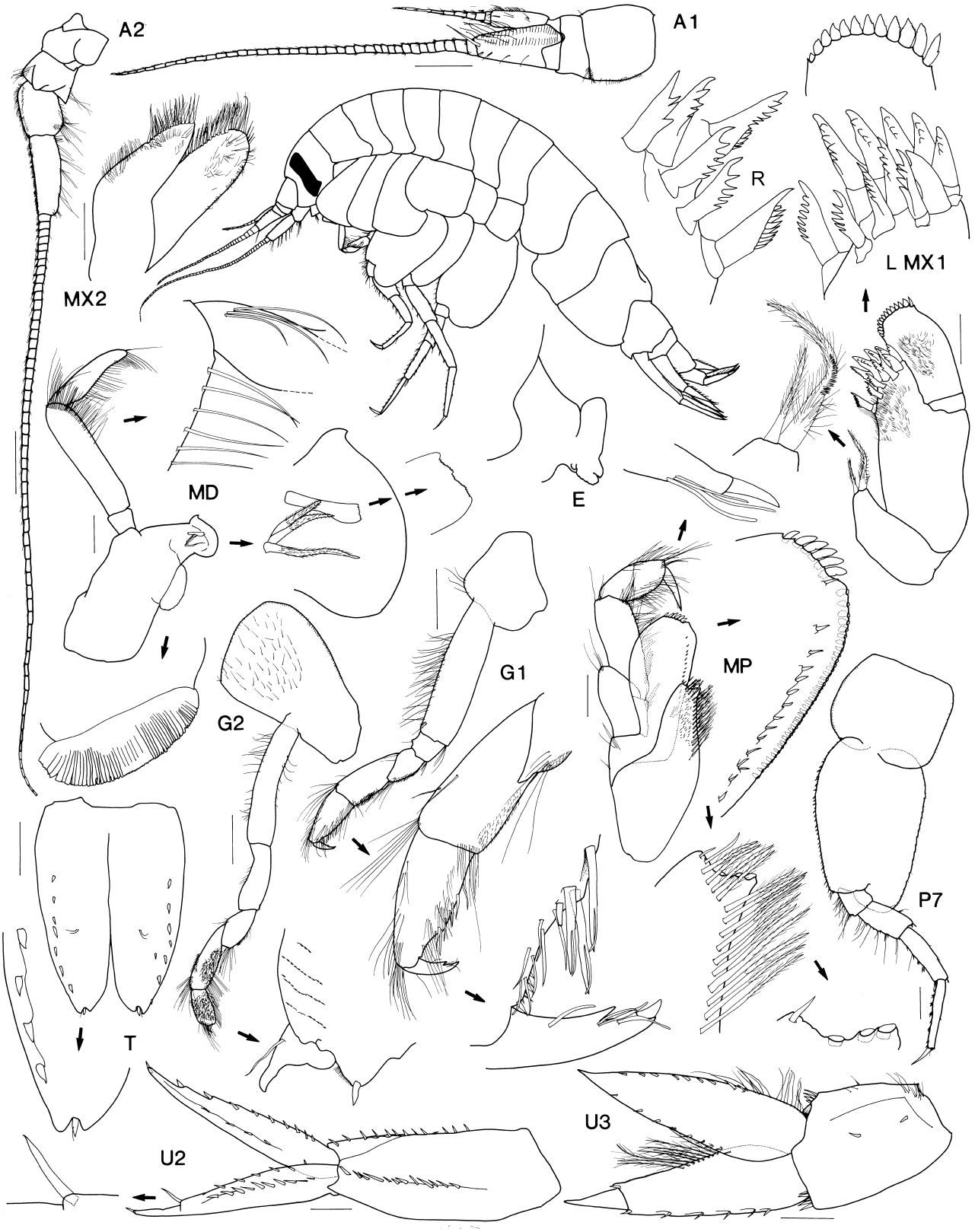

FIGURE 10. *Schisturella pulchra* (Hansen, 1888), male**,** 16.5 mm, AM P.35526, from Baie des Isle, Gulf of St Lawrence, Canada. Scale bars: gnathopods, pereopods, 0.5 mm; remainder, 0.2 mm.

***Schisturella rosa* sp. nov.**
(Figs 11–13)

Types. Holotype, female, 19.0 mm, AM P.68993, from east of Broken Bay, New South Wales, Australia (33°34.8'S 152°4.8'E to 33°37.2'S 152°4.8'E) 1144 m, dredge, 10 December 1980, FRV *Kapala* stn K80-20-10. Paratypes: 1 male, 21.5 mm, AM P.68995, from east of Broken Bay, New South Wales, Australia (33°40.2'S 152°6'E to 33°43.2'S 152°4.2'E) 1108 m, trawl, 19 December 1985, FRV *Kapala* stn K85-21-05; 1 specimen, 13.0 mm, AM P.68994, from east of Broken Bay, New South Wales, Australia (33°34.8'S 152°4.8'E to 33°37.2'S 152°4.8'E) 1144 m, dredge, 10 December 1980, FRV *Kapala* stn K80-20-10; 5 specimens, 12.4–19.8 mm, AM P.68992, from east of Broken Bay, New South Wales, Australia (33°37.2'S 152°4.2'E to 33°39'S 152°1.8'E) 896 m, dredge, 10 December 1980, R.T. Springthorpe, FRV *Kapala* stn K80-20-09; 5 specimens, 8.3–18.0 mm, AM P.68996, from east of Broken Bay, New South Wales, Australia (33°30'S 152°9'E to -33°33'S 152°10.8'E) 922 m, beam trawl, 12 February 1986, R.T. Springthorpe, FRV *Kapala* stn K86-01-08.

Additional material examined. ***New South Wales*:** 86 specimens, AM P.43365, from north-east of Coffs Harbour (30°10.9'S 153°32.27'E) 1000 m, baited trap, Globigerina ooze, 08 September 1994–09 September 1994, J.K. Lowry & K. Dempsey, MV *Carrie Ann* stn NSW-1000. 3 specimens, AM P.43421, from off Wollongong (34°32.4'S 151°22.8'E) 1000 m, Globigerina ooze, 27 March 1994, J.K. Lowry & K. Dempsey, MV *Robin E* stn NSW-954. 35 specimens, AM P.43427, from off Wollongong (34°32.4'S 151°22.8'E) 1000 m, baited trap, 54.7% sand, 45.3% mud, 27 March 1994, J.K. Lowry & K. Dempsey, MV *Robin E* stn NSW-953. 3 specimens, AM P.43436, from off Wollongong (34°32.4'S 151°22.8'E) 1000 m, baited trap, 28 March 1994–29 March 1994, J.K. Lowry & K. Dempsey, MV *Robin E* stn NSW-973. 15 specimens, AM P.43445, from off Wollongong (34°32.4'S 151°22.8'E) 1000 m, 28 March 1994, J.K. Lowry & K. Dempsey, MV *Robin E* stn NSW-971. 3 specimens, AM P.43453, from off Wollongong (34°32.4'S 151°22.8'E) 1000 m, baited trap, 28 March 1994, J.K. Lowry & K. Dempsey, MV *Robin E* stn NSW-972. 51 specimens, AM P.44367, from off Wollongong (34°33.41'S 151°21.35'E) 1000 m, Baited Trap, Globigerina ooze, 6 May 1993–7 May 1993, P. Freewater & party, MV *Robin E* stn NSW-788. 115 specimens, AM P.44374, from off Wollongong (34°33.41'S 151°21.35'E) 1000 m, baited trap, Globigerina ooze, 6 May 1993–7 May 1993, P. Freewater & party, MV *Robin E* stn NSW-789. 1 specimen, AM P.44385, from off Wollongong (34°33.21'S 151°21.4'E) 1000 m, Globigerina ooze, 7 May 1993, P. Freewater & party, MV *Robin E* stn NSW-806. 2 specimens, AM P.44392, from off Wollongong (34°33.21'S 151°21.4'E) 1000 m, Globigerina ooze, 7 May 1993, P. Freewater & party, MV *Robin E* stn NSW-808. 153 specimens, AM P.48096, from north-east of Coffs Harbour (30°10.94'S 153°32.27'E) 963 m, baited trap, 11–12 August 1993, P.B. Berents, R.T. Springthorpe & W. Vader, MV *Cheryl Lee* stn NSW-862. 151 specimens, AM P.48116, from north-east of Coffs Harbour (30°10.94'S 153°32.27'E) 963 m, baited trap, 11–12 August 1993, P.B. Berents, R.T. Springthorpe & W. Vader, MV *Cheryl Lee* stn NSW-863. 282 specimens, AM P.49809, from north-east of Coffs Harbour (30°10.88'S 153°32.21'E) 1000 m, baited trap, 12–13 August 1993, P.B. Berents, R.T. Springthorpe & W. Vader, MV *Cheryl Lee* stn NSW-876. 311 specimens, AM P.49826, from north-east of Coffs Harbour (30°10.88'S 153°32.21'E) 1000 m, baited trap, 12–13 August 1993, P.B. Berents, R.T. Springthorpe & W. Vader, MV *Cheryl Lee* stn NSW-877. 6 specimens, AM P.50069, from north-east of Coffs Harbour (30°10.94'S 153°32.27'E) 1000 m, baited trap, 9–10 September 1994, J.K. Lowry & K. Dempsey, MV *Carrie Ann* stn NSW-1021. 1 specimen, AM P.50084, from north-east of Coffs Harbour (30°10.94'S 153°32.27'E) 1000 m, 9 September 1994, J.K. Lowry & K. Dempsey, MV *Carrie Ann* stn NSW-1022. 6 specimens, AM P.52659, from north-east of Coffs Harbour (30°10.88'S 153°32.21'E) 1000 m, baited trap, 12–13 August 1993, P.B. Berents, R.T. Springthorpe & W. Vader, MV *Cheryl Lee* stn NSW-876. 32 specimens, AM P.56077, from north-east of Coffs Harbour (30°10.88'S 153°32.21'E) 1000 m, baited trap, 12–13 August 1993, P.B. Berents, R.T. Springthorpe & W. Vader, MV *Cheryl Lee* stn NSW-877. 1 female, AM P.68991, from off Wollongong (34°32.4'S 151°22.8'E) 1000 m, baited trap, 27 March 1994, J.K. Lowry & K. Dempsey, MV *Robin E* stn NSW-953.

***Tasmania*:** 106 specimens, AM P.51312, from east of Fortescue Bay (43°8.96'S 148°15.36'E) 1000 m, baited trap, 8–9 April 1994, J.K. Lowry & K. Dempsey, MV *Martrudan* stn TAS-403. 10 specimens, AM P.51382, from east of Fortescue Bay (43°8.96'S 148°15.36'E) 1000 m, baited trap, 8–9 April 1994, J.K. Lowry & K. Dempsey, MV *Martrudan* stn TAS-422. 46 specimens, AM P.51389, from east of Fortescue Bay (43°8.96'S 148°15.36'E) 1000 m, baited trap, 9–10 April 1994, J.K. Lowry & K. Dempsey, MV *Martrudan* stn TAS-421. 113 specimens, AM P.57978, from east of Fortescue Bay (43°8.96'S 148°15.36'E) 1000 m, baited trap, 8–9 April 1994, J.K.

Lowry & K. Dempsey, MV *Martrudan* stn TAS-423. 666 specimens, AM P.74783, from 76.8 km south-south-east of South East Cape, Main Pedra Hill (44°15.6'S 147°7.8'E) 1312 m, baited trap, 21–24 January 1997, CSIRO party, FRV *Southern Surveyor* stn SS01/97/08.

