

A new caprellid genus and species (Crustacea: Amphipoda: Caprellidae) from Australia

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ABSTRACT

A new genus and new species of caprellid, *Parapseudaeginella* n. gen., and *Parapseudaeginella australiensis* n. sp., is described from shallow water of Ningaloo Reef, south of Tantabiddy, reef front, Western Australia. The new genus is very similar to *Pseudaeginella* Mayer, 1890, but can be easily distinguished by the pereonites 6 and 7 being clearly fused (separated in *Pseudaeginella*) and by the absence of a pair of proximal grasping spines on the propodus of pereopods 5–7 (present in *Pseudaeginella*). The new species is characterised by acute dorsal projections on head, pereonite 1 and 2, and acute lateral projections near the coxa of gnathopod 2 in males. The new taxon has probably been overlooked in the past due to its tiny size. Further efforts to sample and describe the smaller caprellids is needed to fully understand the global diversity and relationships of caprellids.

KEYWORDS

New genus, Ningaloo Reef, *Parapseudaeginella*, Senticaudata, Western Australia.

INTRODUCTION

The Caprellidae is a family of the Suborder Senticaudata proposed by Lowry and Myers (2013) within the order Amphipoda. It comprises about 441 species within 93 genera worldwide (Horton *et al.*, 2020).

In recent years the caprellid fauna from Western Australia has received increasing attention. McCain and Steinberg (1970) in their 'Crustaceorum Catalogus' listed only seven caprellid species from Western Australia (*Caprella equilibra* Say, 1818, *Hemiaegina minuta* Mayer, 1890, *Liriarchus perplexus* Mayer, 1912, *Metaprotella haswelliana* (Mayer, 1882), *Metaprotella sandalensis* Mayer, 1898, *Monoliropus agilis* Mayer, 1903, and *Orthoprotella australis* (Haswell, 1880)). Hirayama (1988) described the genus *Quadrisegmentum* Hirayama, 1988 from Ashmore Reef, Northwestern Australia.

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Guerra-García (2004) studied the caprellids from Western Australia and Northern Territory and reported 25 species in 18 genera from Western Australia. Takeuchi and Lowry (2007) redescribed in detail *Me. haswelliana* from Western Australia, with designation of a neotype. Currently the diversity of caprellids described so far from this region includes 27 species in 20 genera, which represents 6% of species and 22% of genera described worldwide.

Launched in 2005, “Census of Coral Reef Ecosystems – CReefs” (<http://www.coml.org/census-coral-reef-ecosystems-creefs/>) is the coral reef component of the Census of Marine Life, a 10-year program involving researchers in more than 80 countries. The Census is the first comprehensive survey of the diversity, distribution, and abundance of marine life in the oceans. The Australian part of the “CReefs” program included three trips each to Ningaloo Reef in Western Australia, and Lizard and Heron Islands on

the Great Barrier Reef. “CReefs Australia” is supported by BHP Billiton through the Great Barrier Reef Foundation and the Australian Institute of Marine Science (AIMS). The consortium included scientists from the Australian Museum, the Museum and Art Gallery of the Northern Territory, Museum Victoria, the Queensland Museum, the South Australian Museum and the Western Australian Museum, as well as the University of Adelaide, Murdoch University, the South Australian Herbarium and the Smithsonian Institution, USA.

The present study reveals the presence of an undescribed genus collected during fieldwork at Ningaloo Reef, Western Australia (WA) (Fig. 1) by SCUBA in shallow waters, as part of the expeditions organized by the “CReefs” team. This new genus is partially characterized by its tiny size, indicating that caprellid diversity is probably still underestimated due to the lack of study of the smallest taxa.

