

**PARAPROTELLA SALTATRIX, A NEW SPECIES OF THE CAPRELLIDEA (CRUSTACEA: AMPHIPODA) FROM PHUKET ISLAND, THAILAND**

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**ABSTRACT**

*Paraprotella saltatrix* sp. nov. is described from specimens from Phuket Island, the Andaman Sea coast of Thailand. *Paraprotella saltatrix* differs from *P. prima* Mayer, 1903 by the lack of lateral projections on head and pereonite II and by the uropod being reduced to a single seta. No single male specimen of *P. saltatrix* could be found among the more than 70 specimens of *P. saltatrix* collected, indicating the possibility that *P. saltatrix* is parthenogenetic.

**INTRODUCTION**

Although the tropical areas of the Indo-Pacific are well recognised as having a high species diversity of marine invertebrates, caprellidean amphipods have rarely been recorded from these areas with the exception of Mayer (1903) and Laubitz (1991). Recently, Takeuchi and Sawamoto (1998) recorded five species of the Caprellidea from the South China Sea and Gulf of Thailand. However, most of these specimens had been damaged and accurate descriptions to establish new taxa or to redescribe specimens could not be achieved. In Thailand, thirteen species of caprellidean are known from the coast of the Gulf of Thailand (Mayer, 1903; McCain and Steinberg, 1970) but, until now, none have been recorded from the Andaman Sea coast.

During March 1999, the senior author, had an opportunity to conduct a preliminary field survey on the southern coast of Phuket Island while visiting the Phuket Marine Biological Center, and collected several species of caprellidean. Among the collected material were 71 specimens of an undescribed species for which males are apparently lacking. This species is here described.

**MATERIALS AND METHODS**

Material from the BIOSHELF program was sent to the senior author for inclusion in this volume. Unfortunately this material was in a condition that precluded accurate description for taxonomic purposes. However, the senior author had made collections from this region, and that material is here described.

Samples of various types of substrata on which caprellideans were expected to inhabit were carefully detached from rocks and ropes. Samples were collected from several localities around southwest area of Phuket Island and placed immediately in individual plastic bags. Samples were brought to the laboratory and opened in a shallow tray filled with seawater. The caprellideans were then picked out using forceps and preserved in 5 % neutralised seawater–formalin.

Of the specimens examined, two individuals, a mature female (holotype) and a premature female (paratype ‘smart’), were drawn—using a camera lucida: the body length of all specimens was measured using a profile projector. Holotype and several paratype specimens are deposited in the Reference Collection of Phuket Marine Biological Center (PMBC), Thailand.

## TAXONOMY

## Family Caprellidae

Genus *Paraprotella**Paraprotella saltatrix* sp. nov.

(Figs 1–4)

## Material examined

**Holotype:** PMBC 14936, Female, mature, off north-east corner of Aeow Island, 07°45.92'N, 098°24.06'E, 28.5°C, SCUBA, 12 m, coll. I. Takeuchi, 23.03.1999.

**Paratypes:** PMBC 14937, Female 'smart', premature, PMBC 14938, Lot A, 2 mature, 10 premature and 3 immature females, same data as holotype, and Lot B, 4 mature, 31 premature and 17 immature females, PMBC pier, 07°48.10'N, 098°24.35'E, 29.0°C, by hand, 1 m, coll. I. Takeuchi, 25.03.1999.

## Description

Mature female, holotype. Body length, 8.08 mm; head and pereonites slender. Pereonite V longest, followed by pereonite III. Length of head 0.57 mm; length of pereonites I–VII 0.76, 1.29, 1.45, 1.22, 1.67, 0.63 and 0.49 mm, respectively. Head with elongate triangular projection; eyes large and distinctive. Pereonite I with forwardly bent projection near posterior end of dorsal surface. Pereonite II with pair of small mid-lateral projections and a posterior projection. Pereonite III and IV with a shallow mid-dorsal projections, respectively.

Antenna I elongate, nearly 0.8 as long as body; propodus article 2 longest. Flagellum slightly longer than propodus, 19-segmented. Antenna II a little more than 0.3 times as long as antenna I; propodus articles 2 to flagellum article 1 scarcely setose.

Gnathopod I, merus to propodus setose. Propodus 1.5 times as long as wide.

Gnathopod II positioned about 0.3 from the anterior end. Basis 1.5 times as long as pereonite II, distally with triangular projection. Propodus elongate, 2.5 times as long as wide, with 3 projections on palm; hooked spine on small

projection situated 0.20 from proximal end; second projection situated 0.40 from distal end; third projection separated by "U" notch from second projection 0.25 from distal end of palm; palm between grasping proximal projection and second projection with serratifiform teeth, scarcely setose. Dactylus falcate.