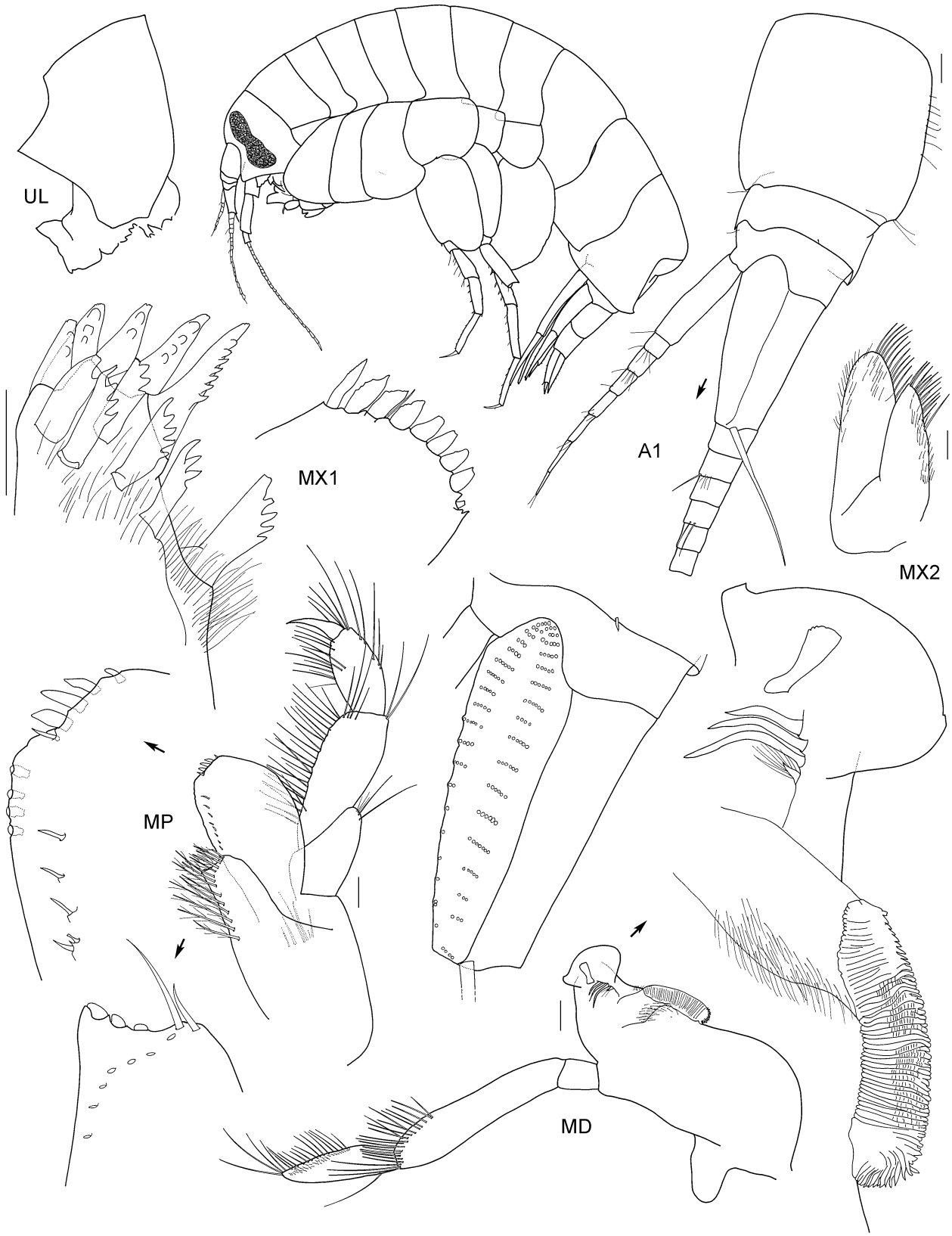

FIGURE 11. *Schisturella rosa* **sp. nov.**, holotype, female, 19.0 mm, AM P.68993, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.1 mm.

Type locality. East of Broken Bay, New South Wales, Australia (33°34.8'S 152°4.8'E to 33°37.2'S 152°4.8'E), 1144 m depth.

Etymology. The specific epithet 'rosa' is a reference to the deep pink colour of the eyes in this species.

Description. Based on holotype female, 19.0 mm, AM P.68993. *Head* lateral cephalic lobe subtriangular, apically acute; ***eyes reinform, bright red***. *Antenna 1* accessory flagellum forming cap partially covering callynophore, 8-articulate; primary flagellum with strong 2-field callynophore, long robust seta present on article 1; calceoli absent. *Antenna 2* peduncular article 3 short; articles 3 to 5 not enlarged, with very weak brush setae; flagellum short, calceoli absent. *Labrum,* epistome and upper lip separate; epistome less produced than upper lip, straight; upper lip produced, subacute apically. *Mandible* molar with reduced column and convex fully triturating surface; palp attached distally, article 3 with 1 proximal A3-setae. *Maxilla 1* outer plate setal-tooth 7 present, cuspidate distally; palp distal margin with apical robust setae. *Maxilliped* outer plate with 4 slender apical robust setae.

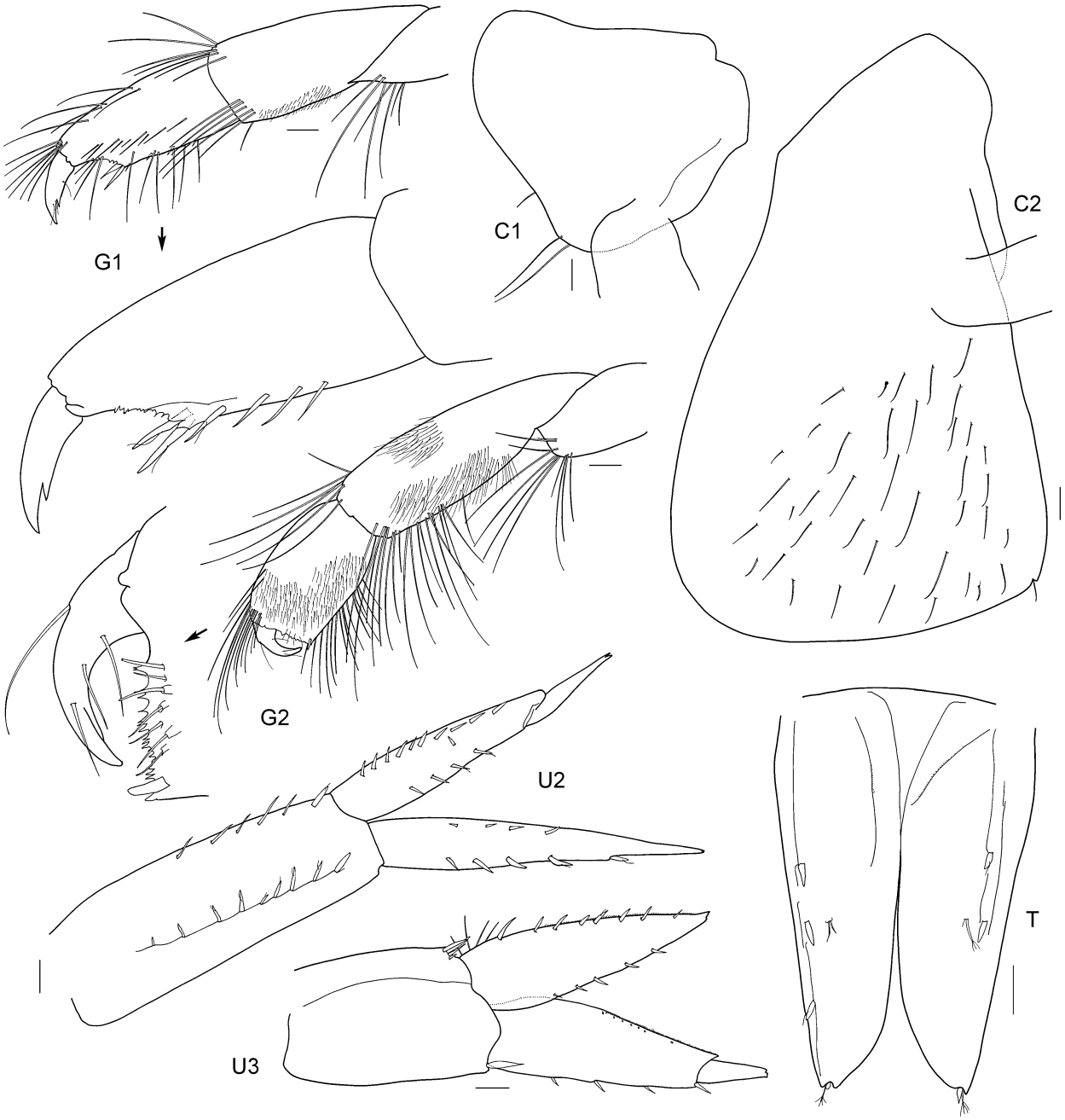

FIGURE 12. *Schisturella rosa* **sp. nov.**, female, 19.0 mm, AM P.68993, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.1 mm.

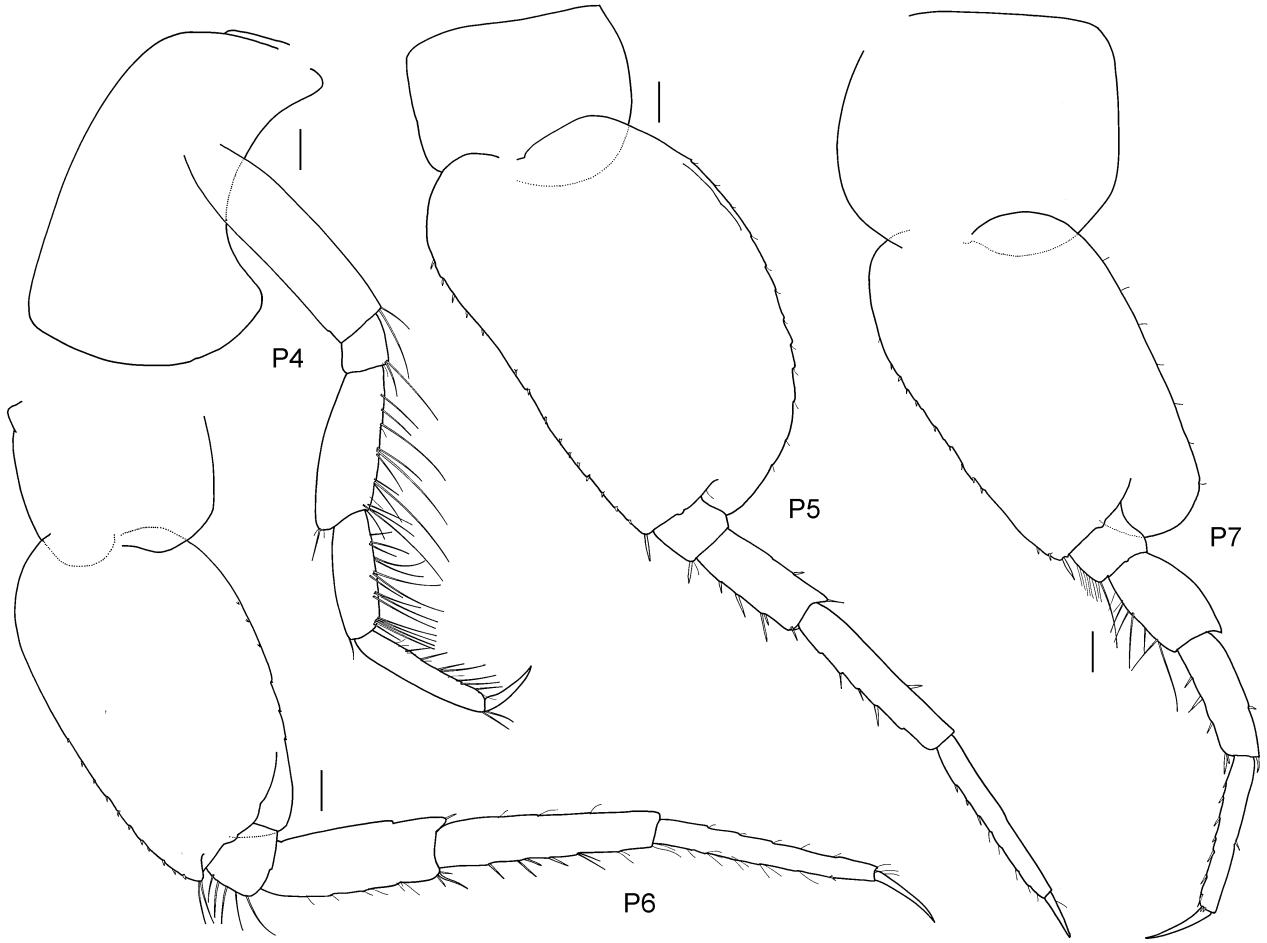

FIGURE 13. *Schisturella rosa* **sp. nov.**, female, 19.0 mm, AM P.68993, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.2 mm.