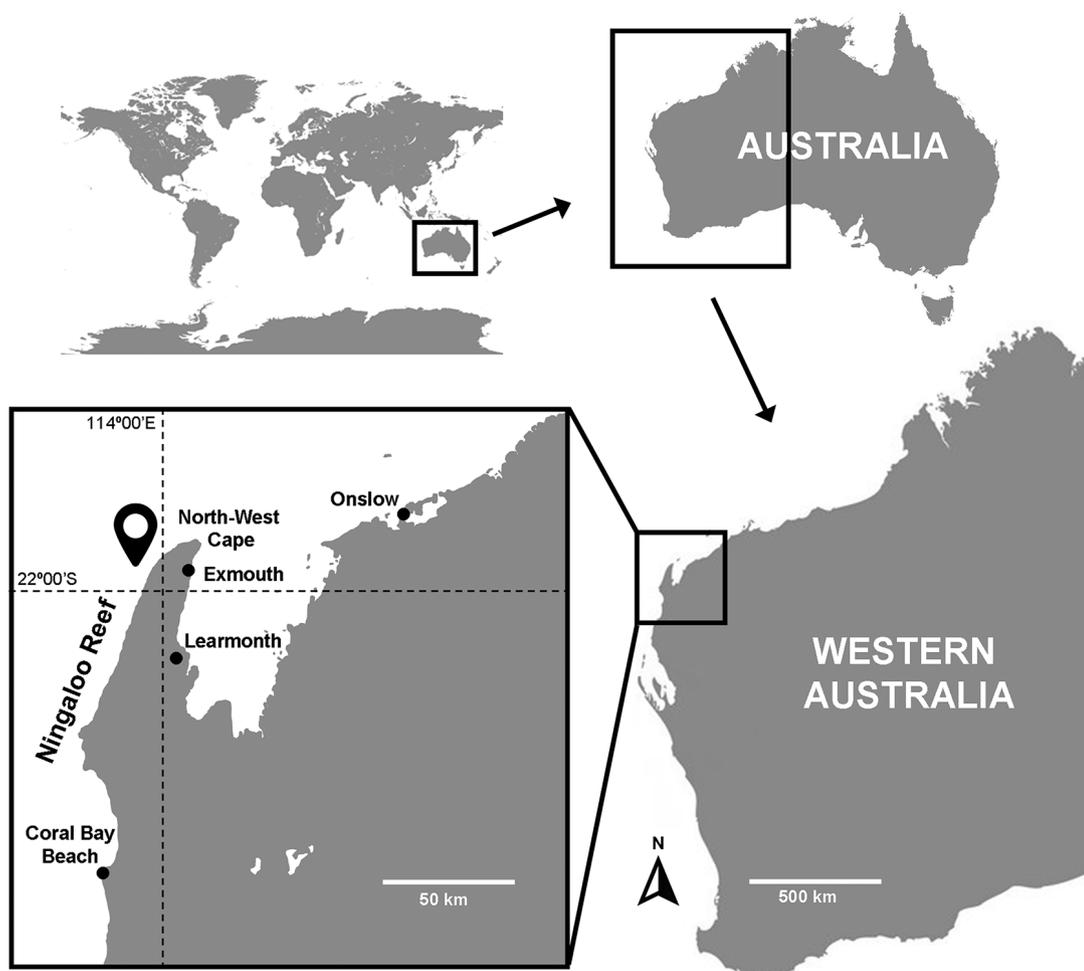


Figure 1. Map showing type locality of *Parapseudaeginella australiensis* n. sp.

MATERIAL AND METHODS

Specimens of *Parapseudoaeginella australiensis* n. gen., n. sp. were dissected in 80% ethanol and slides made using polyvinyl lactophenol. The method for illustrations is based on Takeuchi (2015). Original drawings of a whole animal in lateral view, antennae, gnathopods, pereopods, and mouthparts were made using a Leica DM1000 compound microscope equipped with a camera lucida. Hand-inked tracings were made using Rotring pens, based on the reduced copies of the original drawings organized into plates. Finally, with Photoshop® 6, inked copies were improved, cleaned, and arranged into final illustration plates. Body length was measured from the anterior end of the head to the posterior end of pereonite 7. Abbreviations used in the illustrations are: A1, 2 = Antenna 1, 2; UL = Upper lip; LMd = Left mandible; RMd = Right mandible; LL = Lower lip; Mx 1, 2 = Maxilla 1, 2; Mxp = Maxilliped; Gn 1, 2 = Gnathopod 1, 2; P3–7 = Pereopod 3–7; Ab = Abdomen. In the descriptions, the term “spine” is used for stout, inflexible articulated structures, “seta” for slender, flexible articulated structures and “setula” for very short setae. Systematic classification was based on Lowry and Myers (2013). Specimens of the new genus and species are deposited in the Australian Museum (AM) and the Western Australian Museum (WAM).

SYSTEMATICS

Order Amphipoda Latreille, 1816

Suborder Senticaudata Lowry and Myers, 2013

Superfamily Caprelloidea Leach, 1814

Family Caprellidae Leach, 1814

Subfamily Caprellinae Leach, 1814

Parapseudoaeginella n. gen.

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Diagnosis. Head fused (suture present) with pereonite 1. Pereonites 6 and 7 fused. Flagellum of

antenna 1 more than two-articulate. Flagellum of antenna 2 two-articulate, swimming setae absent. Mandible molar absent; mandible palp three-articulate, setal formula 1-x-1. Gills present on pereonites 3 and 4. Pereopods 3 and 4 one-articulate, vestigial. Pereopods 5–7 six-articulate. Abdomen without appendages.

Etymology. The name is derived from ancient Greek παρά (*Para*, which means “near”, “next to”, “closely related” or “closely resembling” among others) and “*Pseudaeginella*”, because the new genus is very similar to *Pseudaeginella* Mayer, 1890.

Type species. *Parapseudoaeginella australiensis* n. sp.

