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Littoral Caprellidae (Crustacea: Amphipoda) from Indonesia, with the description of a new species

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ABSTRACT

The Caprellidean fauna of shallow waters of Indonesia is investigated. Samples of algae, seagrasses and hydroids were collected from the sandy-rocky beaches of Bali, Lombok and Java. Seven caprellid species were found: Pseudocaprellina pambanensis *Sundara Raj, 1927,* Caprella cf. penantis *Leach, 1814,* Hemiaegina minuta *Mayer, 1890,* Metaprotella sandalensis *Mayer, 1898,* Paracaprella *sp.,* Pseudaeginella sp., *and the new species* Pseudaeginella inae *n.sp., which is fully described and illustrated in the present paper. Lateral view figures of the seven species, together with a key to species level for all Indonesian caprellids reported so far are also provided.*
Key-words: *Amphipoda, Caprellidae, taxonomy, new species,* Pseudaeginella inae *n.sp., key, Indonesia.*

RIASSUNTO

Vengono studiati Caprellidi di bassa profondità dell'Indonesia. Sono stati raccolti campioni di alghe, praterie di *Zostera* o *Posidonia* oppure idroidi presenti in tratti di costa sabbiosa o rocciosa delle isole Bali, Lombok e Giava. Sono presenti sette specie di Caprellidi: *Pseudocaprellina pambanensis* Sundara Raj, 1927, *Caprella* cf. *penantis* Leach, 1814, *Hemiaegina minuta* Mayer, *1890, Metaprotella sandalensis* Mayer, 1898, *Paracaprella sp., Pseudaeginella sp.*, e una nuova specie *Pseudaeginella inae* n.sp., che viene descritta e raffigurata. Viene quindi indicato l'habitus di tutte le sette specie, con l'aggiunta di una chiave dicotomica relativa ai Caprellidi noti per l'Indonesia.
Parole chiave: Amphipoda, Caprellidae, taxonomy, new species, *Pseudaeginella inae* n.sp., key, Indonesia.

INTRODUCTION

The Caprellidean amphipods of Indonesian waters have been poorly studied. In general, there is a lack of studies dealing with the caprellid fauna of the Indo-Pacific region (McCain, Steinberg, 1970). As pointed out by Laubitz (1991), Mayer's (1903) Siboga Expedition monograph gives the best overview of the region, and contains descriptions of many species of this area. So far, to our knowledge, only 10 species had been reported for Indonesian waters, including the Banda Sea and Arafura Sea: *Metaprotella sandalensis* Mayer, 1898, *Monoliropus agilis* Mayer, 1903, *Orthoprotella australis* (Haswell, 1880), *Propodalirius insolitus* Mayer, 1903, *Pseudoprotella bogisa* (Mayer, 1903), *Paedaridium miserum* Mayer, 1903, *Protogeton inflatus* Mayer, 1903, *Protoplesius enigma* Mayer, 1903 and *Protoplesius falx* Mayer, 1903 (see Mayer, 1903; McCain, Steinberg, 1970; Laubitz, 1991).

Laubitz (1991) studied the caprellids from the Western Pacific based on specimens collected during French Oceanographic Expeditions to New Caledonia, Indonesia and Philippines. However, these samples came from deep stations (most of them more than 400 m deep) and no littoral species were investigated. After Laubitz (1991), recently attempts to improve the knowledge of the Indo-Pacific caprellids have been conducted and several collections of littoral caprellids from Philippines, Papua New Guinea and Australia have been studied (Guerra-García, 2002a, 2003a, 2004).

During September 1987 and July 1993, the first author (TK-S) collected Indonesian amphipods from algae, seagrasses and hydroids from the sandy-rocky beaches of Bali, Lombok and Java. The collections contained seven species: *Caprella cf. penantis* Leach, 1814, *Hemiaegina minuta* Mayer, 1890, *Metaprotella sandalensis*, *Paracaprella* sp., *Pseudocaprellina pambanensis* Sundara Raj, 1927, *Pseudaeginella* sp. and *Pseudaeginella inae* n.sp. Of these species, only *Metaprotella sandalensis* had been reported before for Indonesian waters. *Caprella* cf *penantis*, *Hemiaegina minuta*, *Paracaprella* sp., *Pseudaeginella* sp. and *Pseudocaprellina pambanensis*, although cited for the IndoPacific area in previous studies (McCain, Steinberg, 1970), are new records for Indonesia, and the species *Pseudaeginella inae* n.sp. is

described as a new species in the present study.

Material and methods

All the examined material for the present study is deposited at the Museo Civico di Storia Naturale di Verona.

The symbols used in plates are (in alphabetic order):

A1, 2 = Antenna 1, 2
Ab = Abdomen
Gn1, 2 = Gnathopod 1, 2
LL = Lower lip = labium
LMd = Left mandible
Mx1, 2 = Maxilla 1, 2
Mxp = Maxilliped
P3-7 = Pereopods 3-7
RMd = Right mandible
UL = Upper lip = labrum

The samples were fixed in ethanol 70%. Selected specimens were dissected under a Leica dissecting microscope. All dissected appendages were mounted in polyvinyl-lactophenol. The figures were drawn using a Leica compound microscope equipped with a *camera lucida* (drawing-tube).

Specimens prepared for SEM were sonicated in order to remove mucus and debris from their surface. They were dehydrated in an acetone series ranging from 70 to 100%, 10 minutes at each dehydration. Specimens were then dried in a critical point dryer, before being mounted on a stub and coated with gold.

Although the phylogeny and higher classification of the caprellids is still under debate (see Laubitz, 1993; Takeuchi, 1993), Myers and Lowry (2003) have recently proposed a new phylogeny and classification for the suborder Corophiidea Leach, 1814, which is divided into two infraorders, the Corophiida and the Caprellida, based on a hypothesis of the evolution of different feeding strategies. In their new classification, the superfamily Caprelloidea contains five families: Caprellidae, Caprogammaridae, Cyamidae, Dulichiidae and Podoceridae. The Caprellidae are subdivided into three subfamilies: Caprellinae, Paracercopinae and Phtisicinae. In the present paper we have adopted this classification and have focused our study on members of the family Caprellidae.

Station list:

5/1: fine green algae, 1.5m, Pulau Opak Besar, 12 Sept. 1987
7/1: Pulau Opak Besar (one of "thousand Islands" N of Jakarta-Java (5°29'S, 106°30'E), *Sargassum*, 2m depth, 12. Sept. 1987
17/1: Bali, Sanur beach, 2-2.5m depth, 22 Sept. 1987
18/1: Bali, Beach of Sanur, mixed fine algae, 1-2m depth, 22 Sept. 1987
19/1: Bali Desa Antiga, rocks with much water movement, breakers and spindrift, 0-0.5m depth, 22 Sept. 1987
21/1: Lombok island (E of Bali), Senggigi (spit on W-coast), 0.2m depth, 1987
27/1: Bali, vicinity of Sanur, *Posidonia* and epiphytes, among *Sargassum*, 0.2-1m depth, 26 Sept. 1987
62/1: Bali, mixed algae, 1-1.5m depth, 27 Sept. 1987
74/1: Bali, mixed algae, 1-1.5m depth, 27 Sept. 1987

6/2: Sanur-Bali, *Posidonia* and epiphytes, 1-1.5m depth, 17 July 1993
8/2: Sanur-Bali, *Caulerpa* among *Posidonia*, 1m depth, 18 July 1993
9/2: Sanur-Bali, *Halimeda* and sponges, 2m depth, 19 July 1993
12/2: Sanur-Bali, *Halimeda* and *Actina*, 0.5m depth at low tide, 19 July 1993
23/2: Sanur-Bali, *Cystoseira* and *Laurencia*, 21 July 1993
24/2: Sanur-Bali, *Cystoseira* among *Posidonia*, 1-2m depth, 23 July 1993
25/2: Sanur-Bali, *Cystoseira* and *Laurencia*, among *Posidonia*, 1m depth, 23 July 1993
26/2: Sanur-Bali, *Sargassum*, 2m depth, 25 July 1993
30/2: Sanur-Bali, mixed algae, 1m depth at low tide, 26 July 1993
31/2: Sanur-Bali, mixed algae, among *Posidonia*, 1m depth, 27 July 1993
32/2: Sanur-Bali, stones covered with alga *Utricularia*, also *Aglaophenia*, 0.5-1m depth, 27 July 1993

Systematic account

List of species collected during the present study:

Family Caprellidae Leach, 1814

Subfamily Phtisicinae Vassilenko, 1968

Pseudocaprellina pambanensis Sundara Raj, 1927 (Fig. 1)

Subfamily Caprellinae Leach, 1814

Caprella cf. penantis Leach, 1814 (Fig. 2)
Hemiaegina minuta Mayer, 1890 (Fig. 3)
Metaprotella sandalensis Mayer, 1898 (Fig. 4)
Paracaprella sp. (Fig. 5)
Pseudaeginella inae n.sp. (Figs. 6-12)
Pseudaeginella sp. (Fig. 13)

Complete synonymies of the species can be found in McCain, Steinberg (1970).