Pereonites 1–7 dorsally smooth. ***Gnathopod 1*** subchelate; coxa small, reduced, significantly shorter than coxa 2, subquadrate; basis moderately setose along anterior margin; carpus long, longer than propodus, without posterior lobe; propodus small, margins slightly tapering distally, sparsely setose along posterior margin, ***palm moderately acute, entire, concave***. ***Gnathopod 2 subchelate, propodus palm transverse***. *Pereopod 5* basis longer than broad, not posteroproximally excavate, posterior margin weakly serrate. *Pereopod 7* basis posterodistally produced, not reaching merus.

Pleonite 3 without mid-dorsal carina, not produced dorsodistally, posterodorsal margin not produced. ***Epimeron 3*** posterior margin smooth, ***posteroventral corner acutely produced forming weak spine***. *Urosomite 1* not projecting over urosomite 2, dorsally straight. *Uropod 2* inner ramus with constriction. *Uropod 3* inner and outer rami well developed, outer ramus article 2 long, without plumose setae on rami. *Telson* moderately to deeply cleft, with 2–3 dorsal robust setae per lobe and 1 apical robust setae on each lobe.

Sexually dimorphic characters. Based on paratype, male, 21.5 mm, AM P.68995. Antenna 1 and 2 with calceoli, antenna 2 peduncle article 4 slightly swollen, articles 4 and 5 with brush setae. Uropod 3 rami with plumose setae.

Remarks. In contrast to the female holotype, which has only very weak brush setae on the peduncle of antenna 2 and a complete absence of plumose setae on uropod 3, a very large female (AM P.68991) from off Wollongong has well-developed brush setae and some sparse plumose setae on the rami of uropod 3, suggesting that these characters only develop in more mature females.

Schisturella rosa **sp. nov.** appears to be morphologically most similar to *Schisturella cocula*. These species may be separated by the second gnathopod, which is subchelate with a transverse palm in *S. rosa* but minutely chelate with a distinctly obtuse palm in *S. cocula.*

Depth range. 896–1312 m (this study).

Distribution. *Tasman Sea.* Continental slope of east Australia from Coffs Harbour, New South Wales to South East Cape, Tasmania (this study).

Schisturella spinirama Hendrycks & Conlan, 2003

Schisturella spinirama Hendrycks & Conlan, 2003: 2329, figs 11, 12.—Larsen, 2007: 14 (key).

Types. Holotype, male, 9 mm, CMNC 2002-0037.

Type locality. Off Point Conception, California, USA (34°47.18'N 123°04.18'W), 4050 m.

Habitat. Not recorded.

Depth range. 4050 m (Hendrycks & Conlan 2003).

Distribution. *Eastern Pacific Ocean*. Off central California (Hendrycks & Conlan 2003).

Thrombasia J.L. Barnard, 1966

Thrombasia J.L. Barnard, 1966: 72.—Ledoyer, 1986: 810.
Schisturella.—Barnard & Karaman, 1991: 526 (in part).

Type species. *Thrombasia tracalero* J.L. Barnard, 1966, original designation.

Included species. *Thrombasia* includes six species: *T. evalina* **sp. nov.**; *T. grabenis* J.L. Barnard, 1967; *T. rotundata* (K.H. Barnard, 1926); *T. saros* **sp. nov.**; *T. tracalero* J.L. Barnard, 1966; *T. umina* **sp. nov.**

Diagnostic description. Antenna 1 flagellum article 1 lacking robust seta on distal margin; accessory flagellum forming cap. Antenna 2 flagellum articles 3–5 slender in female, article 3 enlarged in male; articles 3–5 with brush setae on the anterior margin. Mandibular incisor curved; molar a reduced column with convex triturating surface or proximally setose and distally triturating; palp attached midway. Maxilla 1 ST-7 serrate along the distomedial medial margin; ST-D slender, apically cuspidate. Maxilliped outer plate apical robust setae present. Gnathopod 1 subchelate; coxa slightly to greatly shorter than coxa 2, tapering distally; carpus slightly longer than propodus; propodus palm acute, straight. Pereopod 4 coxa with well developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami plumose setae absent in female, present occasionally in adult male. Telson moderately cleft.

Remarks. The genus *Thrombasia* was established by Barnard (1966) for *T. tracalero*, and was subsequently placed in the synonymy of *Schisturella* by Barnard & Karaman (1991). However, we consider *Thrombasia* to be distinct from *Schisturella* based on the gnathopod 1 coxa, which is tapering and slightly reduced, not vestigial as in *Schisturella.* There are four other genera in the *Tryphosa* group with a gnathopod 1 coxa that is not vestigial. Of these, *Thrombasia* may be separated from *Gronella* by the gnathopod 1 carpus, which is longer than the propodus, from *Tryphosa* and *Bruunosa* in the tapering gnathopod 1 coxa, and from *Glorieusella* in the subchelate gnathopod 1.

Distribution. Pacific Ocean, South Atlantic Ocean.

Thrombasia evalina sp. nov.

(Figs 14–16)

Types. Holotype female, 9.8 mm, AM P.69059, from east of Broken Bay, New South Wales, Australia (33°37'S 152°04'E to 33°39'S 152°02'E), 896–923 m, dredge, 10 December 1980, R.T. Springthorpe, FRV *Kapala* stn K80-20-09. Paratypes: 1 male, 10.2 mm, AM P.69060; 2 specimens, 8.0–8.8 mm, AM P.69061, same collection details as holotype.

Additional material examined. 2 specimens, AM P.69062, from north-east of Port Jackson, New South Wales, Australia (33°41'S 152°00'E to 33°44'S 151°57'E), 820–888 m, beam trawl, 11 February 1986, R.T. Springthorpe, FRV *Kapala* stn K86-01-07; 1 specimen, AM P.69058, from east of Broken Bay, New South Wales, Australia (33°31'S 152°08'E to 33°33'S 152°07'E), 914 m, 2.5 m sled dredge, 10 December 1980, R.T. Springthorpe, FRV *Kapala* stn K80-20-08.

Type locality. Australia, New South Wales, east of Broken Bay (33°37' S 152°04' E), 896–923 m.

Etymology. Named for schooner *Evalina* lost in 1871 on route between Sydney and Port Stephens; used as a noun in apposition.

Description. Based on holotype, female, 9.8 mm, AM P.69059. *Head* lateral cephalic lobe subtriangular, apically subacute. *Antenna 1* accessory flagellum forming cap partially covering callynophore; primary flagellum with strong 2-field callynophore, robust setae absent from proximal articles; calceoli absent. *Antenna 2* peduncular articles 3–5 not enlarged, articles 4–5 with weak brush setae on anterior margin; calceoli absent. peduncular articles 3–5 enlarged, article 4 slightly enlarged; articles 4 and 5 with weak brush setae; flagellum long, calceoli present. *Labrum,* epistome and upper lip separate; epistome less produced than upper lip, straight; upper lip produced, strongly rounded apically. *Mandible* molar columnar, with oval fully triturating surface. *Maxilla 1* outer plate setal-tooth 7 cuspidate distally; palp distal margin with apical robust setae. *Maxilliped* outer plate with one slender and one broad apical robust setae.

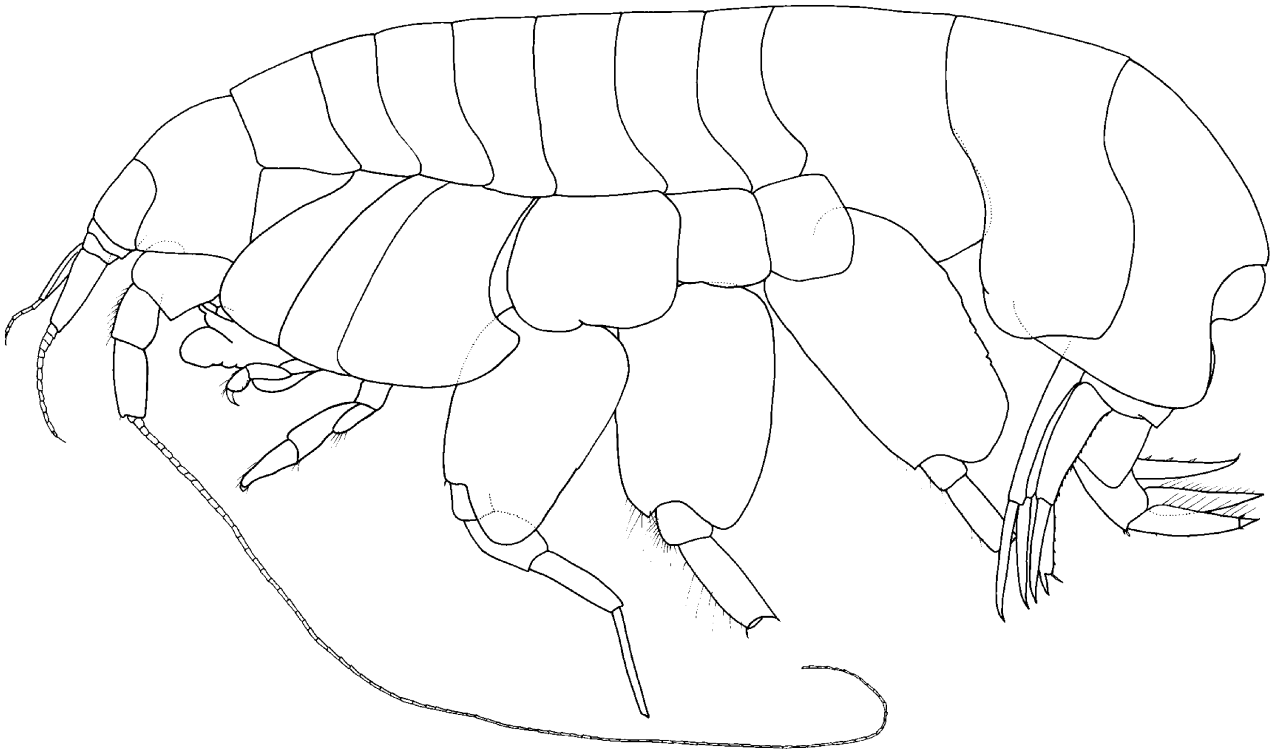

FIGURE 14. *Thrombasia evalina* **sp. nov.** paratype, male, *habitus*, 10.2 mm, AM P.69060, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.1 mm.

Pereonites 1–7 dorsally smooth. ***Gnathopod 1*** subchelate; ***coxa reduced, significantly shorter than coxa 2 (~ 50%), tapering distally***; basis densely setose along anterior margin; carpus long, longer than propodus, without posterior lobe; propodus small, margins subparallel, sparsely setose along posterior margin, ***palm moderately acute, entire, straight***. *Gnathopod 2* propodus palm transverse, slightly convex. *Pereopod 5* basis longer than broad, not posteroproximally excavate, posterior margin not serrate. *Pereopod 7* basis posterodistally produced less than halfway along merus.