Parapseudoaeginella australiensis n. sp.

(Figs. 2–6)

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Material examined. Holotype: mature male, WAM C76110 (ex AMP.101302) (vial + 2 slides) (mouthparts dissected, used for description, figured), Ningaloo Reef, south of Tantabiddy, reef front, Western Australia, Australia, 21°54'37"S 113°55'42"E, 9 m depth, coral heads, preserved 80% ethanol, 12 June 2008, coll. N.L. Bruce and M. Blazewicz-Paszkowycz. — Paratypes (same data as the holotype): (a) mature female, AM P.101303 (vial + 1 slide) (mouthparts dissected, used for description, figured); (b) mature male, AM P.101304 (vial + 3 slides) (mouthparts dissected, used for description in part).

Etymology. The named *australiensis* is alluding to the country where the species was found.

Diagnosis. Head and pereonite 1 with an acute dorsal projection, bent forward. Pereonite 2 with a pair of small dorsal projections medially, and acute lateral projections near the coxa of gnathopod 2. Gnathopod 1 propodus palm with a pair of proximal grasping spines. Gnathopod 2 basis with a distal projection; propodus palm with one proximal grasping spine. Antennae 1 and 2 setose in males. Pereopods 5–7 propodus palm with strong setae but lacking proximal grasping spines.

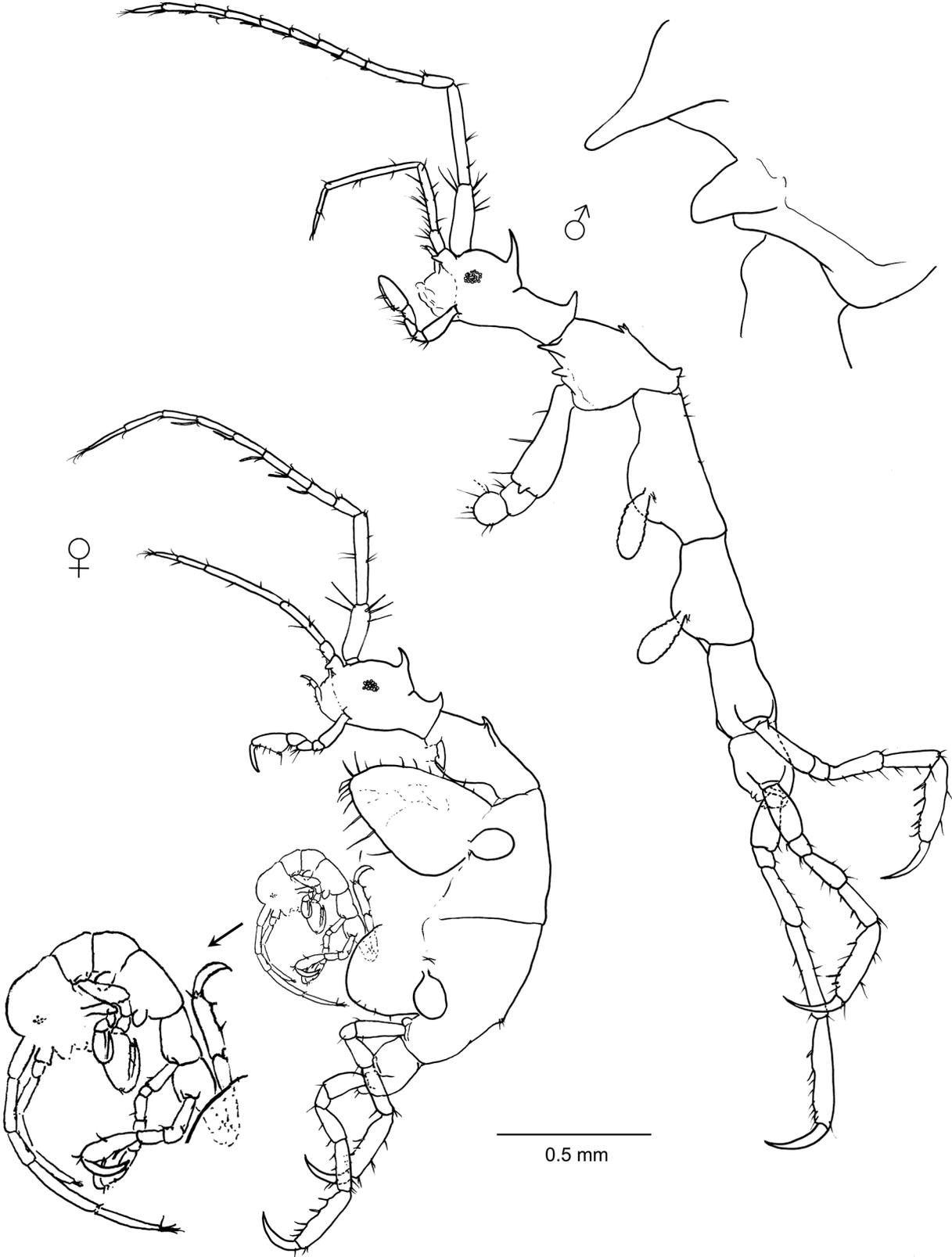


Figure 2. *Parapseudaeginella australiensis* n. sp. Lateral view of holotype male (WAM C76110) and paratype female (AM P.101303). Detail of hatchingling emerging from the brood pouch (arrow).