Subfamily Phtisicinae Vassilenko, 1968

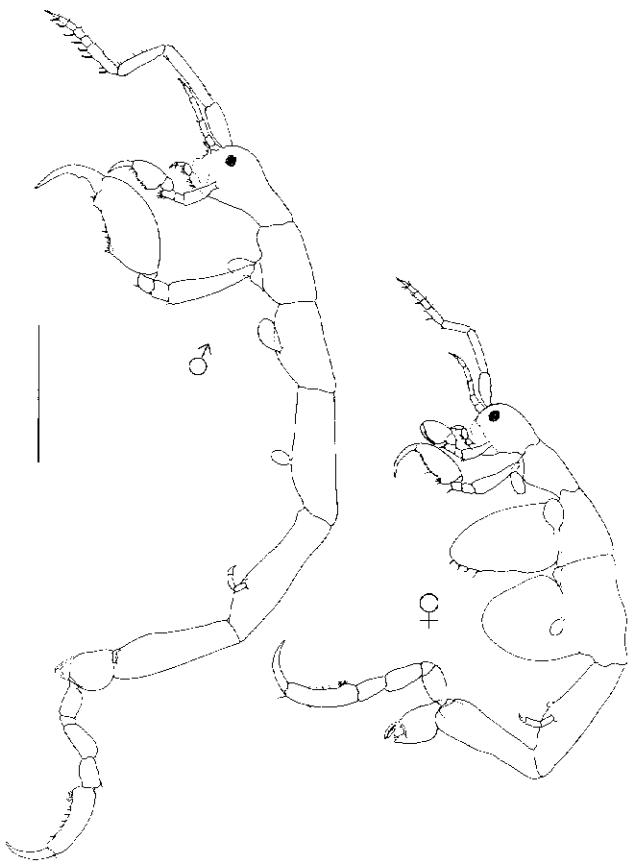

Fig. 1 – *Pseudocaprellina pambanensis* Sundara Raj, 1927. Lateral view, male; female. Scale = 1 mm.

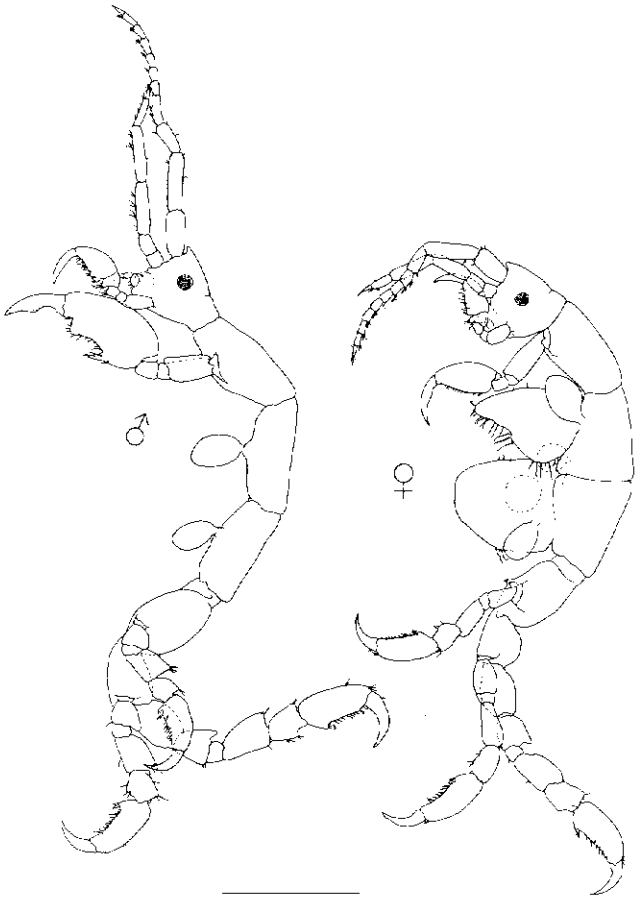

Fig. 2 – *Caprella cf penantis* Leach, 1814. Lateral view, male; female. Scale = 1 mm.

Pseudocaprellina pambanensis Sundara Raj, 1927
(Fig. 1)

Pseudocaprellina pambanensis Sundara Raj, 1927, p. 127, pl. 17; Sivaprakasam, 1977, p. 80-82, figs. 1,2; Guerra-García, 2002b, p. 221-223, figs. 1-4; Guerra-García, 2004, p. 13, 15, fig. 12.

Material examined

7 spec.

St. 17/1: 1 male (used for lateral view figure); **st. 18/1**: 1 female; **st. 31/2**: 1 female; **st. 62/1**: 1 male; **st. 74/1**: 1 female (used for lateral view figure), 1 male, 1 female. All stored in MVRCr in alcohol.

Remarks

The male of *Pseudocaprellina pambanensis* was described by Sundara Raj (1927) based on material from the Gulf of Mannar, India. The female was described later, by Sivaprakasam (1977), also based on specimens collected in the Gulf of Mannar. Guerra-García (2002b, 2004) figured specimens collected from Tanzania and Western Australia, respectively. The specimens collected from Indonesia are morphologically in agreement with those coming from India, Western Australia and Tanzania. The species is probably distributed throughout the whole Indian Ocean. On the other hand, as pointed out by Guerra-García (2004), the phylogenetic relations among the species of the close genera *Caprellina*, *Pseudocaprellina*, *Hircella* and *Liriarchus* are not clear yet and this group of genera should be further investigated in detail to explore constant morphological differences among species to clarify the delimitation and diagnosis of valid genera and species.

Habitat

The species was known previously from algae between corals (Guerra-García, 2002b) and bottoms with *Posidonia australis* (Hooker, 1858) (Guerra-García,

2004). The specimens of the present study have also been collected from mixed algae, among *Posidonia*.

Distribution

Type locality: Gulf of Mannar, India (McCain, Steinberg, 1970). Other records: Tanzanian coasts (Guerra-García, 2002b), Western Australia (Guerra-García, 2004). New record for Indonesia.

Subfamily Caprellinae Leach, 1814 (see Myers and Lowry, 2003)

Caprella cf. penantis Leach, 1814
(Fig. 2)

Caprella Penantis Leach, 1814, p. 404.
Caprella acutifrons Mayer, 1882, p. 48; Mayer, 1890 (included f. *neglecta*, *tabida*, *gibbosa*, *carolinensis*, *lusitanica*, *virginia*), p. 50, pl. 2, figs. 36-37, 39-41, pl. 4, figs. 52-53, 55, 57-61, 65-69; Mayer, 1903, p. 79, pl. 3, figs. 4-28; pl. 7, figs. 62-65.
Caprella penantis McCain, 1968, p. 33, figs. 15-16; McCain and Steinberg, 1970, p. 33; Cavedini, 1982, p. 508; Krapp-Schickel, 1993, p. 791-793; Guerra-García and Takeuchi, 2002, p. 692-693, fig. 12; Guerra-García, 2004, p. 30, 32, fig. 26; Guerra-García and Takeuchi, 2004, p. 1013-1015, fig. 35.

Material examined

9 spec.

St. 19/1: 1 male (used for lateral view figure), 1 female (used for lateral view figure), 4 males, 3 females. All stored in MVRCr in alcohol.

Remarks

The specimens of *Caprella* collected from Indonesian waters (9 specimens) are closest to *Caprella penantis*. At the moment, we have considered this species as *Caprella cf penantis* since we have not been able to find constant morphological differences between the Indonesian specimens and the Mediterranean and Atlantic *Caprella penantis* (cf Krapp-Schickel, 1993; Guerra-García, Takeuchi, 2002). *Caprella penantis* has been recorded under several species or subspecies names from the temperate regions of the world and there is need of further studies to determinate its nomenclatural status at each locality (McCain, 1968; Laubitz, 1972; Takeuchi, Hirano, 1995).