Pleonite 3 without mid-dorsal carina, not produced dorsodistally. ***Epimeron 3 posterior margin smooth, posteroventral corner broadly rounded***. *Urosomite 1* not projecting over urosomite 2. *Uropod 2* inner ramus with constriction. *Uropod 3* stout; inner and outer rami well developed, outer ramus article 2 short, without plumose setae. *Telson* moderately cleft, with 3 dorsal robust setae per lobe and 1 apical robust setae on each lobe.

Sexually dimorphic characters. Based on paratype, male, 10.2 mm, AM P.69060. Antenna 1 calceoli present. Antenna 2 peduncular article 3 enlarged, article 4 slightly enlarged; articles 4 and 5 with weak brush setae; flagellum long, calceoli present. Uropod 3 rami with dense plumose setae.

Habitat. Not recorded.

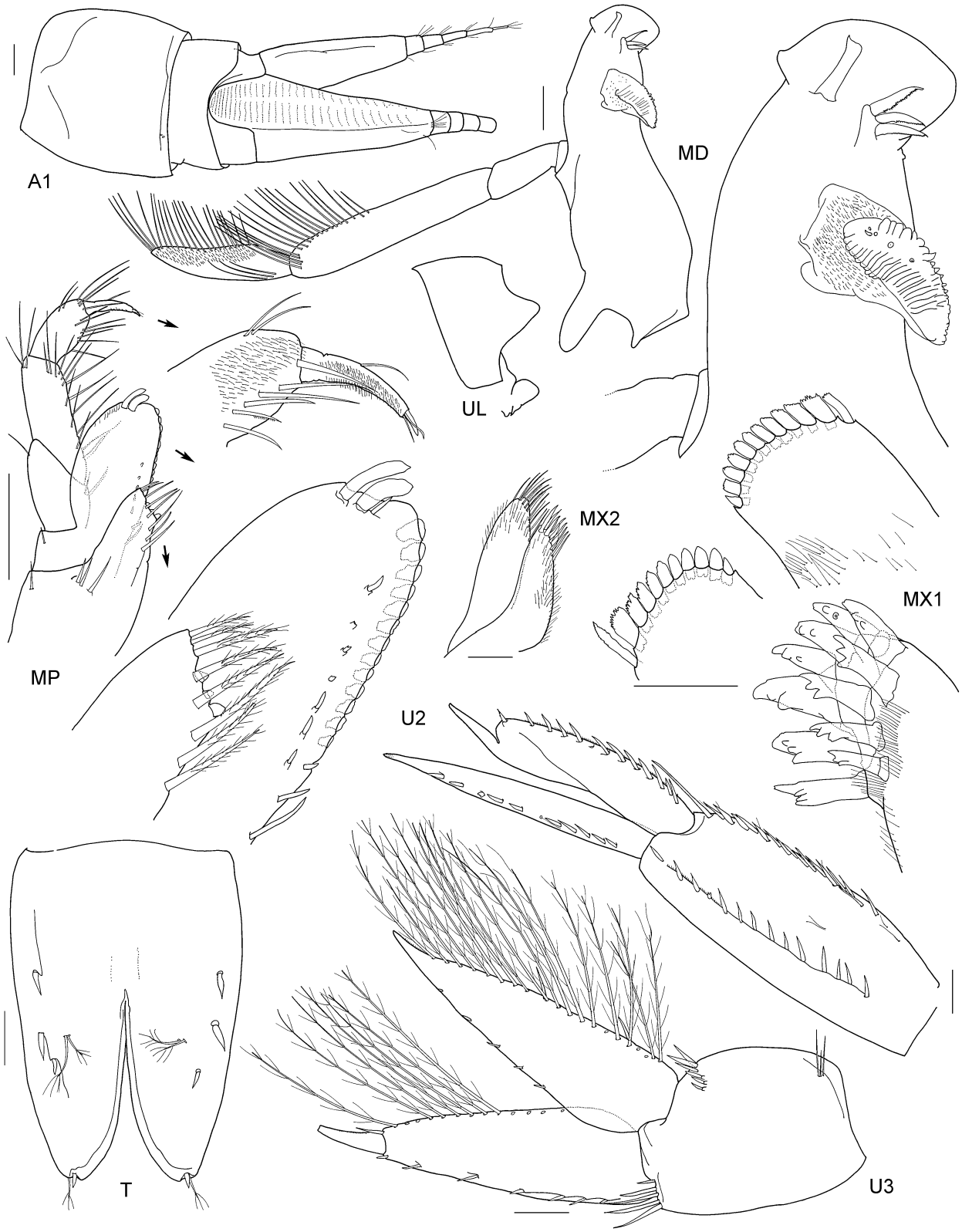

FIGURE 15. *Thrombasia evalina* **sp. nov.** paratype, male, 10.2 mm, AM P.69060, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.1 mm.

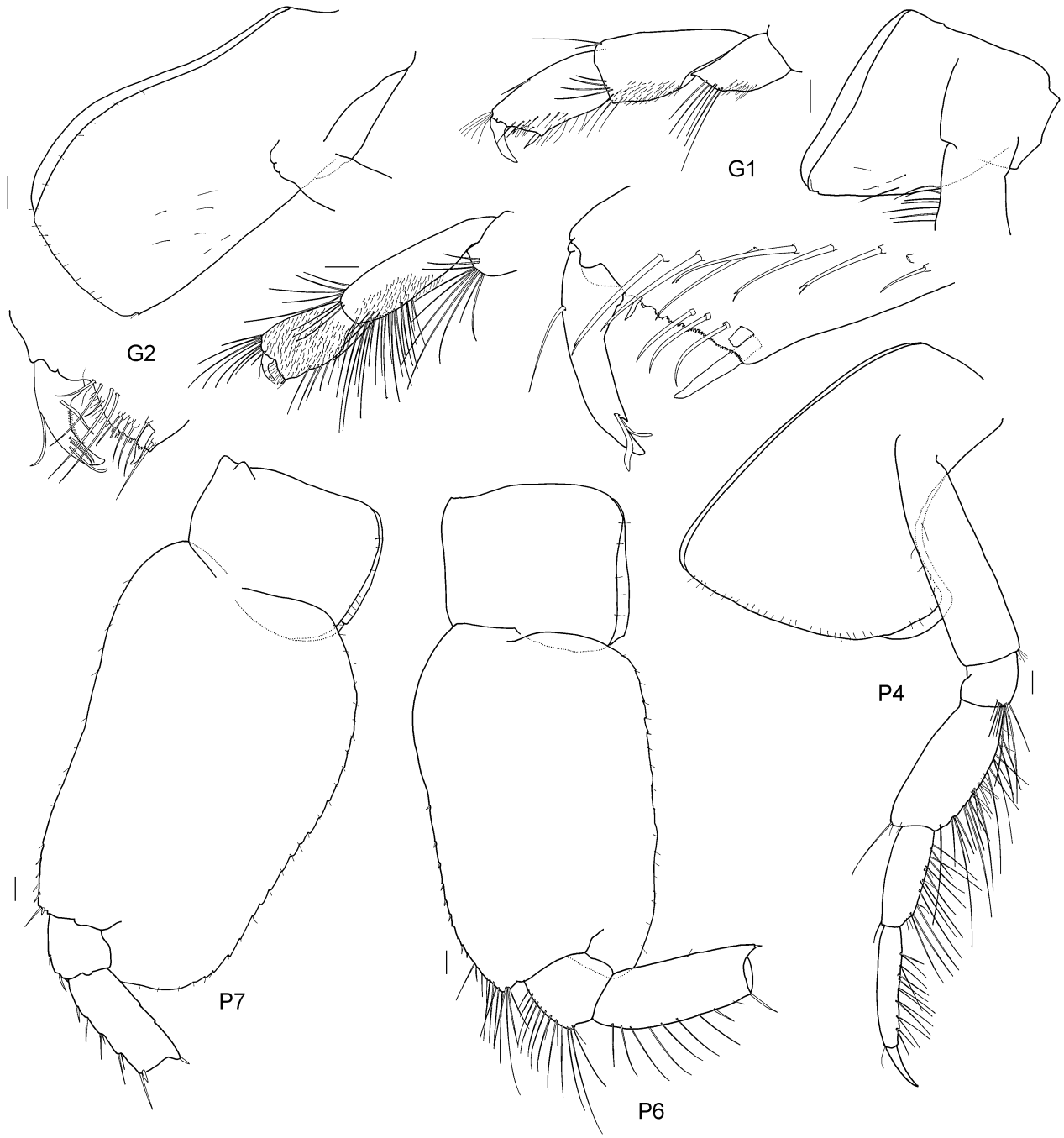

FIGURE 16. *Thrombasia evalina* **sp. nov.** paratype, male, 10.2 mm, AM P.69060, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.1 mm.

Depth range. 820–923 m (this study).

Remarks. *Thrombasia evalina* appears to be quite similar to *T. rotundata* (K.H. Barnard). Although that species is poorly described, it shares a number of characters in common with *T. evalina*, notably the shortened and strongly tapering gnathopod 1 coxa and the distinctly subchelate gnathopod 2. However, the epimeron 3 posteroventral corner of *T. evalina* is much more broadly rounded than that of *T. rotundata* and the gnathopod 1 palm is straight in *T. evalina* but slightly convex in *T. rotundata*.

Distribution. *Tasman Sea.* Coast of New South Wales, Australia (this study).

Thrombasia grabenis J.L. Barnard, 1967 comb. nov.

Schisturella grabenis J.L. Barnard, 1967: 72 (key), 74, figs 33, 34.—Barnard & Karaman, 1991: 527.—Larsen, 2007: 14 (key).

Types. Holotype, female, 5.0 mm, LACM CR 1960-78.8 (originally AHF 6021).

Type locality. Station 7229 (27°54'25"N 115°40'00"W), 1720–1748 m depth.

Habitat. Marine, hard (stony) to soft (clay) bottoms.

Depth range. 1720–1748 m (J.L. Barnard 1967).

Remarks. The subchelate gnathopod 1 with the slightly tapering, non-vestigial coxa, and carpus longer than propodus places this species in *Thrombasia*.

Distribution. *Eastern Pacific Ocean.* Southwest of Cedros Island, Mexico (J.L. Barnard 1967).

Thrombasia rotundata (K.H. Barnard, 1925) comb. nov.

Lakota rotundatus K.H. Barnard, 1925: 329.—J.L. Barnard, 1967: 38 (table 1).
Chironesimus rotundatus.—J.L. Barnard, 1962: 22, fig. 3.
Schisturella rotundata.—J.L. Barnard, 1967: 72 (key).—Larsen, 2007: 14 (key).

Types. Syntypes, 12 specimens, SAM A2813, SAM A4545, SAM A5910.

Type locality. 36 miles east to north-east of Cape Point, South Africa, 650–800 fathoms [1189–1463 m].

Depth range. 1189–4050 m (K.H. Barnard 1926, J.L. Barnard 1962).

Remarks. This species is poorly known, however in the original description of the species K.H. Barnard (1926) specified "*side-plate 1 subtriangular, inferior angle sub-acute… first gnathopod, 6th joint a little shorter than the 5th*". Furthermore, J.L. Barnard (1962) illustrated the gnathopod 1 coxa as being only slightly shorter than the coxa of gnathopod 2 (vestigial in *Schisturella*). This combination of characters indicate that this species is more properly placed in *Thrombasia*.

Distribution. *South Atlantic Ocean*. Cape Point, South Africa (K.H. Barnard 1926); Cape Basin (J.L. Barnard 1962).