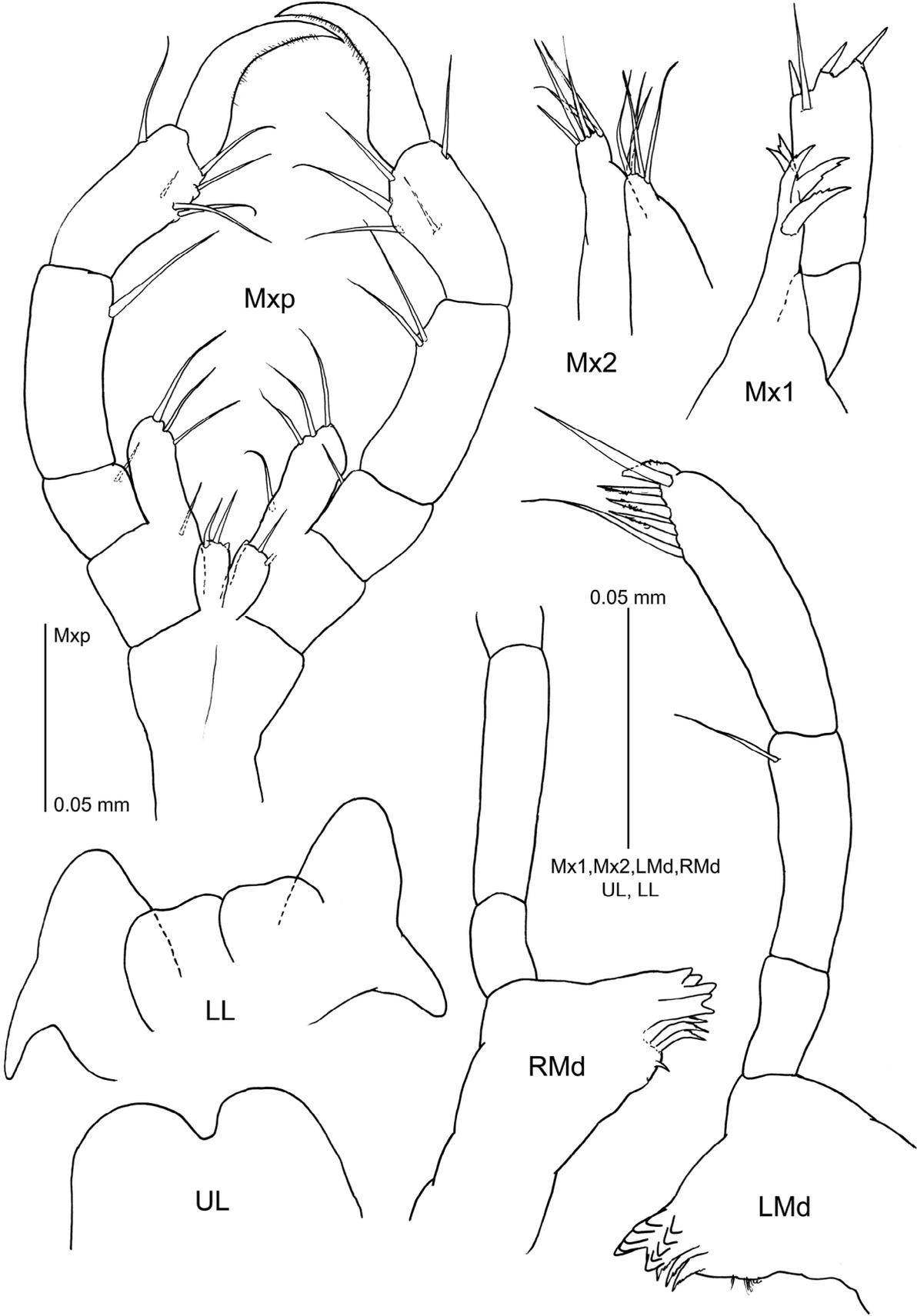


Figure 3. *Parapseudaeginella australiensis* n. sp. Mouthparts of holotype male (WAM C76110). Abbreviations: UU = Upper lip; LMd = Left mandible; RMd = Right mandible; LL = Lower lip; Mx 1, 2 = Maxilla 1, 2; Mxp = Maxilliped.