Habitat

The species has been found living on red and brown algae, *Posidonia*, hydroids, Alcyonaria, Zoantharia, Bryozoa, sponges, *Arbacia* (Echinodermata) and *Libinia* (Decapoda) (Krapp-Schickel, 1993). Guerra-García (2001) found the species in intertidal exposed areas and in infralittoral areas of high hydrodynamics, clinging onto different species of algae (*Asparagopsis armata* Harvey, 1855, *Cladostephus spongiosus* Lyngbye, 1819, *Cystoseira tamariscifolia* (Hudson) Papenfuss, 1950, *Gelidium sesquipedale* (Clemente) Bornet and Thuret, 1876, *Halopteris scoparia* (L.) Sauvageau, 1907, *Laurencia pinnatifida* (Gmelin) Lamouroux, 1813, *Zonaria flava* (Clemente) Agardh and hydroids (*Gymnangium montagui* (Billard, 1912) and *Sertularella gayi gayi* (Lamouroux, 1821)). The species has been also found in sponges, ascidians, spirorbids, gorgonaceans and *Caulerpa* beds (Guerra-García, 2004). In the present study, it was found in rocks with much water movement, breakers and spindrift.

Distribution

Type locality: Devonshire Coast, England (McCain, Steinberg, 1970). Other records: Atlantic Ocean, Indian Ocean, Pacific Ocean and Mediterranean Sea. So-called cosmopolitan species (doubtful). New record for Indonesia.

Hemiaegina minuta Mayer, 1890
(Fig. 3)

Hemiaegina minuta Mayer, 1890, p. 40, pl. 1, figs. 25-27, pl. 3, figs. 32-35, pl. 5, figs. 52-53, pl. 6, figs. 13, 33-34, pl. 7, fig. 4; McCain, 1968, p. 61-64, figs. 29-30; McCain and Steinberg, 1970, p. 51; Gable and Lazo-Wasem, 1987, p. 637; Müller, 1990, p. 836; Serejo, 1997, p. 630-632, fig. 1; Guerra-García, 2003a, p. 105-106, fig. 10; Guerra-García 2003b, p. 6-7, fig. 3; Guerra-García, 2004, p. 39-40, fig. 32.
Hemiaegina quadripunctata Sundara Raj, 1927, p. 126-127, pl. 18.
Hemiaegina costai Quitete, 1972, p. 165-168, pls. 1-2.

Material examined

1 spec.

St. 74/1: 1 premature female (used for lateral view figure) (MVRCr in alcohol).

Remarks

Although only a premature female has been collected during the present studies, this specimen could be identified as *Hemiaegina minuta* since this species shows very distinctive and clear diagnostic characteristics which facilitate the identification: third article of antenna 1 short; antenna 2 without swimming setae; gnathopod 1 propodus with a round projection proximally; gnathopod 2 basis elongate and longer than pereonite 2, and propodus very large, with a proximal grasping

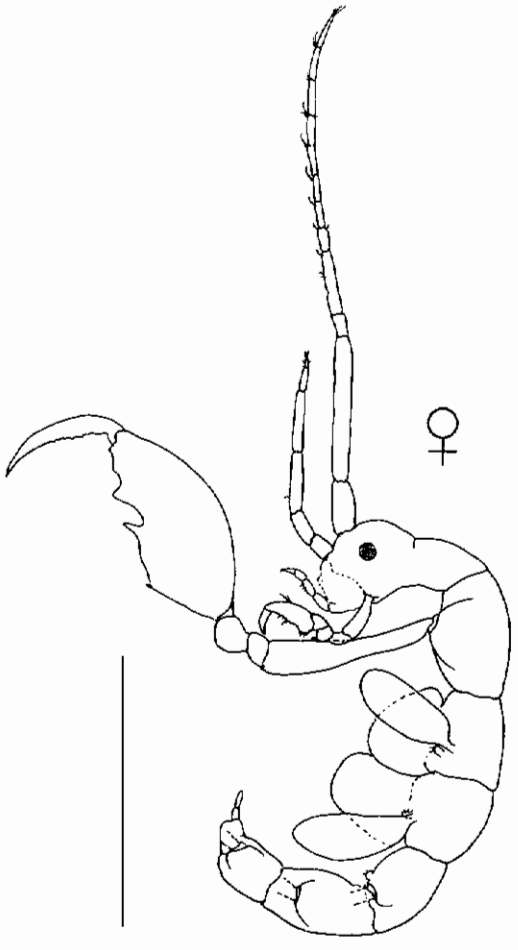

Fig. 3 – *Hemiaegina minuta* Mayer, 1890. Premature female lateral view. Scale = 1 mm.

spine and distal U-notch and projection; pereonites 3 and 4 rounded, and very small; gills elongate; abdomen provided with a very distinctive pair of two-articulate appendages.

Habitat

Müller (1990) found *H. minuta* in relatively exposed reef locations. This species has been reported from *Sargassum* sp and plankton towls (McCain, 1968) and dead corals (Müller, 1990). Guerra-García (2004) reported the species from green algae as *Halimeda* spp, brown algae, red algae, sponges, tunicates, *Posidonia*, dead corals encrusted with algal turf and under small boulders. The single specimen collected during the present study was found in algae from shallow waters.

Distribution

Type locality: Off Amoy, China, 15-46 m. deep (McCain, 1968). Other records: West coast of United States, South Africa, Hawaii, Bora Bora, Japan, Papua New Guinea, Australia, India, South Arabian coast (McCain and Steinberg, 1970; Guerra-García, 2003a, 2004). *Hemiaegina minuta* is widely distributed in tropical and temperate waters of the world oceans (McCain, 1968).

Metaprotella sandalensis Mayer, 1898 (Fig. 4)

Metaprotella sandalensis Mayer, 1898, p. 53-56, figs. 1-6; Mayer, 1903 (included f. *ralumiana*, *singaporensis*, *dolichocephala*, *gisserana*, *amboinensis*, *typica*), p. 40-42, pl. 1, figs.30-31, 34-36, pl. 6, figs. 56-63, pl. 9, figs. 16-17, 44, 60; Müller, 1990, p. 836-842, figs. 41-64; Guerra-García, 2003a, p. 106, fig. 11; Guerra-García, 2003b, p. 14-15, fig. 8; Guerra-García, 2004, p. 39-41, fig. 33; Guerra-García and Takeuchi, 2004, p. 1017-1018, fig. 37.

Material examined

123 spec.

St. 7/1: 1 male (used for lateral view figure), 3 males, 8 females, 1 premature female, 1 juvenile; **st. 18/1**: 1 female; **st. 27/1**: 2 males, 5 females, 2 premature females; **st. 62/1**: 1 female (used for lateral view figure), 1 female; **st. 8/2**: 1 female, 1 premature female; **st. 9/2**: 6 males, 7 females, 1 premature female, 11 juveniles; **st. 12/2**: 4 males, 6 females,

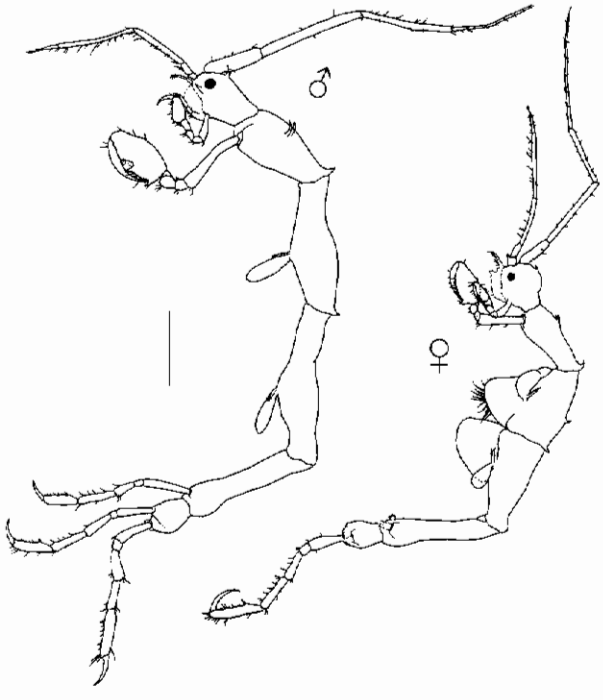

Fig. 4 – *Metaprotella sandalensis* Mayer, 1898. Lateral view, male; female. Scale = 1 mm.