Thrombasia saros sp. nov.
(Figs 17–19)

Types. Holotype, female, 13.5 mm, NMV J46814, from 76 km south of Point Hicks, Victoria, Australia (38°29.33'S 149°19.98'E), 1840 m, sandy mud, fine shell, WHOI epibenthic sled, coll. G.C.B. Poore *et al*, RV Franklin, 26 October 1988. Paratypes, 4 specimens (1 damaged), 5.1–10.0 mm, NMV J16318, same collection details as holotype.

Type locality. South of Point Hicks, Victoria, Australia (38°29.33'S 149°19.98'E), 1840 m depth.

Etymology. Named for the SS *Saros*, the wreck of a steamship visible on the rocks at Point Hicks, Victoria; used as a noun in apposition.

Description. Based on holotype, female, 13.5 mm. *Head* lateral cephalic lobe subtriangular, apically subacute; eyes apparently absent. *Antenna 1* accessory flagellum forming cap partially covering callynophore, 5-articulate; primary flagellum with strong 2-field callynophore; calceoli absent. *Antenna 2* peduncular article 3 short; articles 3 to 5 not enlarged, with brush setae on articles 4 and 5; flagellum short, calceoli absent. *Labrum,* epistome and upper lip separate; epistome less produced than upper lip, very slightly concave; upper lip produced, rounded apically. *Mandible* molar columnar, with oval fully triturating surface; palp attached distally, article 3 with 1 proximal A3-seta. *Maxilla 1* outer plate setal-tooth 7 present, left and right symmetrical, cuspidate distally; palp distal margin with apical robust setae. *Maxilliped* outer plate with 4 long, broad apical robust setae and 2 long, slender apical robust setae.

Pereonites 1–7 dorsally smooth. ***Gnathopod 1 weakly subchelate; coxa large, about as long as coxa 2, slightly tapering distally*;** basis densely setose along anterior margin; ischium short; carpus long, longer than propodus, without posterior lobe; propodus small, margins tapering distally, sparsely setose along posterior margin,

palm slightly acute, entire, straight. *Gnathopod 2* propodus palm transverse. *Pereopod 4* coxa with a well-developed posteroventral lobe. *Pereopod 5* basis slightly longer than broad, not posteroproximally excavate, posterior margin not serrate. *Pereopod 7* basis posterodistally produced not reaching merus.

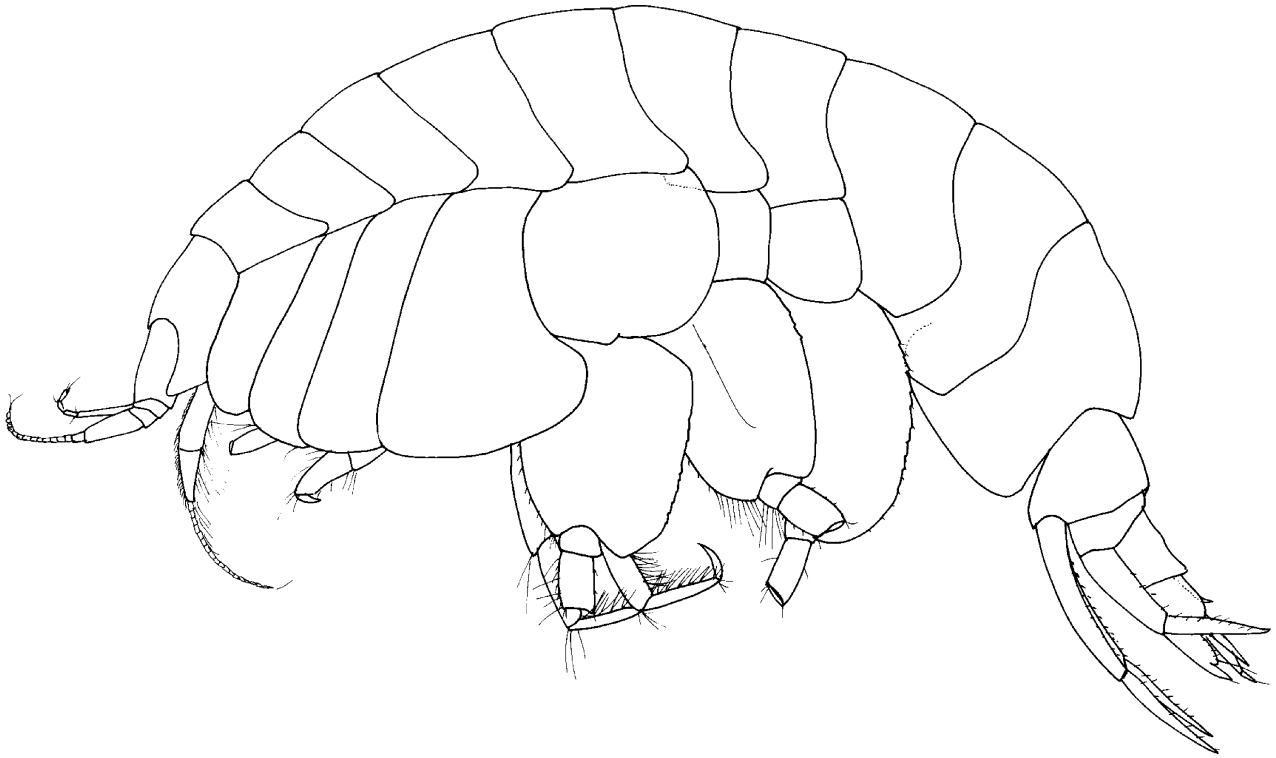

FIGURE 17. *Thrombasia saros* **sp. nov.**, holotype, female, *habitus*, 13.5 mm, NMV J46814, from 76 km south of Point Hicks, Victoria, Australia.

Pleonite 3 without mid-dorsal carina, not produced dorsodistally, posterodorsal margin not produced. *Epimeron* 1 anterodistal corner produced, forming small upturned spine. ***Epimeron 3*** posterior margin smooth, ***posteroventral corner rounded***. *Urosomite 1* not projecting over urosomite 2, dorsally straight. *Uropod 2* inner ramus with strong constriction. *Uropod 3* inner and outer rami well developed, outer ramus article 2 short, without plumose setae on rami. *Telson m*oderately cleft, with 2 dorsal robust setae per lobe and 1 apical robust setae on each lobe.

Sexually dimorphic characters. Unknown.

Habitat. Sandy mud and fine shell.

Depth range. 1840 m (this study).

Remarks. Based on the rounded posteroventral corner of epimeron 3, this species is most similar to *Thrombasia rotundata* and *T. evalina*. It is easily distinguished from these species by its longer and more weakly tapered gnathopod 1 coxa, by the propodus which is distinctly narrower than the carpus, and by the poorly defined palm.

Distribution. *Bass Strait*. Off the coast of Victoria, Australia (this study).

Thrombasia tracalero **J.L. Barnard, 1966**

(Fig. 20)

Thrombasia tracalero J.L. Barnard, 1966: 73, figs 23, 24.
Schisturella tracalero.—Barnard & Karaman, 1991: 527.—Larsen, 2007: 14 (key).
Schisturella totorami J.L. Barnard, 1967: 72 (key), 78, figs 36, 37.—Larsen, 2007: 14 (key).

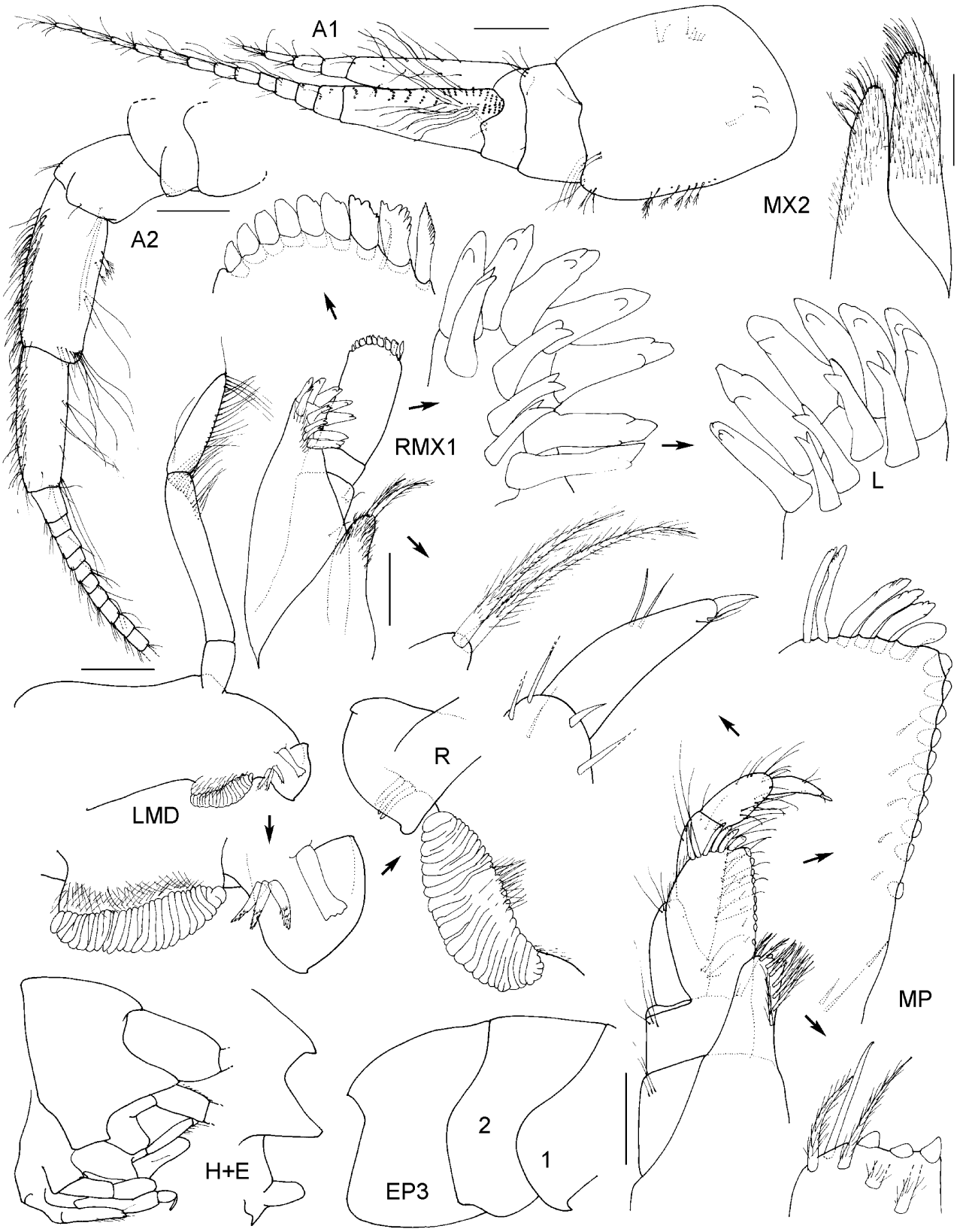

FIGURE 18. *Thrombasia saros* **sp. nov.**, holotype, female, 13.5 mm, NMV J46814, from 76 km south of Point Hicks, Victoria, Australia. Scale bars: 0.2 mm.