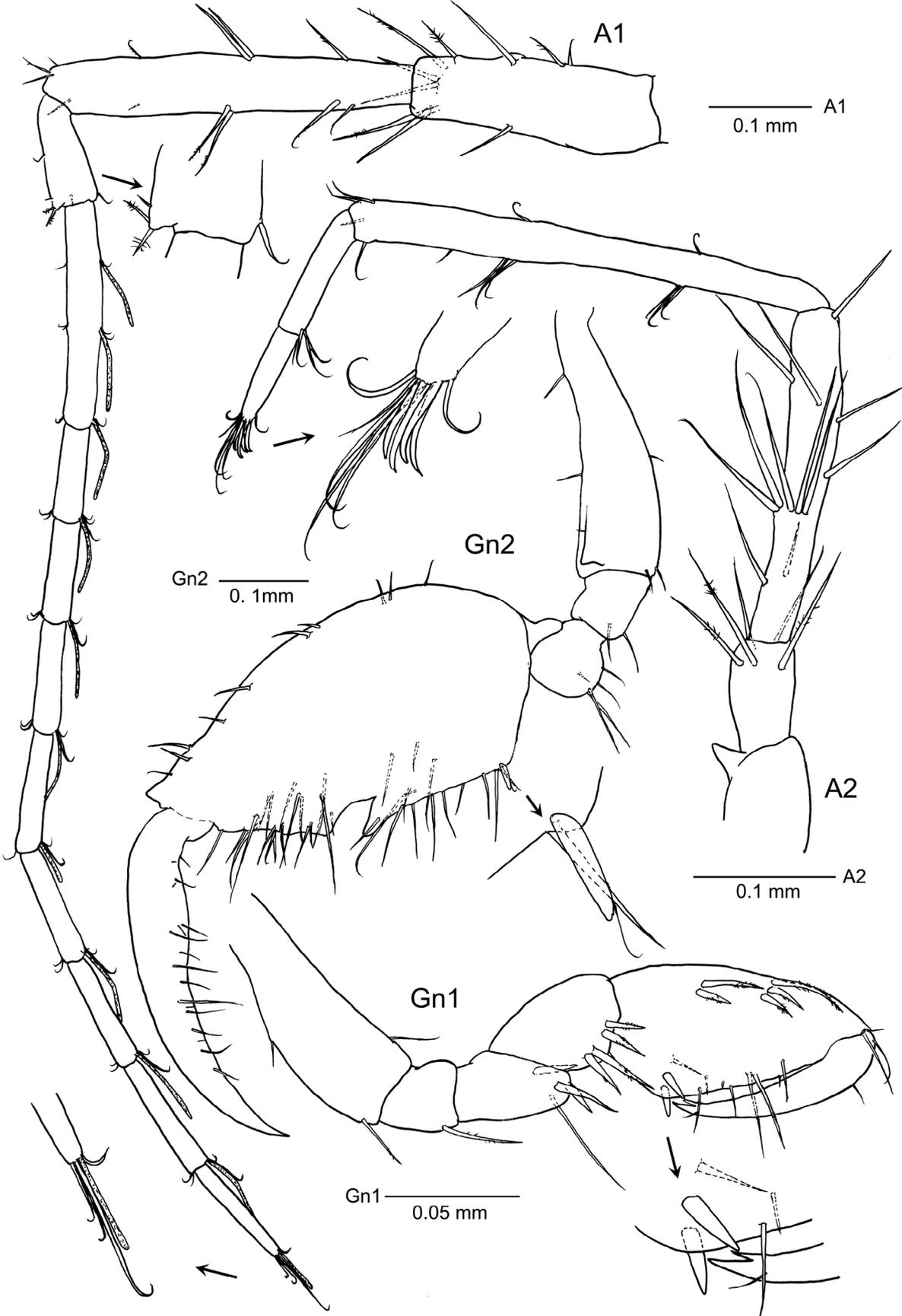


Figure 4. *Parapseudaeginella australiensis* n. sp. Antennae and gnathopod 1 of holotype male (WAM C76110). Gnathopod 2 of paratype male (AMP.101304). Abbreviations: A1, 2 = Antenna 1, 2; Gn 1, 2 = Gnathopod 1, 2.