4 premature females; **st. 23/2**: 1 female; **st. 24/2**:1 male; **st. 25/2**: 1 male, 5 female, 4 juveniles; **st. 26/2**: 3 males, 5 females, 3 premature females, 6 juveniles; **st. 30/2**: 5 males, 5 females, 1 premature female, 1 juvenile; **st. 31/2**: 2 females; **st. 32/2**: 8 males, 4 females, 1 premature female. All stored in MVRCr in alcohol.

Remarks

This species has been recently redescribed in detail by Müller (1990) based on material collected from Bora Bora and Moorea, Society Islands. *Metaprotella sandalensis* is very common in shallow waters of the tropical Indo-Pacific Ocean (Müller, 1990) and it is, together with *Pseudaeginella inae* n. sp., the most common and abundant species in the stations of the present study. Although Müller (1990) pointed out the existence of considerable intraspecific variation for *M. sandalensis*, we can not discard the existence of a complex of different species (Guerra-García, 2004). The Indonesian species are in agreement with the diagnosis of *Metaprotella sandalensis*, mainly on the basis of the non-marked suture between head and pereonite 1. Nevertheless, specimens of *Metaprotella sandalensis*, collected recently from Mauritius (see Guerra-García, 2003b) have a more marked suture, being closer to *Metaprotella africana* Mayer, 1903. Consequently, further detailed morphological and genetic studies are necessary to decide if the variation among specimens is intra- or interspecific and to clarify definitely the status of the genus *Metaprotella* throughout the world.

Habitat

Müller (1990) reported that the species probably prefers not very exposed locations. Recently, *Metaprotella cf sandalensis* from Mauritius has been proposed as a tool to be used as bioindicator of nutrient enrichment on coral reef ecosystems (Guerra-García, Koonjul, 2005). *Metaprotella sandalensis* is the most common inhabitant of the Great Barrier Reef, Australia, living on many different habitats and substrates (algae, seagrass, sponges, hydroids, gorgonians, soft corals, encrusted dead corals, bryozoans, ascidians, coral rubble, coarse and fine sediments and mangroves) (Guerra-García in litt.), and is also very common in Northern Territory and Western Australia (Guerra-García, 2004).

Distribution

Type locality: Sandal Bay, Lifu, Loyalty Islands (McCain and Steinberg, 1970). Other records: Borneo, Celebes, Sulu Sea, Amboina, Ceram Sea, Malaysia Thailand, Ceylon, Papua New Guinea, Australia, Fiji Islands, Gilbert Islands, Hawaiian Islands, Society Islands, Mauritius (McCain, Steinberg, 1970; Müller, 1990; Guerra-García, 2003a,b; Guerra-García, Takeuchi, 2004).

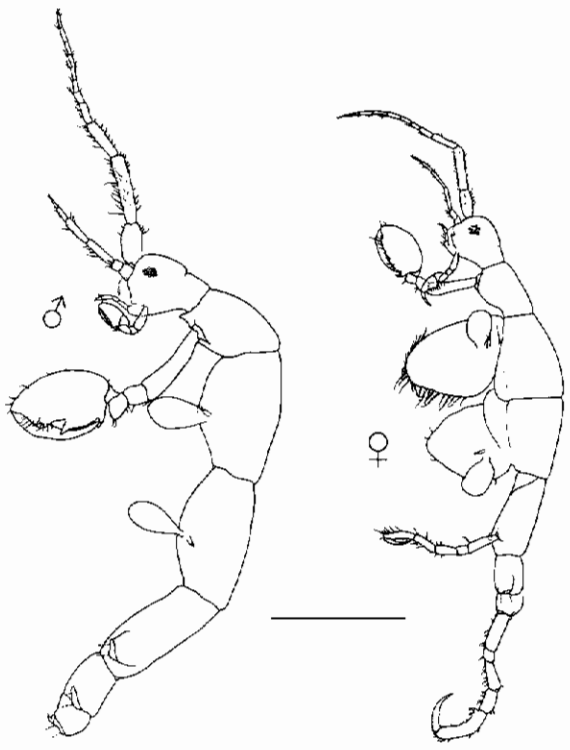

Fig. 5 – *Paracaprella* sp. Lateral view, male; female. Scale = 1 mm.

Paracaprella sp.
(Fig. 5)

Material examined

5 spec.

St. 6/2: 2 females; **st. 24/2**: 1 female (used for lateral view figure); **st. 31/2**: 1 female; **st. 32/2**: 1 male (used for lateral view figure). All stored in MVRCr in alcohol.

Remarks

Our specimens have been identified as *Paracaprella* mainly on the basis of the presence of pereopods 3 and 4 reduced to 2-articles, antenna 2 without swimming setae, abdomen of male with a pair of appendages and madibular palp absent. The species recorded in previous studies for the Indian Ocean is *Paracaprella pusilla*; nevertheless, the present specimens are closer to *Paracaprella tenuis* than to *Paracaprella pusilla*, based mainly on the small triangular projection on the anterolateral margin of pereonite 2 and on the non-expanded basis and lack of a proximal knob on gnathopod 2. Recently, Guerra-García (2003b) also found a *Paracaprella* species from Mauritius difficult to assign to one of the described species of *Paracaprella*. In addition, specimens identified as *Paracaprella tenuis*, collected from Tanzania (see Guerra-García, 2003a) could also belong to an undescribed species.

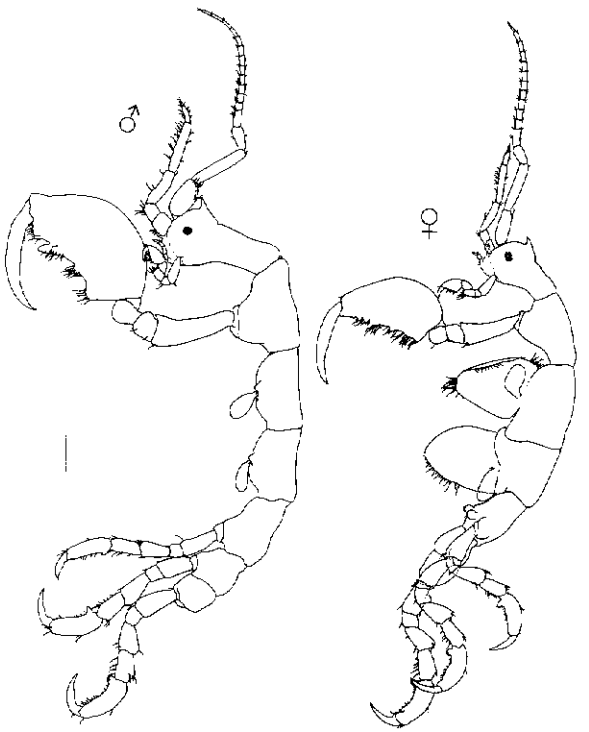

Fig. 6 – *Pseudaeginella inae* n.sp. Lateral view, holotype male; allotype female. Scale = 1 mm.

Consequently, taking into account that the material from Indonesia is scarce and that the genus *Paracaprella* is still in need of a further taxonomic revision, we prefer to identify these specimens as *Paracaprella* sp. at the moment instead of assigning them to *Paracaprella tenuis*.

Pseudaeginella inae n. sp.
(Fig. 6-12)

Locus typicus: Indonesia, Bali (Desa Antiga), rocks with much water movement, breakers and spindrift, 0-0.5m depth, 22 September 1987

Material examined:

553 spec.

Type material: **st. 19/1**: Holotype male (dissected, 3 slides, MVRCr 4548-50); allotype female (non-dissected, MVRCr 435); paratypes: 3 males and 3 females (dissected, 6 slides: MVRCr 4551-56), 10 males and 10 females (non-dissected), 5 males and 5 females (put apart for SEM figures, provided in Figs. 10-12).

Additional material: **st. 18/1**: 4 females, 2 juveniles; **st. 19/1**: 495 specimens; **st 74/1**: 1 male, 5 females, 1 juvenile; **st 21/1**: 1 female, 6 juveniles. All stored at MVCR in alcohol.

Description

Holotype male

Body length 4.7 mm

Lateral view (Fig. 6). Head with a dorsal acute projection; suture between head and pereonite 1 present but non-marked; pereonite 2 with a ventral hump at the insertion of gnathopod 2; pereonites 3 and 4 with a lateral projection near the insertion of the gills.