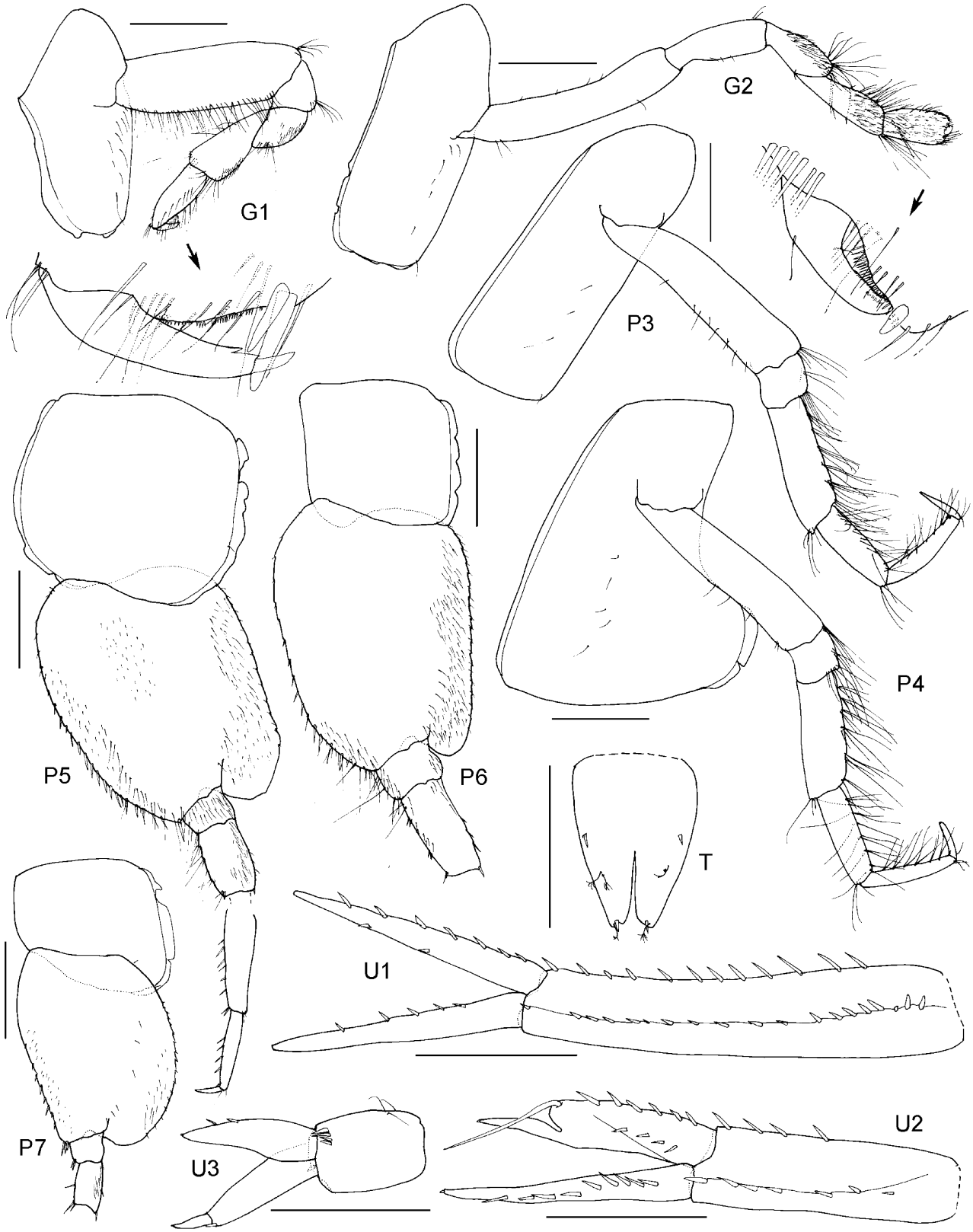

FIGURE 19. *Thrombasia saros* **sp. nov.**, holotype**,** female, 13.5 mm, NMV J46814, from 76 km south of Point Hicks, Victoria, Australia. Scale bars: 0.5 mm.

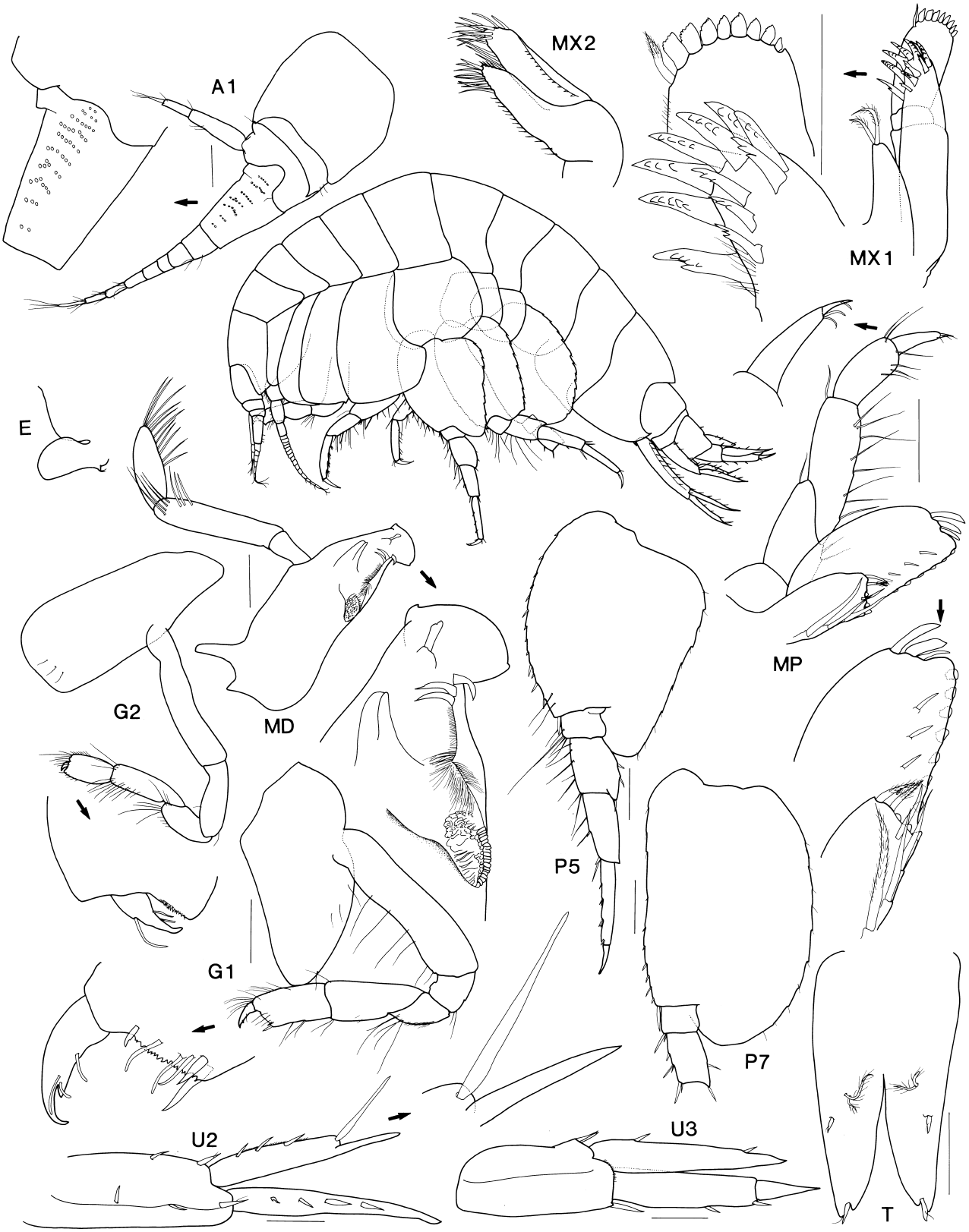

FIGURE 20. *Thrombasia tracalero* J.L. Barnard, 1966, holotype male, 4.5 mm, LACM CR 1954-054.1, from Santa Monica Basin, eastern Pacific Ocean. *Habitus*, E, MX2 after J.L. Barnard, 1966. Scale bars: gnathopods, pereopods, 0.2 mm; remainder, 0.1 mm.

Types. Holotype, male, 4.5 mm, LACM CR 1954-054.1 (originally AHF 2789).

Type locality. Slope of Santa Monica Basin (33º49'59"N 118º34'05"W), 167 m.

Feeding strategy. Scavenger (from a hagfish trap) (J.L. Barnard 1967).

Depth range. 167–183 m (J.L. Barnard 1966, 1967).

Remarks. We consider *Schisturella totorami* to be a junior subjective synonym of *Thrombasia tracalero*. Both species share the same general type locality (Santa Monica Bay (167–183 m)). The only apparent difference noted from the original descriptions is that the uropod 3 rami of *Schisturella totorami* are strongly lined with plumose setae, whereas that of the holotype of *T. tracalero* is not. However, the *T. tracalero* holotype is probably an immature specimen.

The mandibular molar of *Thrombasia tracalero* is asymmetrical, proximally setose and distally triturating and thus differs from all other members of the genus that have a columnar molar with oval fully triturating surface.

Distribution. *East Pacific Ocean.* Santa Monica Basin, California, USA (J.L. Barnard 1966, 1967).

***Thrombasia umina* sp. nov.**
(Figs 21, 22)

Types. Holotype, female, 8.6 mm, AM P.69048, east of Broken Bay, New South Wales, Australia (33°37.2'S 152°04.2'E to 33°39.0'S 152°01.8'E), 896–923 m, dredge, 10 December 1980, R.T. Springthorpe, FRV *Kapala* stn K80-20-09. Paratypes: 2 specimens, 9.0–9.5 mm, AM P.69049, same collection details as holotype; 5 specimens, 6.0–9.7 mm, AM P.69050, from east of Broken Bay, New South Wales, Australia (33°30.0'S 152°12.0'E to 33°33.0'S 152°09.0'E), 1053–1066 m, beam trawl, 12 February 1986, R.T. Springthorpe, FRV *Kapala* stn K86-01-10.

Additional material examined: 3 specimens, AM P.51385, from east of Fortescue Bay, Tasmania, Australia (43°08.96'S 148°15.36'E), 1000 m, baited trap, 8 April 1994 – 9 April 1994, J.K. Lowry & K. Dempsey, MV *Martrudan* stn TAS-422; 31 specimens, AM P.57989, from east of Fortescue Bay, Tasmania, Australia (43°08.96'S 148°15.36'E), 1000 m, baited trap, 8 April 1994 – 9 April 1994, J.K. Lowry & K. Dempsey, MV *Martrudan* stn TAS-423.

Type Locality. East of Broken Bay, New South Wales, Australia (33°37.2'S 152°04.2'E to 33°39.0'S 152°01.8'E), 896–923 m.

Etymology. Named for Umina Beach in Broken Bay, near the type locality; used as a noun in apposition.

Description. Based on holotype, female, 8.6 mm, AM P.69048. *Head* lateral cephalic lobe subtriangular, apically subacute. *Antenna 1* accessory flagellum forming cap partially covering callynophore; primary flagellum with strong 2-field callynophore, robust setae absent from proximal articles; calceoli absent. *Antenna 2* peduncular articles 3 to 5 not enlarged; flagellum short, calceoli absent. *Labrum,* epistome and upper lip separate; epistome less produced than upper lip, narrowly rounded and concave; upper lip produced, strongly rounded apically. *Mandible* molar columnar, with oval fully triturating surface. *Maxilla 1* outer plate setal-tooth 7 present, cuspidate distally; palp distal margin with apical robust setae. *Maxilliped* outer plate with one slender and one broad apical robust setae.

Pereonites 1–7 dorsally smooth. ***Gnathopod 1*** subchelate; ***coxa reduced, significantly shorter than coxa 2, tapering distally***; carpus without posterior lobe; propodus small, margins subparallel, sparsely setose along posterior margin, palm moderately acute, entire, straight. *Pereopod 5* basis longer than broad, not posteroproximally excavate, posterior margin not serrate. *Pereopod 7* basis posterodistally produced less than halfway along merus.

Pleonite 3 without mid-dorsal carina, not produced dorsodistally. ***Epimeron 3 posterior margin smooth, posteroventral corner forming broad spine***. *Urosomite 1* not projecting over urosomite 2, dorsally straight. *Uropod 2* inner ramus with constriction. *Uropod 3* stout; inner and outer rami well developed, without plumose setae, outer ramus article 2 short. *Telson* moderately cleft, with 2 dorsal robust setae and 1 apical robust setae on each lobe.