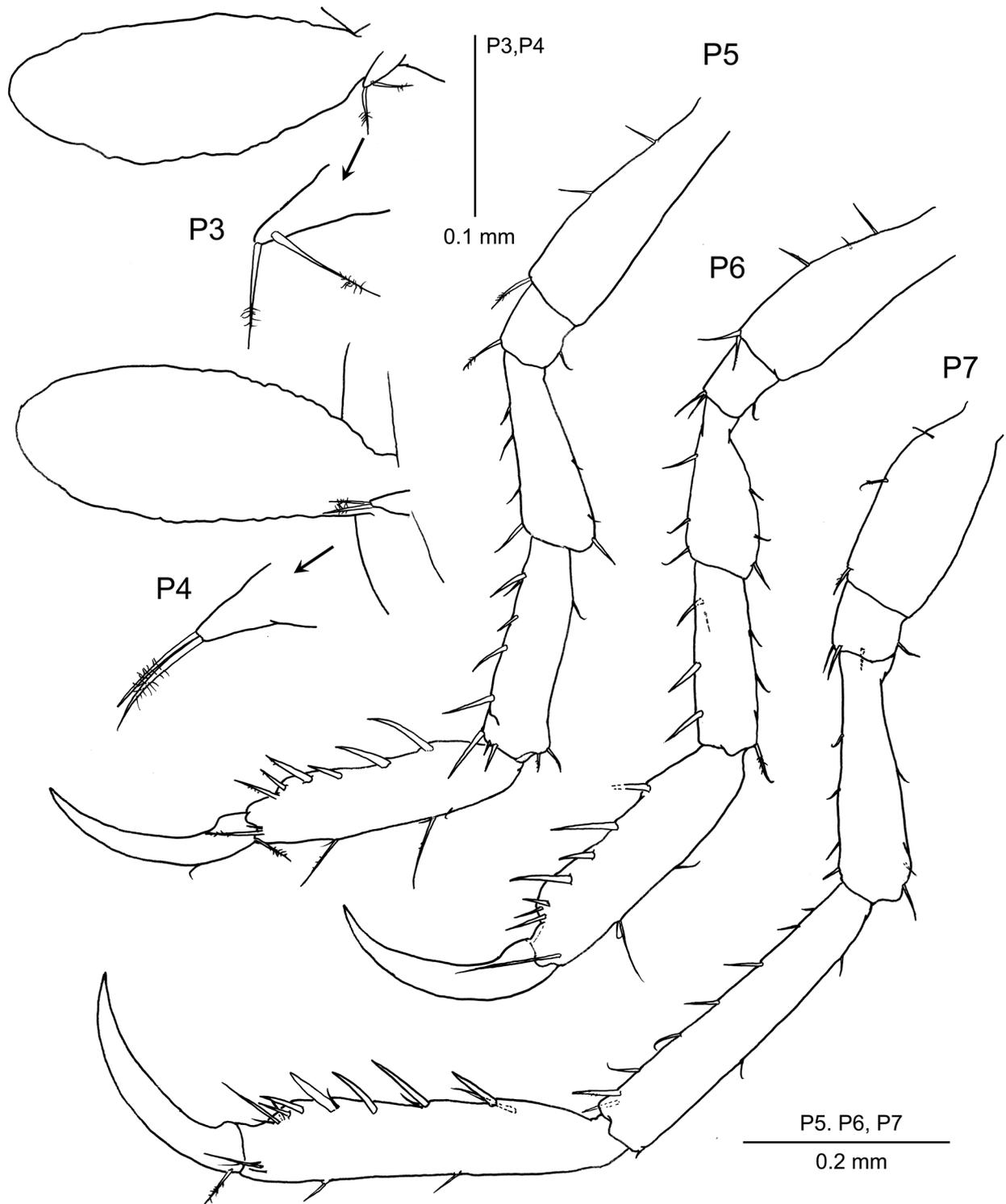


Figure 5. *Parapseudaeginella australiensis* n. sp. Pereopods 3–7 of holotype male (WAM C76110). Abbreviation: P = Pereopod.