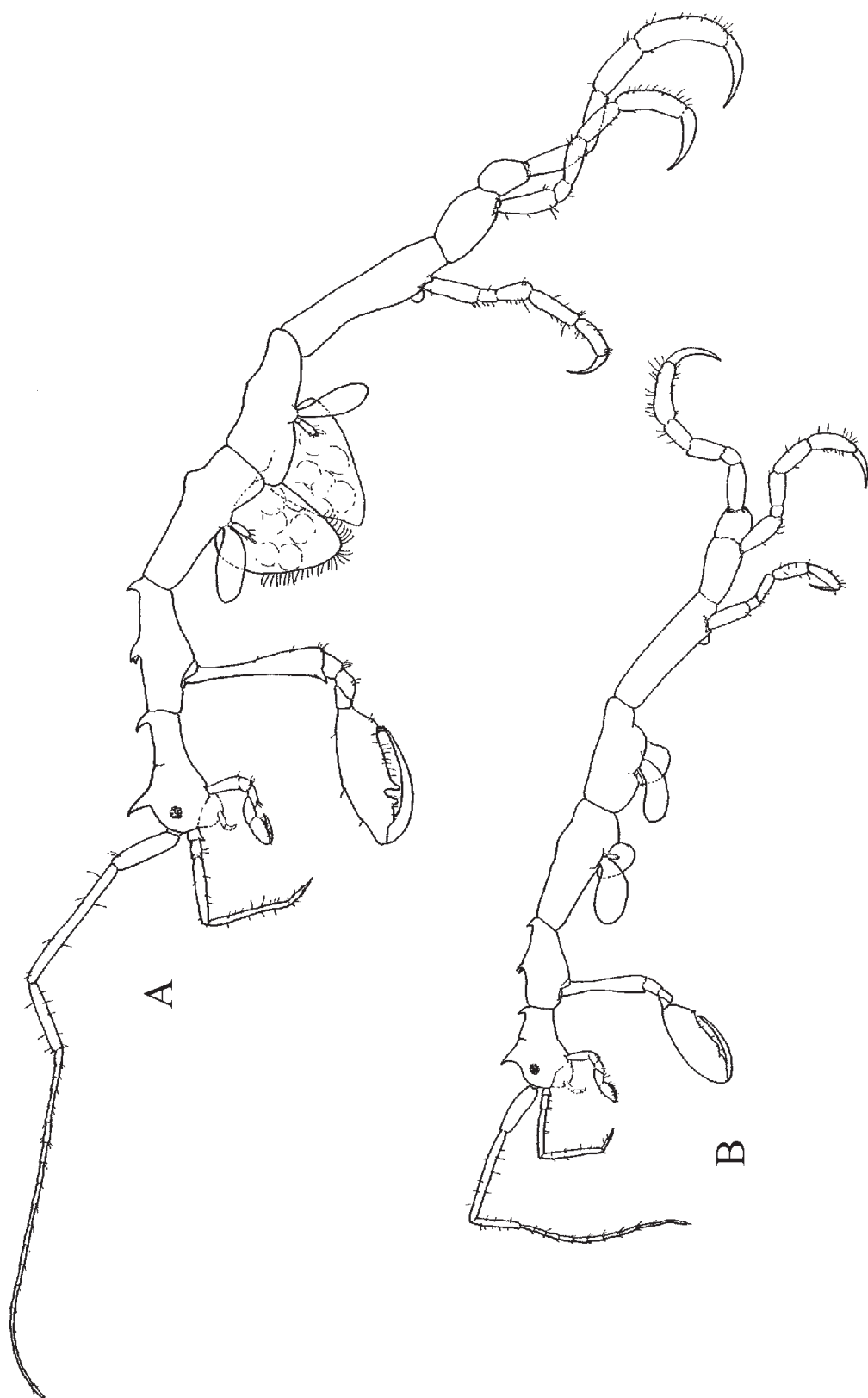
Pereopod III minute; article 1 rectangular, article 2 ovate, scarcely setose; article 3 vestigial with 3 setae. Pereopod IV similar to pereopod III.

Pereopods V, VI and VII becoming progressively more robust. Pereopod V elongate; carpus longest followed by basis, merus and propodus. Propodus cylindrical and convex with a pair of long setae near proximal end of palm. Pereopod VI with propodus longer than carpus. Propodus of pereopod VII developing pair of grasping spines near proximal end of palm instead of long setae on pereopods V and VI.