Sexually dimorphic characters. Based on paratype, male, AM P.69050. Antenna 2 peduncle article 3 enlarged, article 4 slightly enlarged, articles 4–5 with weak brush setae on anterior margin, flagellum long, calceoli absent. Uropod 3 rami without plumose setae.

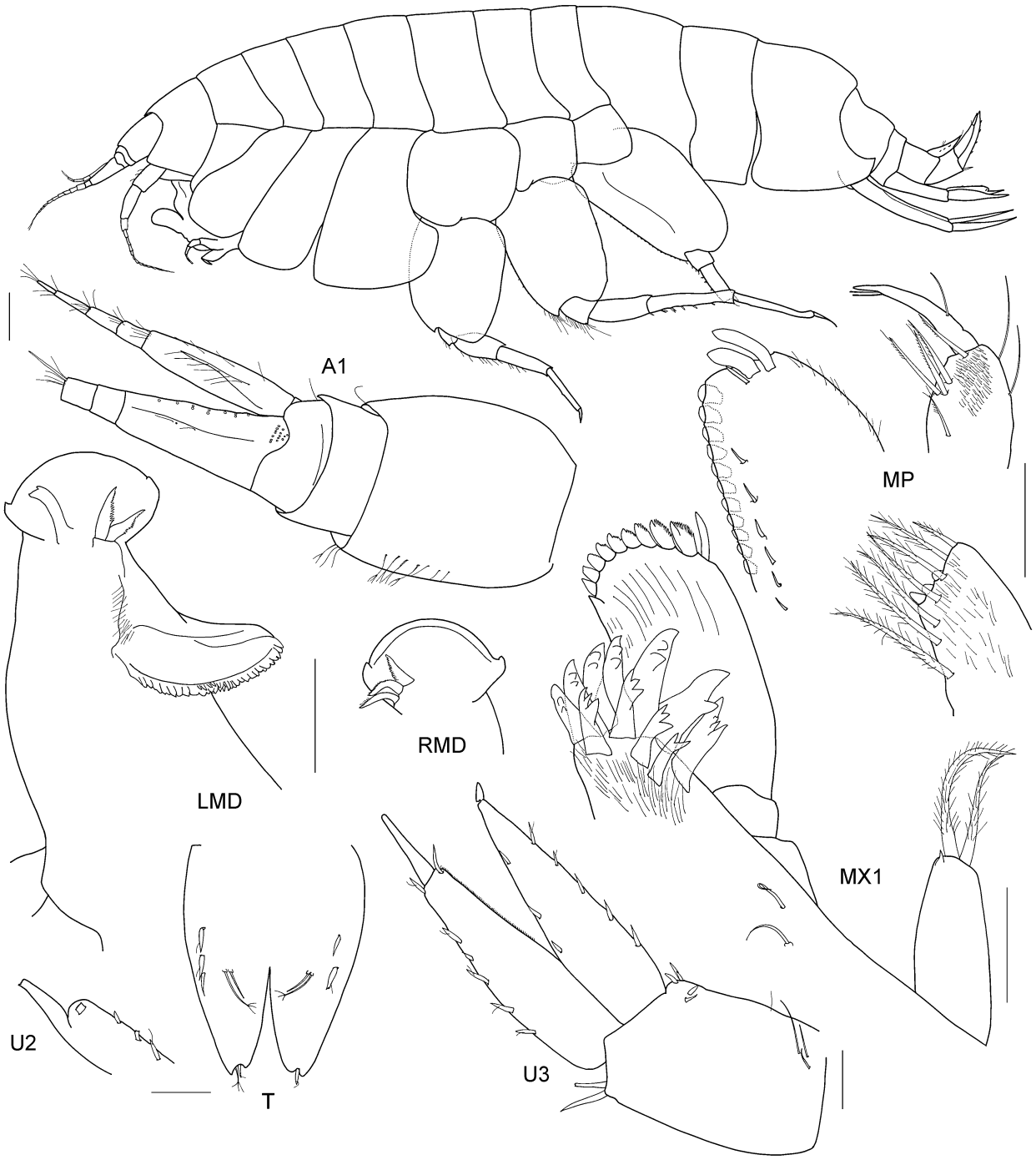

FIGURE 21. *Thrombasia umina* **sp. nov.**, holotype, female, 8.6 mm, AM P.69048, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.1 mm.

Habitat. None recorded.

Feeding strategy. Scavenger (from baited trap) (this study).

Depth range. 896–1066 m (this study).

Remarks. The only male of this species available for study does not have calceoli on either antenna and does not appear to have plumose setae on the rami of uropod 3. However, it may still be an immature specimen that has not yet developed these characters.

Thrombasia umina shares a type locality and partial distribution with *T. evalina*, and is morphologically similar to that species. However, *T. umina* has an upturned spine on the posteroventral corner of epimeron 3, which is lacking in *T. evalina*. Two other species of *Thrombasia* have a spine on epimeron 3, *T. grabenis* and *T. tracalero*.

Both of those species have a longer gnathopod 1 coxa that is more weakly tapered and so are quite distinct from the *T. umina*.

Distribution. *Tasman Sea*. East coast of Australia from Broken Bay, New South Wales to Fortescue Bay, Tasmania (this study).

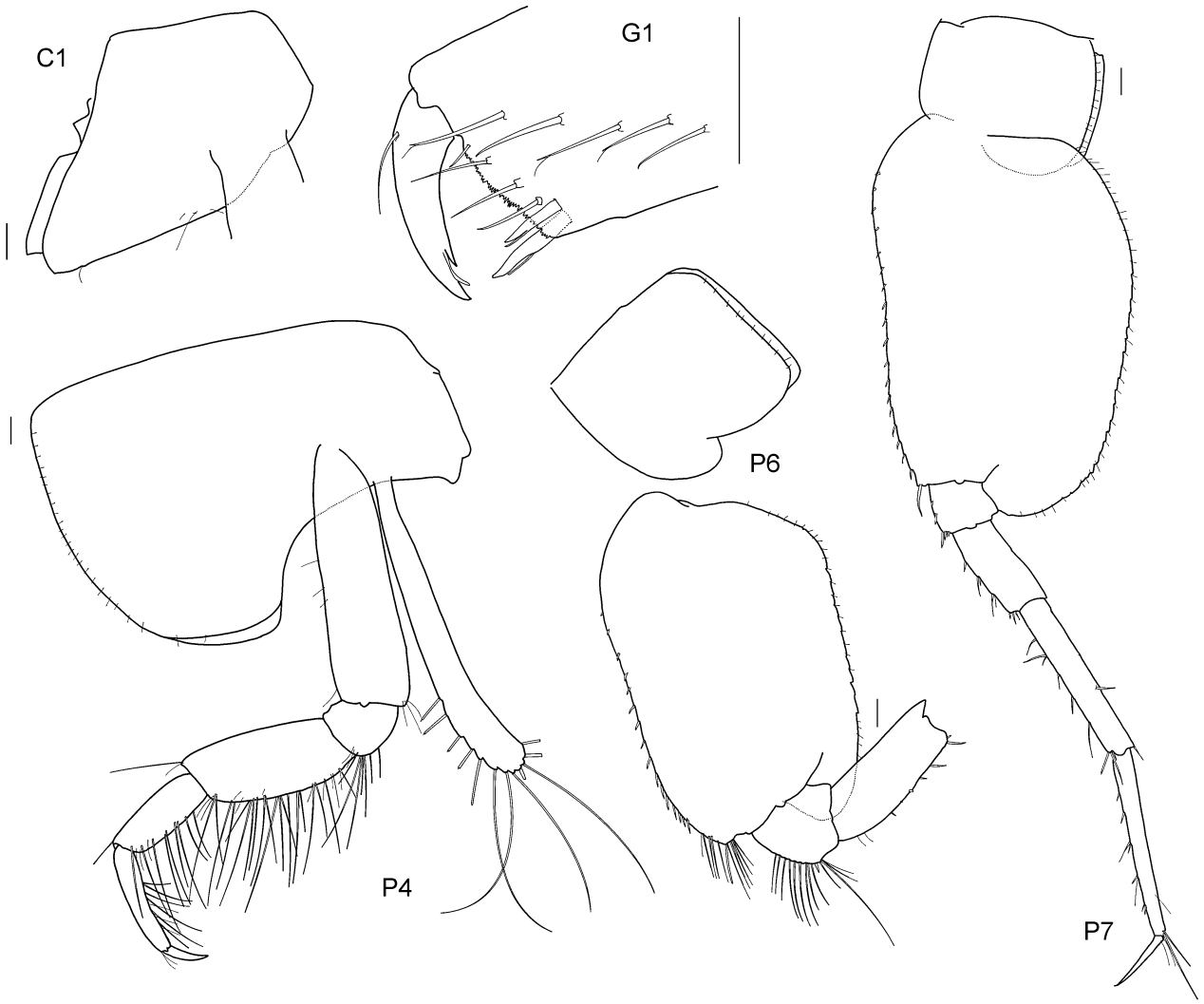

FIGURE 22. *Thrombasia umina* **sp. nov.**, holotype, female, 8.6 mm, AM P.69048, from east of Broken Bay, New South Wales, Australia. Scale bars: 0.1 mm.

Tryphosa Boeck, 1871

Tryphosa Boeck, 1871: 117.—Stephensen, 1925: 101 (in part).
Orchomene.—Barnard & Karaman, 1991: 507 (in part).
Tryphosella.—J.L. Barnard, 1969: 365 (in part).

Type species. *Anonyx nanus* Krøyer, 1846a, by monotypy.

Included species. *Tryphosa* includes two species: *T. crenata* (Chevreux & Fage, 1925); *T. nana* (Krøyer, 1846a).

Diagnostic description. Antenna 1 flagellum article 1 lacking robust seta on distal margin; accessory flagellum forming cap. Antenna 2 flagellum article 5 slender (with dense brush setae on the anterior margin). Mandibular incisor slightly curved; molar a reduced column with convex triturating surface (button); palp attached midway. Maxilla 1 ST-7 serrate along most of curved medial margin; ST-D slender, serrate along the entire curved medial margin. Maxilliped outer plate apical setae present. Gnathopod 1 subchelate; coxa large, nearly as long as

coxa 2, not tapering; carpus slightly shorter than propodus; propodus palm slightly acute, straight. Pereopod 4 coxa with well developed posteroventral lobe. Uropod 2 inner ramus constricted. Uropod 3 rami with plumose setae in male and female; inner ramus broad, lanceolate. Telson deeply cleft.

Remarks. See d'Udekem d'Acoz & Havermans (2012) for a comprehensive summary of the historical taxonomic and nomenclatural treatment of *Tryphosa*.

Tryphosa is easily separated from *Orchomenella*, with which it has long been associated, by the constricted inner ramus on uropod 2.

Distribution. Northeast Atlantic, Mediterranean Sea, Adriatic Sea.

Tryphosa crenata (Chevreux & Fage, 1925)

Orchomenella crenata Chevreux & Fage, 1925: 70 (key), 71, figs 60, 61.—Chevreux, 1925: 288.—Reid, 1951: 195.—Ledoyer, 1977: 384.—Kilgallen *et al*, 2006: 1390, figs 1–3.
Orchomene crenata.—Karaman, 1973: 138.
Orchomenella nana f. *crenata.*—Diviacco & Ruffo, 1989: 525, fig. 359 (in part).
Orchomene crenatus.—Barnard & Karaman, 1991: 508.

Types. Chevreux described an ovigerous female, 2.5 mm, from Villefranche on the Mediterranean coast of France. One specimen on 6 slides, MNHN Am7586, with the corresponding collection details, is probably the material Chevreux & Fage had before them when they described the species.

Type locality. Villefranche, Mediterranean coast of France, 20 m, mud.

Depth range. 15–150 m (Kilgallen *et al*. 2006).