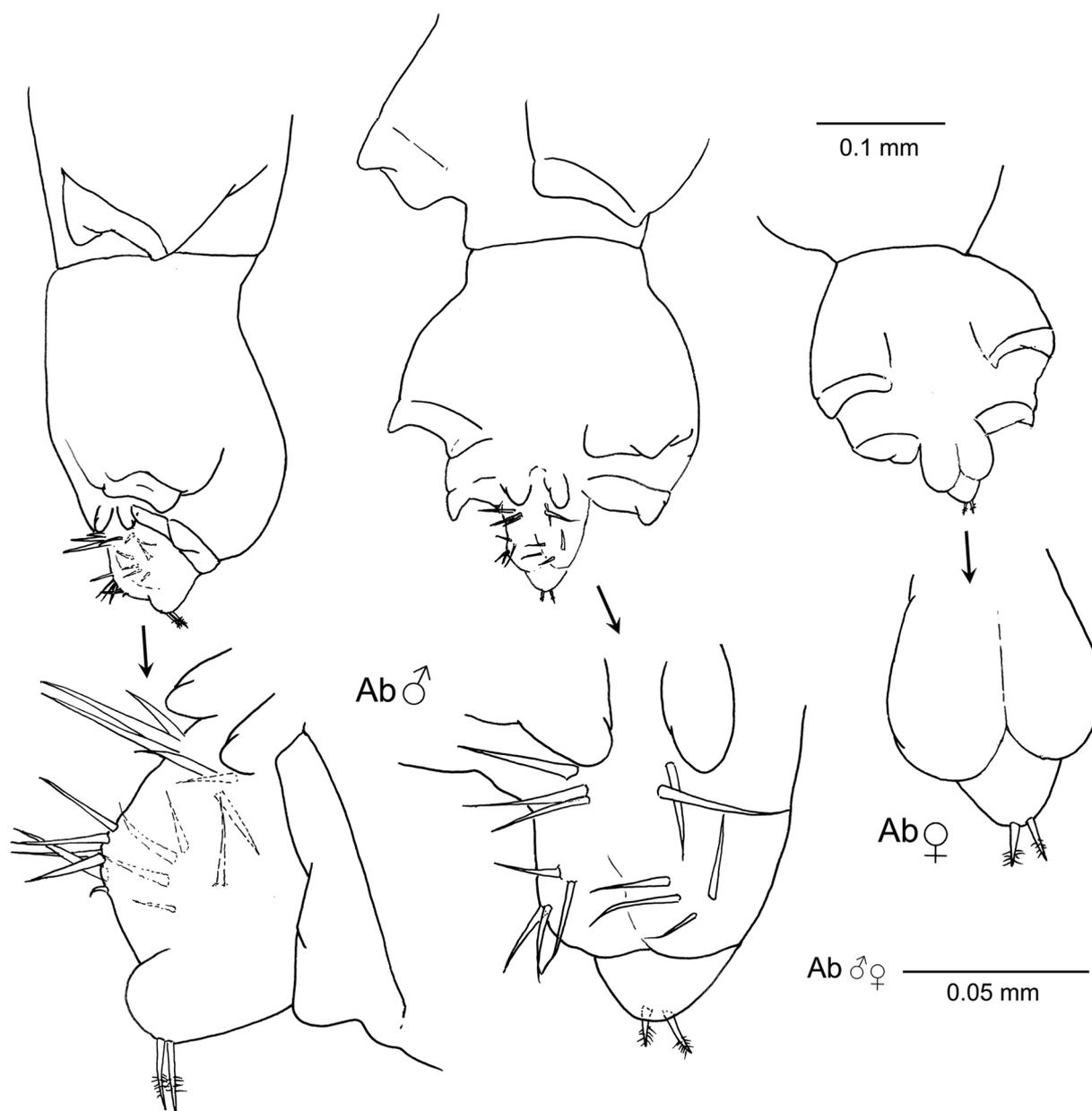


Figure 6. *Parapseudaeginella australiensis* n. sp. Pereonites 6 and 7 showing the total fusion and details of male and female abdomen [lateral and ventral view of holotype male (WAM C76110), and ventral view of paratype female (AM P.101303)]. Abbreviation: Ab = Abdomen.

Description. Holotype male (2.6 mm) (Figs. 2–6): Lateral view (Fig. 2). Eyes present and distinctive. Head with an acute dorsal projection, curved forward. Pereonite 1 fused with head, suture present. Pereonite 1 with acute dorsal projection bent forward distally. Pereonite 2 with a pair of small dorsal projections medially, an acute hump distally, and acute lateral projections (one on each side) near the coxa of gnathopod 2. Pereonites 3 and 4 ventrally expanded

and rounded near gills. Pereonites 3–7 without projections. Pereonites 6 and 7 fused (Fig. 6).

Gills (Fig. 2). Present at middle of pereonites 3–4, elongate, length about two times width.

Mouthparts (Fig. 3). Upper lip symmetrically bilobed, smooth apically. Mandibles without mandibular molar. Three-articulate palp with a setal formula 1-3-1, medial article provided with one seta; left mandible with incisor five-toothed, lacinia mobilis five-toothed, followed by two or

three accessory blades; right mandible with incisor five-toothed, lacinia mobilis blade-like, followed by two accessory blades; molar flake absent. Lower lip without setulae; inner lobes quadrangular. Maxilla 1 outer lobe carrying five serrated spines, palp two-articulate, distal article with three apical spines and 1 medial seta. Maxilla 2 inner lobe small, shorter than outer lobe, both with five setae respectively. Maxilliped inner plate small, about 1/3 of outer plate in length, carrying two apical setae and a small tooth; outer plate elongate, with 3 apical setae; palp four-articulate, distal article (dactylus) curved and with rows of minute setulae.

Antennae (Figs. 2, 4). Antenna 1 peduncle setose, some setae plumose; article 1 robust; article 2 longest; article 3 shortest; flagellum with nine articles, first article apparently composed of two articles fused as indicated by aesthetascs at midlength. Antenna 2 setose, slightly shorter than peduncle of antenna 1; swimming setae absent; proximal peduncular article with a distal projection (gland cone); flagellum two-articulate.