Gills (Fig. 6). Present on pereonites 3 and 4, oval, length 2 times width.

Mouthparts (Fig. 7). Upper lip symmetrically bilobed, with small setulae distally. Mandibles with mandibular molar reduced to a small protuberance; left mandible with incisor five-toothed, lacinia mobilis five-toothed followed by four plates minutely serrate; right mandible with incisor five-toothed, lacinia mobilis transformed into a plate, followed by another plate; molar flake absent; palp three-articulate, second article with a single seta, distal article with a distal knob and a setal formula 1-x-1 being x=6. Lower lip without setulae; inner lobes bilobed. Maxilla 1 outer lobe carrying six robust setae; distal article of the palp with four setae. Maxilla 2 inner lobe triangular; outer lobe rectangular, about 1.5 times as long as inner lobe; inner and outer lobe with five setae apically. Maxilliped inner plate small and rounded with two setae; outer plate elongate, three times as long as the inner plate, with six setae; palp four-articulate, dactylus with rows of setulae.

Antennae (Fig. 8). Antenna 1 about the half of body length; flagellum 13-articulate. Antenna 2 without swimming setae but provided with abundant short setae; flagellum two-articulate.

Gnathopods (Fig. 8). Gnathopod 1 basis as long as the combination of ischium, merus and carpus (Fig. 6); palm of propodus non-serrate, provided with two grasping spines; dactylus margin smooth. Gnathopod 2 inserted on the middle of pereonite 2 (Fig. 6); basis as long as pereonite 2 with a projection distally; ischium rectangular; merus rounded; carpus triangular; propodus rounded, twice as long as wide, provided with a grasping spine proximally and three triangular projections medially and distally respectively; dactylus with minute setae on the margin.

Pereopods (Fig. 9). Pereopods 3 and 4 minuscule (less than 0.05 mm) one-articulate, triangular, provided with a distal seta. Pereopods 5, 6 and 7 similar in feature but increasing in size respectively; palm of propodus with a group of grasping spines proximally.

Penes (Fig. 9) large, length about 4 times width.

Abdomen (Fig. 9) without appendages, with a pair of lateral lobes and a single dorsal lobe; lateral lobes provided with two humps with setae at the top, two bunches of setae medially and two single setae below; dorsal lobe provided with a pair of plumose setae.

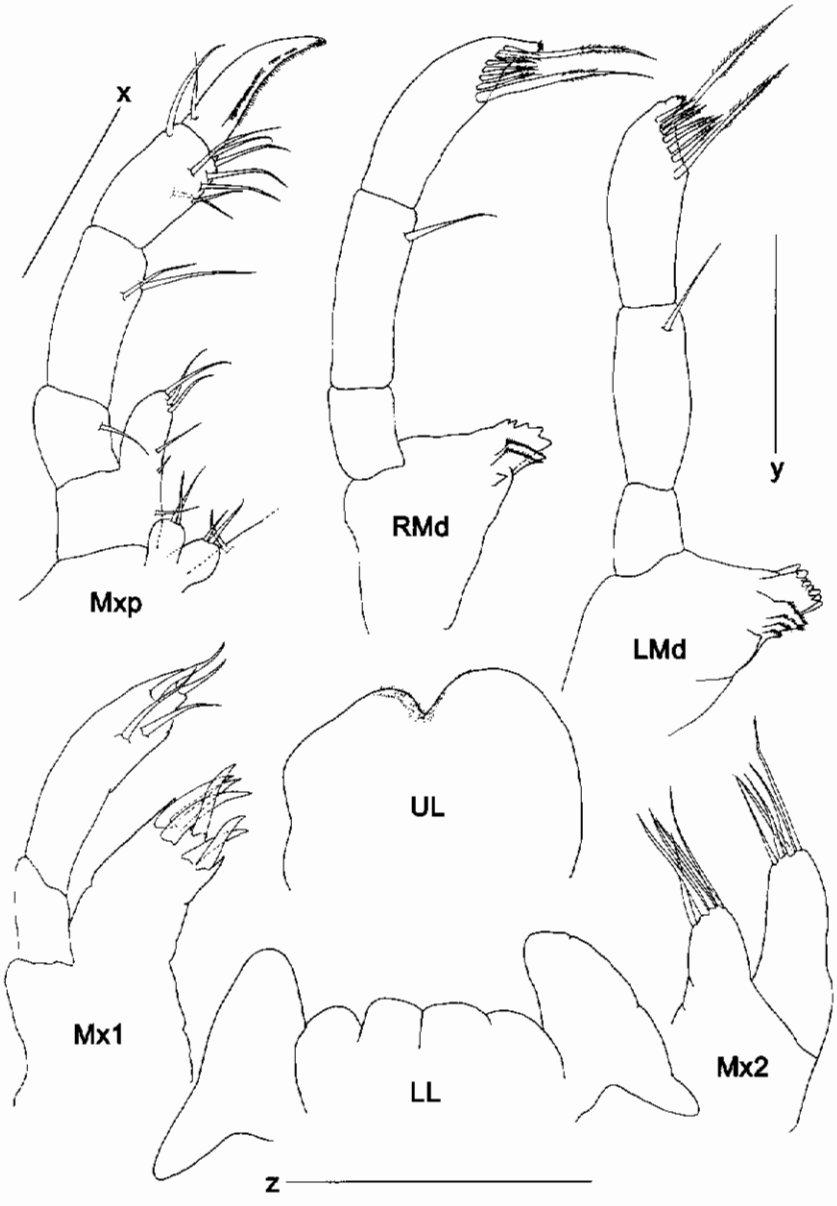

Fig. 7 – *Pseudaeginella inae* n.sp. Mouthparts of holotype male. Scales = 0.1 mm (Mxp in scale x; RMd, LMd in scale y; Mx 1, Mx2, UL, LL in scale z).

Allotype female

Body length 4 mm. Pereonite 1 shorter than in male (Fig. 6). Lateral projections in pereonites 3 and 4 absent. Antenna 1 flagellum 12-articulate (Fig. 6). Gnathopod 2 inserted on the anterior part of the pereonite 2. Genital openings very distinctive, and provided with setulae. Abdomen lateral lobes provided only with a pair of single setae.

Intraspecific variation

The number of articles in the flagellum of antenna 1 varies between 11-14 in adult males and 9-11 in adult females. Besides the holotype, 3 males and 3 females have been dissected for comparison of the mouthparts, and the setal formula of the mandibular palp is always 1-x-1, but x varies between 4 and 6. The maxilliped is rather constant, the inner plate carrying 2 setae and the outer plate with 6 setae in all the specimens examined. The inner lobes of the lower lip are bilobed in all the material dissected and the number of robust on maxilla 1 is always six.

In some adult males the joint between pereonites 2, 3, 4 and 5 is characterised by the presence of a triangular projection (see SEM picture Fig. 12)