Distribution. *Atlantic coasts of Europe and North Africa:* Off Guinea (Reid 1951); Senegal (Kilgallen *et al.* 2006); Irish Sea (Kilgallen *et al.* 2006). *Mediterranean Sea*: Villefranche (Chevreux & Fage 1925); Banyuls-sur-Mer; Gulf of Naples, (Kilgallen *et al.* 2006); Kotor, Montenegro (Karaman 1973 as *Orchomene nana*).

Tryphosa nana (Krøyer, 1846a)

(Fig. 23)

Anonyx nanus Krøyer, 1846a: 30.—Krøyer, 1846b: pl. 17 fig. 2a–t.—Bruzelius, 1859: 42.—Bate, 1862: 78, pl. 12 fig. 2.—Lilljeborg, 1865a: 18.—Lilljeborg, 1865b: 28.—Heller, 1866: 24.—Norman, 1869: 274.—Stalio, 1877: 243.—Graeffe, 1880: 48.—Stossich, 1880: 71.—Nebeski, 1881: 34.—Krapp-Schickel, 1974: 321, 338.
Tryphosa nanus.—Boeck, 1871: 118.—Boeck, 1876: 181.
Tryphosa ciliata Sars, 1883: 81, pl. 3 fig. 4.—Chevreux, 1887: 295, 331.—Walker, 1888: 172, pl. 13 figs 1–4.—Walker, 1889: 77.—Walker, 1892: 241.
Tryphosa nana.—Chevreux, 1888: 3.—Meinert, 1890: 155.—Bonnier, 1893: 191, 196, pl.7.—Norman, 1900: 203.—Scott, 1901.—Christodoulou, Paraskevopoulou, Syranidou & Koukouras, 2013: 1312, table 2.
Tryphosa höringii.—Walker, 1889: 77.
Orchomenella ciliata.—Sars, 1891: 69, pl. 25 fig. 2.—Robertson, 1892: 204.—Sars, 1895: 683.—Walker, 1895a: 420.—Walker, 1895b: 292.
Anonyx pinguis.—Della Valle, 1893: 821, pl. 28 figs 22–35.
Orchomenella nana.—Chevreux, 1898: 476.—Walker, 1898: 166.—Walker, 1904: 244.—Stephensen, 1923: 12.—Chevreux, 1925: 288.—Chevreux & Fage, 1925: 71, fig. 62.—Stephensen, 1929: 60.—Marine Biological Association of the UK, 1931: 188.—Stephensen, 1932: 357.—Stephensen, 1935: 104 (key).—Crawford, 1937: 644.—Moore, 1937: 117.—Schellenberg, 1942: 108.—Stephensen, 1942: 474.—Gorbunov, 1946: 43.—Jones, 1948: 404.—Enequist, 1949: 387, 400.—Reid, 1951: 195.—J.L. Barnard, 1958: 97.—Oldevig, 1959: 22.—Duhig, 1960: 64.—Agrawal, 1963: 632, pl. 3.—Gurjanova, 1964: 279.—Toulmond, 1964: 321.—Toulmond & Truchot, 1964: 7.—Agrawal, 1966: 459, pl. 5.—Nayar, 1966: 135.—O'Riordan, 1969: 32.—Bellan-Santini & Ledoyer, 1973: 920.—Laverack & Blackler, 1974: 81.—Drago & Albertelli, 1978: 212.—Myers & Southgate, 1980: 975.—Walker & Rees, 1980: 56.—Macquart-Moulin, 1984: 185.—Diviacco & Ruffo, 1989: 525, fig. 359 (in part).—Dauvin & Sorbe, 1995: 443, 447, 449, 456, tables 4, 5.—Stefanidou & Voultsiadou-Koukoura, 1995: 602, table 1.—Cartes & Sorbe, 1999: 1138, table 1, 1134, table 4.—Bakir & Çevirgen, 2010: 83, table 1.
Orchomenella nanus.—Stebbing, 1906: 81.—Tattersall, 1913: 4.—Schellenberg, 1925: 118.
Orchomene nana.—J.L. Barnard, 1964: 89 (key).—Karaman, 1973: 133, figs 14–18 (in part).—Krapp-Schickel, 1974: 321, 338.—Kitching *et al*, 1976: 756.—Lincoln, 1979: 70, figs 25a–g, 26e–h.—O'Riordan, 1982: 551.—Moore, 1984: 35.

—Parker, 1984: 122.—Bellan-Santini, 1985: 275.—Marques & Bellan-Santini, 1985: 323, 349.—Holmes, 1986: 37.—Costello *et al*, 1989: 34.—Kaartvedt, 1989: 189, table 3, 191, table 5.—Dauvin & Gentil, 1990: 126, 128.—Buhl-Jensen & Fosså, 1991: 248.—Hamerlynck & Mees, 1991: 208. table 2.—Mees & Hamerlynck, 1992: 360, table 2.—Cattrijsse, Mees & Hamerlynck, 1993: 191, table 1.—Marques & Bellan-Santini, 1993: 557, table 2, 559, table 3, 560, table 4, 561, table 5.—Dauvin *et al*, 1994: 550, table 3.—Dauvin & Zouhiri, 1996: 914, table 3, 916, table 5, 921, table 6.—Conradi & Lopez-Gónzález, 1999: 6, table 1.

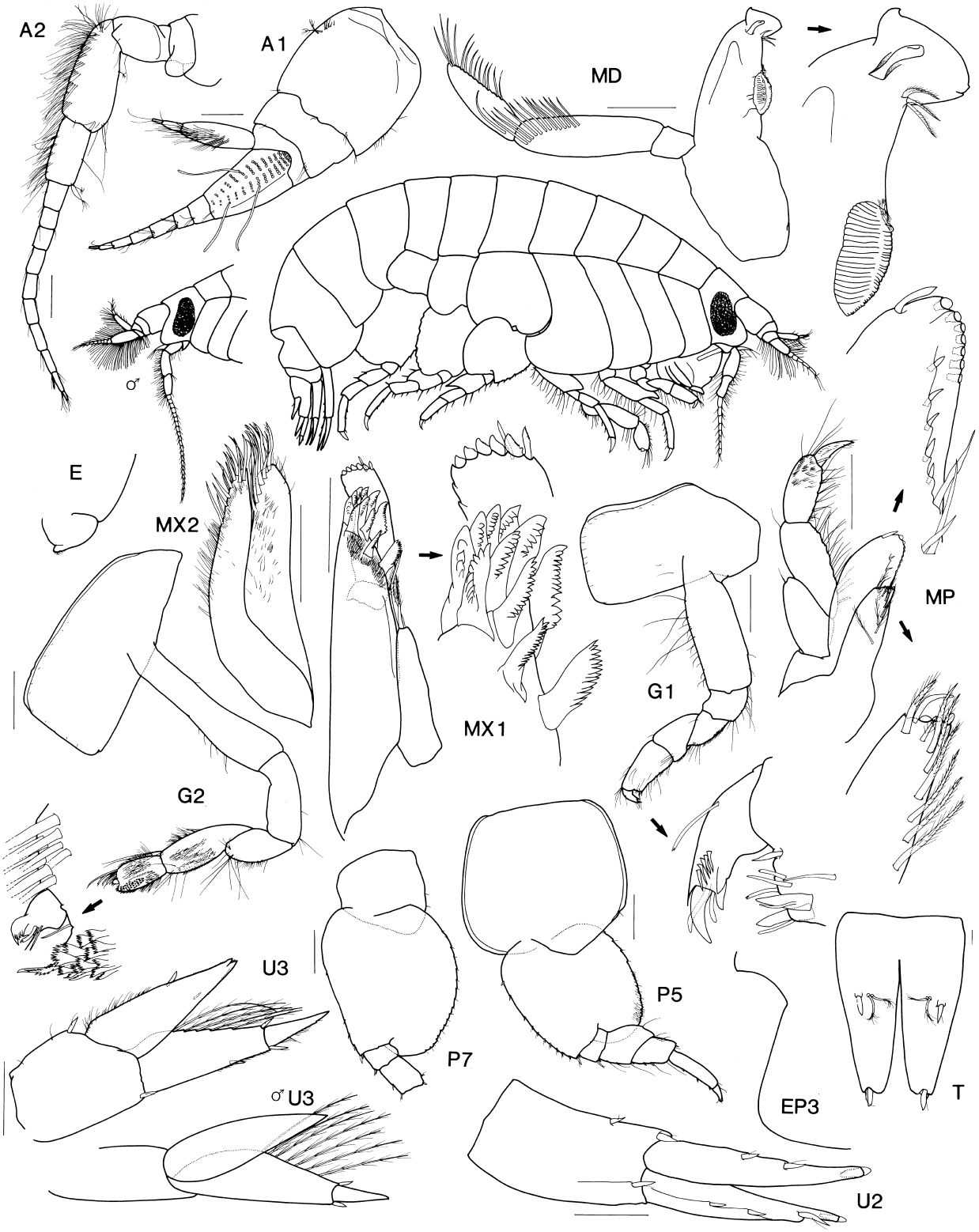

FIGURE 23. *Tryphosa nana* (Krøyer, 1846), female, 5.6 mm, SMNH N. Amph. 6904, Gåsörännan, Sweden; female whole animal and head of male, after Sars, 1891 (as *Orchomenella ciliata*). Scale bars: gnathopods, pereopods, 0.2 mm; remainder, 0.1 mm.

Orchomene nanus.—Barnard & Karaman, 1991: 509.—Conlan, 1994: 520

not *Tryphosa nana*.—Sars, 1891: 76, pl. 27 fig. 1 (= *Tryphosella sarsi*).—Sars, 1895: 684 (= *Tryphosella sarsi*).—Walker, 1895a: 422 (= *Tryphosella sarsi*).—Walker, 1895b: 294 (= *Tryphosella sarsi*).

not *Tryphosa nanus*.—Robertson, 1892: 205 (?= *Tryphosella sarsi*).

not *Orchomene nana*.—Karaman, 1973: 133, figs 14–18 (in part =*Orchomenella crenata* Chevreux & Fage, 1925 according to Kilgallen *et al*. 2006).

not *Orchomenella nana*.—Ledoyer, 1977: 384 (=*Orchomenella crenata* Chevreux & Fage, 1925 according to Kilgallen *et al*. 2006).—Diviacco & Ruffo, 1989: 525, fig. 359 (in part =*Orchomenella crenata* Chevreux & Fage, 1925 according to Kilgallen *et al*. 2006).

Types. According to Dr Jørgen Olesen (ZMUC) there are two sets of material (ZMUC CRU-7476 ?type and ZMUC CRU-7487 syntype) which might be considered as original material.

Material examined. 23 specimens & 1 slide (female, 5.5 mm), SMNH N. Amph. 6904, from Gåsörännan, Sweden, 30–40 m; 8 specimens, AM P.11222, from Plymouth, Devon, United Kingdom (50°24'N 4°7'W), coll. A.A. Cameron.

Type locality. The Kattegat.

Habitat. Sand, mud and shelly debris.

Feeding strategies. Often found 'stripping bait in lobster pots' (O'Riordan 1982) on carcasses of dead crabs (Norman 1900, Moore 1984), also in *Echinocardium* tests (Laverack & Blackler 1974).

Depth range. 0–250 m (Lincoln 1979).

Distribution. *Tryphosa nana* is widely recorded and locally very common along the Atlantic coasts of Europe and the North Sea, from Sweden and southern Norway to Spain (Chevreux & Fage 1925); also reported from Senegal (Schellenberg 1925) and Guinea (Reid 1951). It is also recorded from the Adriatic Sea (Heller 1866, Karaman 1973), Aegean Sea (Bellan-Santini 1985, Christodoulou *et al*. 2013) and Mediterranean Sea (Bellan-Santini & Ledoyer 1973).

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