Gnathopods (Figs. 2, 4). Gnathopod 1 basis of the same length as the combination of ischium, merus and carpus; grasping margin of propodus non-serrated; 2 proximal grasping spines, dactylus bifid distally. Gnathopod 2 broken in holotype (Fig. 2); description of carpus, propodus and dactylus based on the gnathopod 2 of paratype male "b" (Fig. 4); gnathopod 2 inserted medially on pereonite 2; coxa well developed, with a proximal projection; basis as long as pereonite 2, with an acute distal projection; ischium small, rectangular; merus rounded; carpus short and triangular; propodus elongate, setose, with one proximal grasping spine and a projection followed by U-shaped notch medially; dactylus with setulae.

Pereopods (Figs. 2, 5). Pereopod 3 and 4 vestigial (approx. 0.05 mm), one-articulate, provided with two distal plumose setae. Pereopods 5–7 similar but slightly increasing in size and robustness respectively; carpus and propodus provided with strong setae ventrally, propodus lacking proximal grasping spines; dactylus smooth.

Penes (Fig. 6) distinctive, length approx. 1.5 times width.

Abdomen (Fig. 6) without appendages, with two setose lateral lobes and a single dorsal lobe with 2 plumose setae.

Paratype female "a" (2.1 mm) (Figs. 2, 6):

Flagellum of antenna 1 with eight articles. Pereonite 1 less elongate than male. Pattern of dorsal pereonite projections as in male except for the acute hump medially in pereonite 2 rather than distally. Mouthparts similar to male but setal formula of mandibular palp 1-2-1. Insertion of gnathopod 2 on the anterior half of pereonite instead of medially. Gnathopods 2 were lacking in the female specimen so they could not be described. Oostegites present on pereonites 3 and 4, more setose on pereonite 3. Gills shorter than in male. Lateral lobes of abdomen lacking setae. The female was carrying hatchlings in the brood pouch (see brood pouch in the female of Fig. 2). Pereopods 6 and 7 are also totally fused in the juvenile, flagellum of antennae 1 and 2 is two-articulate, and the head and pereopods are proportionally larger in comparison with those of adult specimens.

Remarks. The new genus is very similar to *Pseudaeginella*. Presently, thirteen species have been described within *Pseudaeginella* (cf. Horton *et al.*, 2020). Lacerda *et al.* (2011) provided a key to species of the genus *Pseudaeginella* and body illustrations. All the *Pseudaeginella* species have pereonites 6 and 7 separated (unfused), which is a diagnostic character of this genus. Therefore, the main difference between the two genera is that pereonites 6 and 7 are totally fused in *Parapseudaeginella* n. gen., whereas they are separated in *Pseudaeginella*. Additional differences occur in the pereopods, in species of *Pseudaeginella* the propodus of pereopods 5–7 has a pair of proximal grasping spines (usually located on a small projection) whereas these are absent in *Parapseudaeginella* n. gen.

Apart from *Parapseudaeginella* n. gen., there are only two other genera in the Caprellidae with fused pereonites 6 and 7: *Metaprotella* Mayer, 1890 and *Luisacaprella* Guerra-García, 2020. The main differences among these three genera are: (1) a mandibular molar is present in *Metaprotella* and *Luisacaprella*, while it is absent in *Parapseudaeginella* n. gen.;

(2) the setal formula of the mandibular palp is 1-x-y-1 or 1-x-1 in *Metaprotella*, 2-x-1 in *Luisacaprella*, and 1-x-1 in *Parapseudaeginella* n. gen.; (3) the outer plate of the maxilliped is significantly larger in *Metaprotella* than in *Luisacaprella* and *Parapseudaeginella* n. gen.; (4) the palm of the propodus of gnathopod 1 has one grasping spine in *Metaprotella* and two in *Luisacaprella* and *Parapseudaeginella* n. gen.; (5) pereopod 5 is fully developed in *Metaprotella* and *Parapseudaeginella* n. gen. while the distal article of pereopod 5 is vestigial in *Luisacaprella*; (6) the abdomen of male *Metaprotella* is provided with two appendages (cf. pleopods) while these are absent in *Luisacaprella* and *Parapseudaeginella* n. gen.

The material of the new genus was collected from coral heads in shallow waters of Ningaloo Reef. The study conducted by Guerra-García (2004) of the caprellids from Western Australia and Northern Territory included material collected from Ningaloo Reef (stations from WA-317 to WA-361 — cf. Guerra-García, 2004: 70, 71). However, this tiny caprellid was not present in those collections. Probably, the considerably small size of *Parapseudaeginella australiensis* n. sp. has prevented its previous collection and/or sorting. This reveals that further efforts are needed focussing on sorting and studying the smallest specimens to fully understand the global diversity and relationships of caprellids.

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