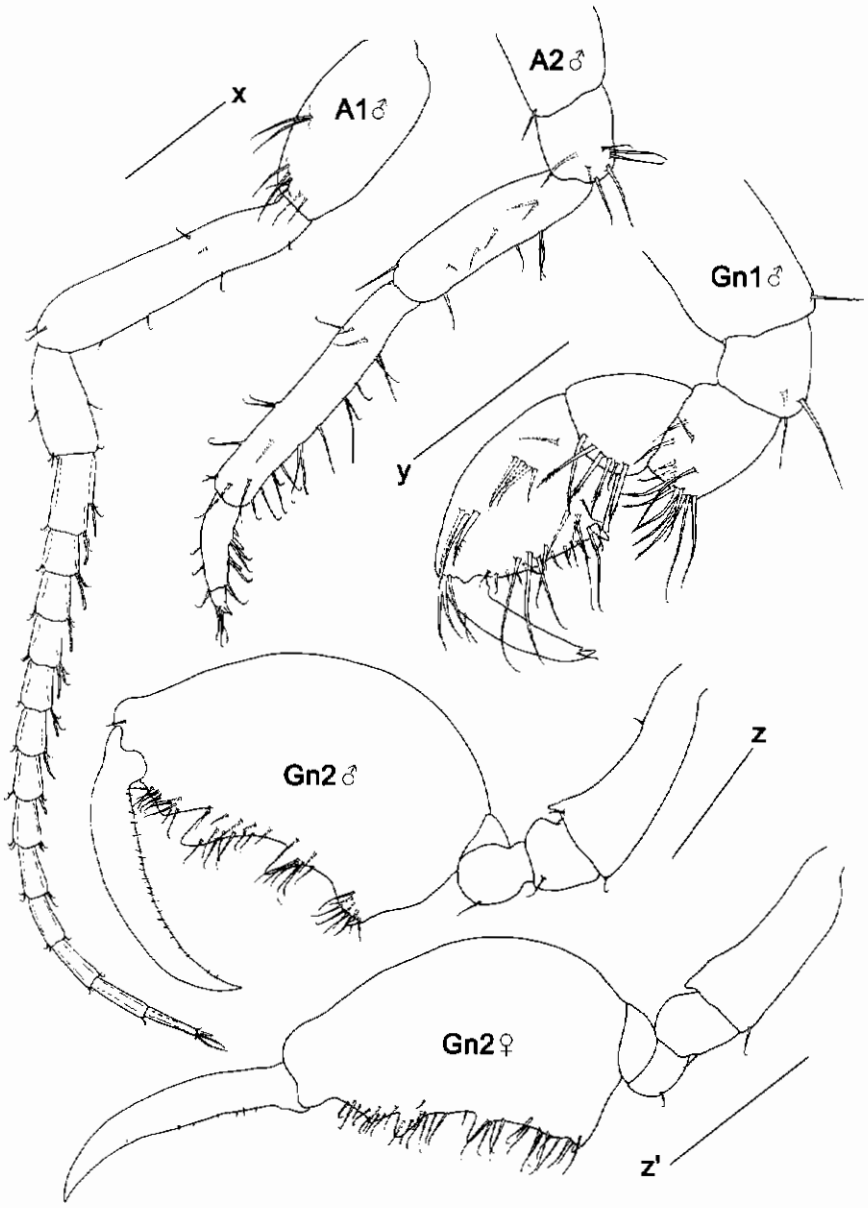

Fig. 8 – *Pseudaeginella inae* n.sp. Holotype male (A1, A2, Gn1, Gn2); allotype female (Gn2). A1, A2 in scale x = 0.2 mm; Gn1 in scale y = 0.2 mm; Gn2 male in scale z = 0.5 mm; Gn2 female in scale z' = 0.5 mm.

Etymology

This species is dedicated to Ina Klemke for her help in careful sorting of the material.

Remarks

The genus *Pseudaeginella* is presently composed of nine species: *P. antiguae* Barnard, 1932 from Antigua, *P. biscaynensis* (McCain, 1968) from Florida, *P. cambellensis* Guerra-García, 2003 from Subantarctica, *P. inae* n.sp from Indonesia, *P. montoucheti* (Quitete, 1971) from Brazil, *P. polynesica* (Müller, 1990) from Bora Bora and Moorea, Society Islands, *P. sanctipauli* Laubitz, 1995 from St Paul and Amsterdam Islands, *P. tristanensis* (Stebbing, 1888) from Tristan da Cunha and *P. vaderi* Guerra-García, 2004 from the Indian Ocean. Laubitz (1995), after examination of specimens of *Pseudaeginella tristanensis* from the Southern Indian Ocean, considered the genus *Fallotritella* synonymous with *Pseudaeginella* based mainly on the presence of minute pereopods 3 and 4 also in *Pseudaeginella*. Consequently, the species *P. biscaynensis*, *P. montoucheti* and *P. polynesica*, previously belonging to the genus *Fallotritella*, were transferred to the genus *Pseudaeginella*. As pointed out by Laubitz (1995), the idea that *Fallotritella* is synonymous with

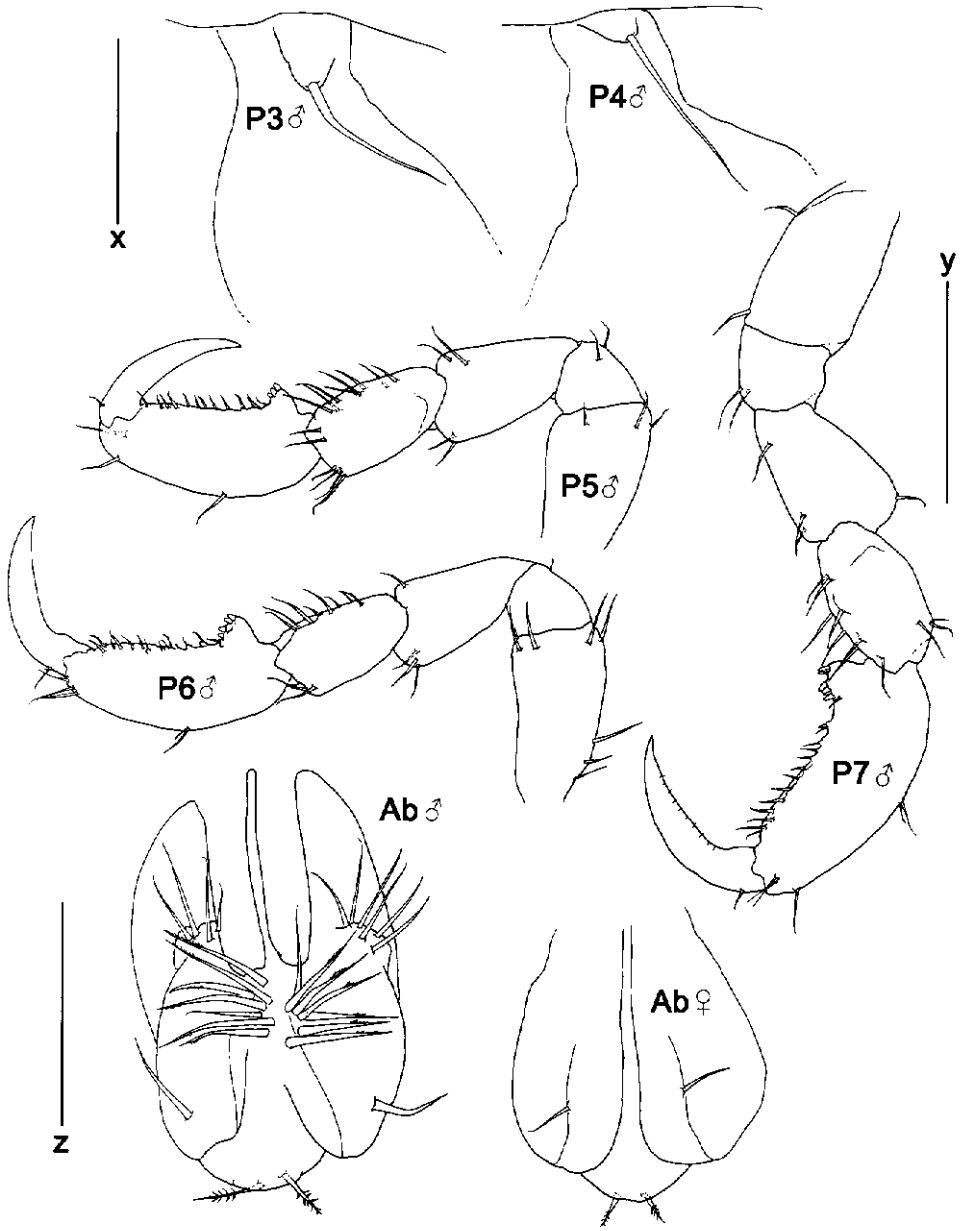

Fig. 9 – *Pseudaeginella inae* n.sp. Holotype male (P3-7, Ab); allotype female (Ab). P3, P4 in scale x = 0.05 mm; P5, P6, P7 in scale y = 0.5 mm; Ab male and female in scale z = 0.1 mm.

Pseudaeginella had been previously suggested by several authors (McCain, 1968; Laubitz, 1993). Because of the lack of available *Pseudaeginella* specimens and the lack of the type material for *P. tristanensis*, the genus *Fallotritella* had been maintained as a valid genus. Laubitz (1995), however, redescribed *Pseudaeginella* based on material newly collected from the Indian Ocean, and established *Fallotritella* as a junior synonym of *Pseudaeginella*. Species of *Pseudaeginella* are compared in Laubitz (1995).

The closest species to *Pseudaeginella inae* n.sp. is *Pseudaeginella vaderi*, recently described by Guerra-García (2004) and distributed in the Indian Ocean. Both species can be distinguished by the following distinct and constant differences: 1) the suture between head and pereonite 1 is marked in *P. vaderi* and not marked in *P. inae*; 2) the body is more robust in *P. inae* and pereonites 3 and 4 are provided with a pair of lateral projections, which are absent in *P. vaderi*; 3) the proximal article of antenna 2 has a projection in *P.*

Fig. 10 – *Pseudaeginella inae* n.sp. SEM pictures of male and female paratypes. Above: lateral view of male. - Center, left to right: detail of Mxp dactylus; head; Mxp. - Below: lateral view of female.

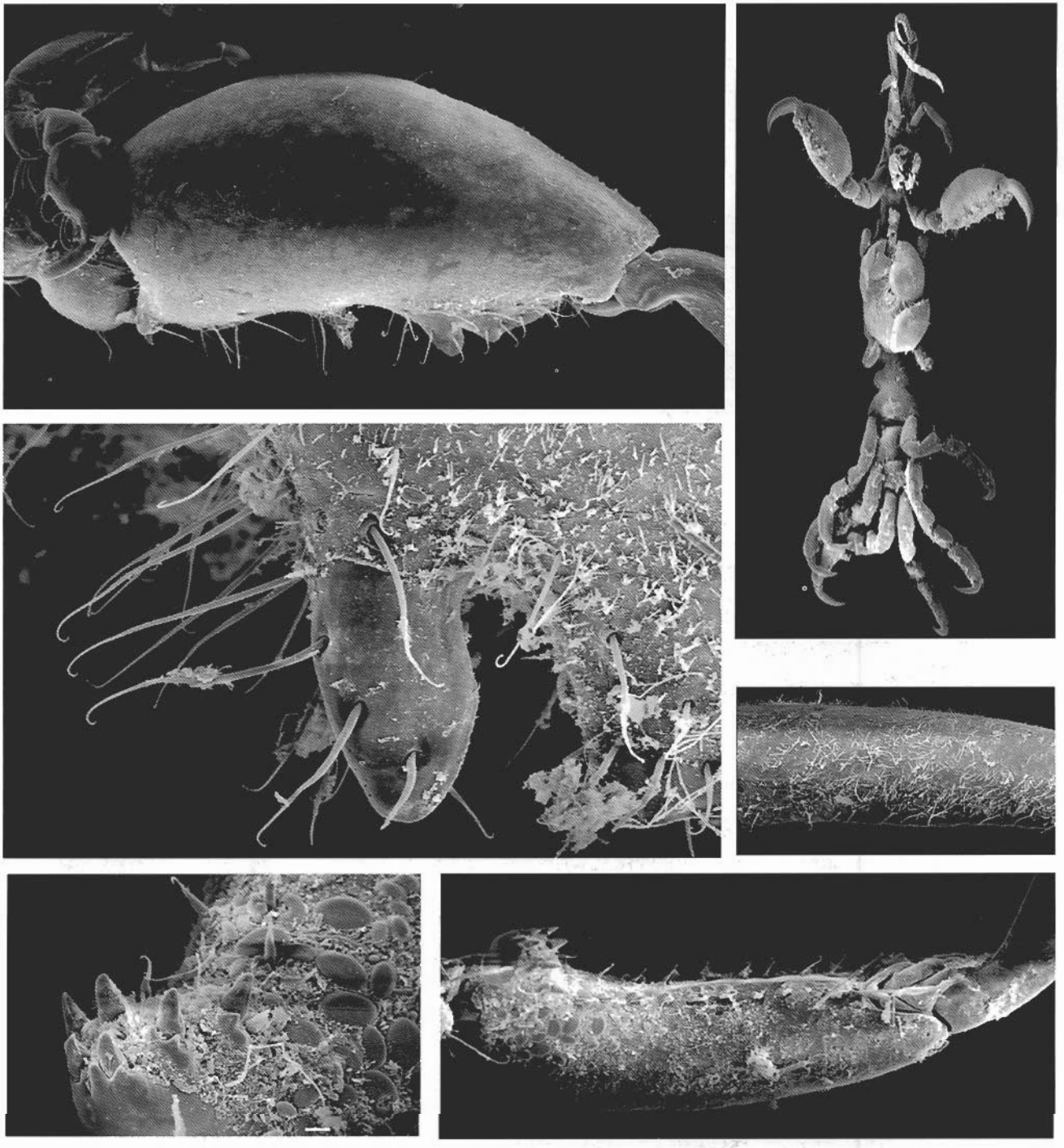

Fig. 11 – *Pseudaeginella inae* n.sp. SEM pictures of male and female paratypes. Left, up to down: Gn2 of female; detail of projection of Gn2; detail of grasping spines in propodus palm of P7 of female. – Right, up to down: ventral view of female; detail of dactylus of Gn2 of female; propodus of P7 of female.

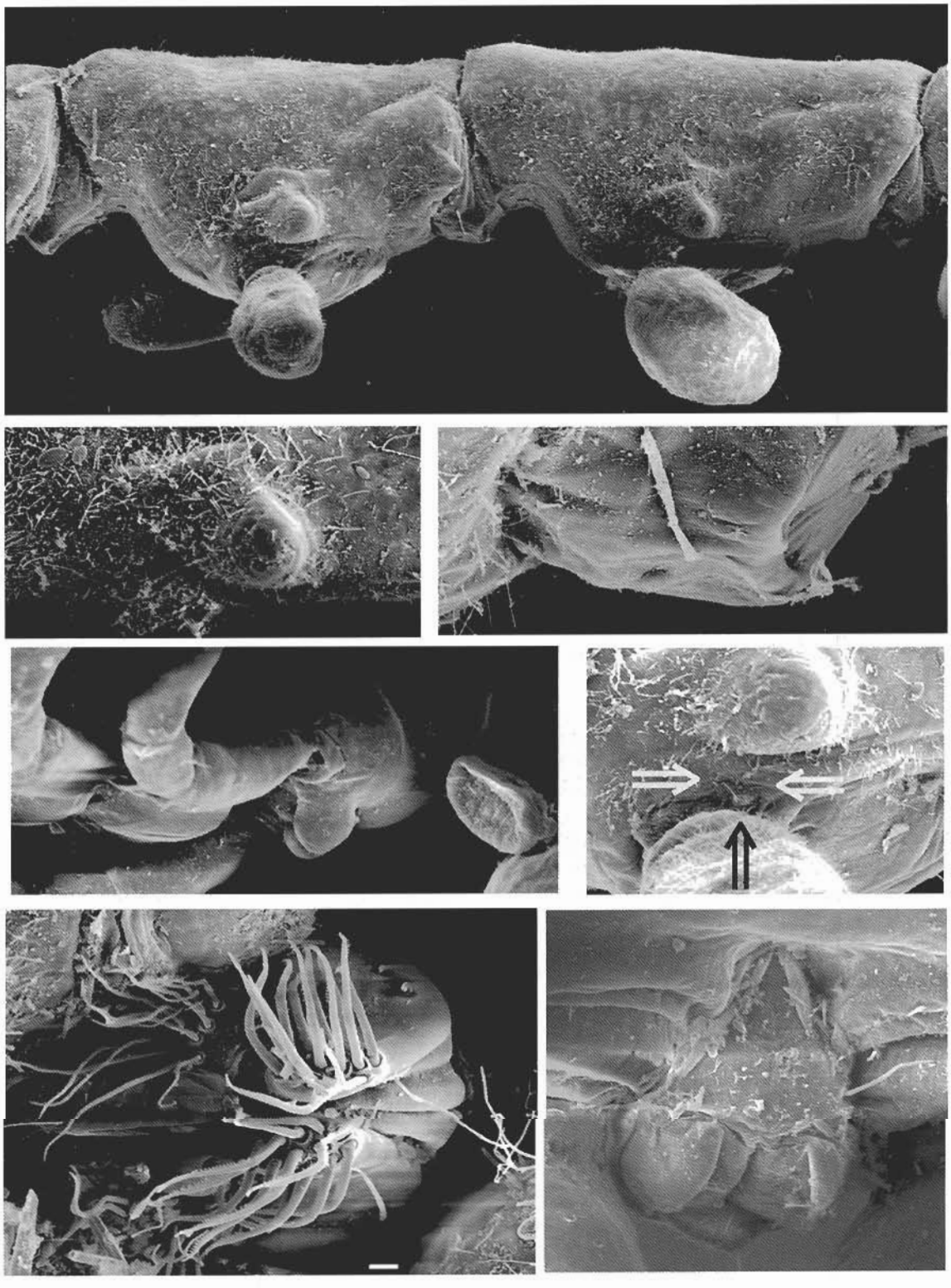

Fig. 12 – *Pseudaeginella inae* n.sp. SEM pictures of male and female paratypes.
Upper half: above: pereonites 3 and 4 of male showing the lateral projections. Left below: lateral projection of pereonite 3 of male showing the tiny P3. Right below: detail of the joint between pereonite 3 and 4 of male.
Lower half: left above: genital openings of female. Right above: detail of pereonite 4 of male showing the tiny P_4. Left below: Ab of male. Right below: Ab of female.

vaderi and lacks this projection in *P. inae*; 4) the basis of male gnathopod 2 is longer than pereonite 2 in *P. vaderi* whereas it is of the same length in *P. inae*; 5) the shape and features of gnathopod 2 propodus differ significantly between the two species; 6) pereopods 3 and 4 have two setae in *P. vaderi* and only one seta in *P. inae*; 7) the propodus of pereopods 5-7 has a single grasping spine in *P.vaderi*, and a group of grasping spines in *P. inae*.

Pseudaeginella sp.
(Fig. 13)

Material examined

1 spec.

St.5/1: 1 female (used for lateral view figure) (stored in MVRCr)

Remarks

Only one female of this species has been collected during the present study. It has been assigned to the genus *Pseudaeginella* mainly on the basis of the following characters: absence of a well developed mandibular molar, presence of minute pereopods 3 and 4, mandibular palp 3-articulate and antenna 2 without swimming setae. The specimen is characterised by the presence of acute projections on head and pereonites 1 and 2, and small tubercles (or humps) on pereonites 3 and 4, differing from *Pseudaeginella inae*. The female examined is very close to *Pseudaeginella biscaynensis*, but taking into account that there are no males available and that the taxonomical status of *P. biscaynensis* throughout the world needs revision, we prefer to identify the specimen as *Pseudaeginella* sp. at the moment instead of assigning it to *P. biscaynensis* or to a new species of *Pseudaeginella*. (See also remarks about the genus *Pseudaeginella* under the remarks section of the previous species, *P. inae* n.sp.).

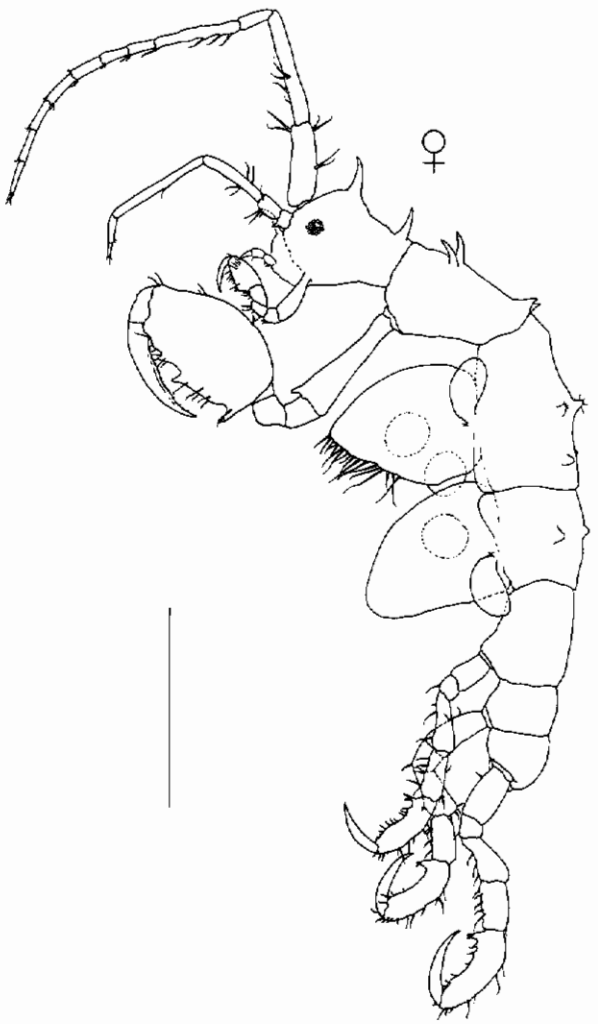

Fig. 13 – *Pseudaeginella* sp. Female lateral view. Scale: 1 mm.

UPDATED LIST OF SPECIES RECORDED IN INDONESIAN WATERS

(Banda Sea and Arafura Sea are included):

Subfamily Phtisicinae Vassilenko, 1968

Paedaridium miserum Mayer, 1903 (see Mayer, 1903, McCain, Steinberg, 1970; Laubitz, 1991)

Protogeton inflatus Mayer, 1903 (see McCain, Steinberg, 1970)

Protoplesius enigma Mayer, 1903 (see McCain, Steinberg, 1970; Laubitz, 1991)

Protoplesius falx Mayer, 1903 (see McCain, Steinberg, 1970)

Pseudocaprellina pambanensis Sundara Raj, 1927 (new record, present study)

Subfamily Caprellinae Leach, 1814

Caprella cf. *penantis* Leach, 1814 (new record, present study)

Hemiaegina minuta Mayer, 1890 (new record, present study)

Metaprotella sandalensis Mayer, 1898 (see Laubitz, 1991, present study)

Monoliropus agilis Mayer, 1903 (see McCain, Steinberg, 1970; Laubitz, 1991)

Orthoprotella australis (Haswell, 1880) (see McCain, Steinberg, 1970)

Paracaprella sp. (new record, present study)

Propodalirius insolitus Mayer, 1903 (see McCain, Steinberg, 1970; Laubitz, 1991)

Protella similis Mayer, 1903 (see McCain, Steinberg,

1970; Laubitz, 1991)

Pseudaeginella inae n.sp. (new species, present study)

Pseudaeginella sp. (new record, present study)

Pseudoprotella bogisa (Mayer, 1903) (distributed in Arafura Sea; see McCain, Steinberg, 1970 and Guerra-García, 2002c)

Key for Indonesian caprellids

(To facilitate identification, the key has been constructed using characters for which dissection is unnecessary.)

1. Gills on pereonites 2, 3 and 4 2
- Gills on pereonites 3 and 4 4

2. Pereopod 4 six-articulate... *Protoplesius* (see Mayer, 1903 for comparison between *P. enigma* and *P. falx*)
- Pereopod 4 absent 3

3. Pereopod 3 present, reduced to one article..... *Paedaridium miserum*
- Pereopod 3 absent ..... *Pseudocaprellina pambanensis* (Fig. 1)

4. Pereopods 3 and 4 six-articulate .. *Protogeton inflatus*
- Pereopods 3 and 4 absent or reduced to one or two articles 5

5. Pereonites 6 and 7 fused ..... *Metaprotella sandalensis* (Fig. 4)
- Pereonites 6 and 7 not fused 6

6. Pereopod 3 absent. Head with rostrum..... *Caprella penantis* (Fig. 2)
- Pereopod 3 present. Head without rostrum 7

7. Head and pereonites dorsally smooth 8
- Head and/or pereonites with dorsal projections..... 12

8. Pereopod 4 absent ..... *Propodalirius insolitus*
- Pereopod 4 present, one or two-articulate 9

9. Pereopods 3 and 4 two-articulate..... *Paracaprella* sp. (Fig.5)
- Pereopods 3 and 4 one-articulate..... 10

10. Antenna 1 shorter than half of the body length ..... *Monoliropus agilis*

- Antenna 1 longer than half of the body..... 11

11. Antenna 1 shorter than the body length ..... *Hemiaegina minuta* (Fig. 3)
- Antenna 1 as long or longer than the body length..... *Protella similis*

12. Pereonite 2 with dorsal projections 13
- Pereonite 2 dorsally smooth 14

13. Pereonites 3 and 4 with humps dorsally. ..... *Pseudaeginella* sp. (Fig. 13)
- Pereonites 3 and 4 dorsally smooth ..... *Pseudoprotella bogisa*

14. Head with a pair of dorsal projections ..... *Orthoprotella australis*
- Head with a single dorsal projection..... *Pseudaeginella inae* n.sp.

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The authors want to dedicate this paper to Sandro Ruffo in occasion of his 90th birthday.

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