Mouthparts. Maxilliped inner plate of rectangular, with 2 pairs of setae near distal margin; outer plate oval, 2.5 times as long as inner plate, with 2 setae on distal margin and 5 setae on lateral margin. Palp article 2 with 5 setae on medial margin; article 3 setose on distal half of lateral part; article 4 falcate weakly interiorly curved and finely setose near distal end; maxilla 1 outer plate of oblong with 5 stout apical teeth, distal part of palm with 4 apical teeth followed by 2 setae. Outer plate of maxilla II trapezoid, with apical seta; palm with row of apical setae. Left mandible with article 3 of palp with 2-7-1 setae formula (see remarks); article 2 with 3 setae on lateral part; incisor divided into 5 teeth, and lacinia mobilis divided into 5 teeth followed by 3 finely setose setae. Right mandible similar to left mandible except for lacinia mobilis with 7 small teeth followed by 2 finely setulose setae. Upper lip weakly notched. Lower lip with inner lobe separated into 2 round lobe and outer lobe.

Abdomen. Uropod degenerated into 1 seta. Abdominal lobe with 2 apical setae.

Female, paratype 'b'. Body length, 5.81 mm. Pereonite V longest. Pereonites III and IV with straight dorsal line. Antenna I with flagellum 11-segmented.



**Figure 1** *Paraprotella saltatrix* sp. nov. A, mature female, holotype, PMBC 14936; B, premature female, paratype 'b', PMBC 14937. Bar indicates 1.0 mm.

**Type locality**

Aeo Island, off the south-eastern coast of Phuket, Thailand.

**Etymology**

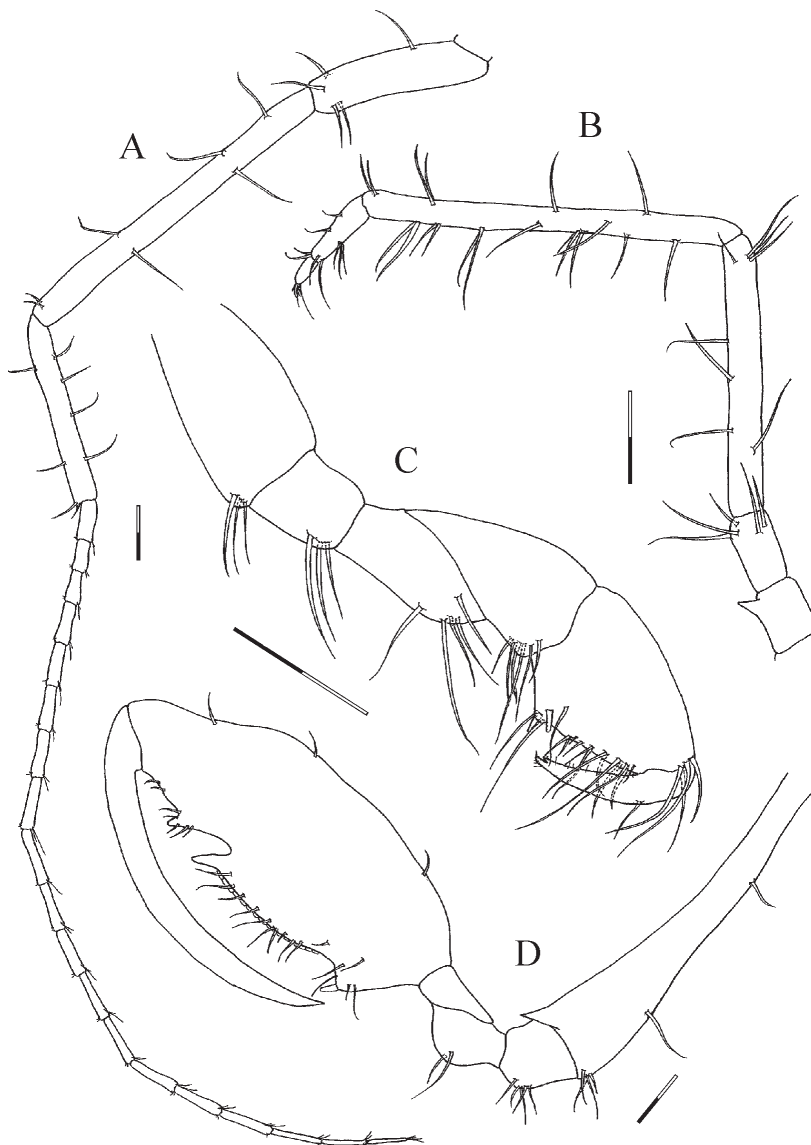
The epithet *saltatrix* is derived from 'dancing lady' alluding to the shaking and clinging behaviour of *Paraprotella saltatrix* sp. nov.

**Remarks**

Generic and species diagnoses of the

Caprellidea have been usually based on mature males. Mayer (1903) established the genus *Paraprotella* Mayer, 1903 based on two species: *P. prima* Mayer, 1903 (from Singapore, Thailand and Japan) and *P. secunda* Mayer, 1903 (from Japan) (Mayer 1903, Arimoto 1976). McCain and Steinberg (1970) designated *P. prima*, as the type species for *Paraprotella*.

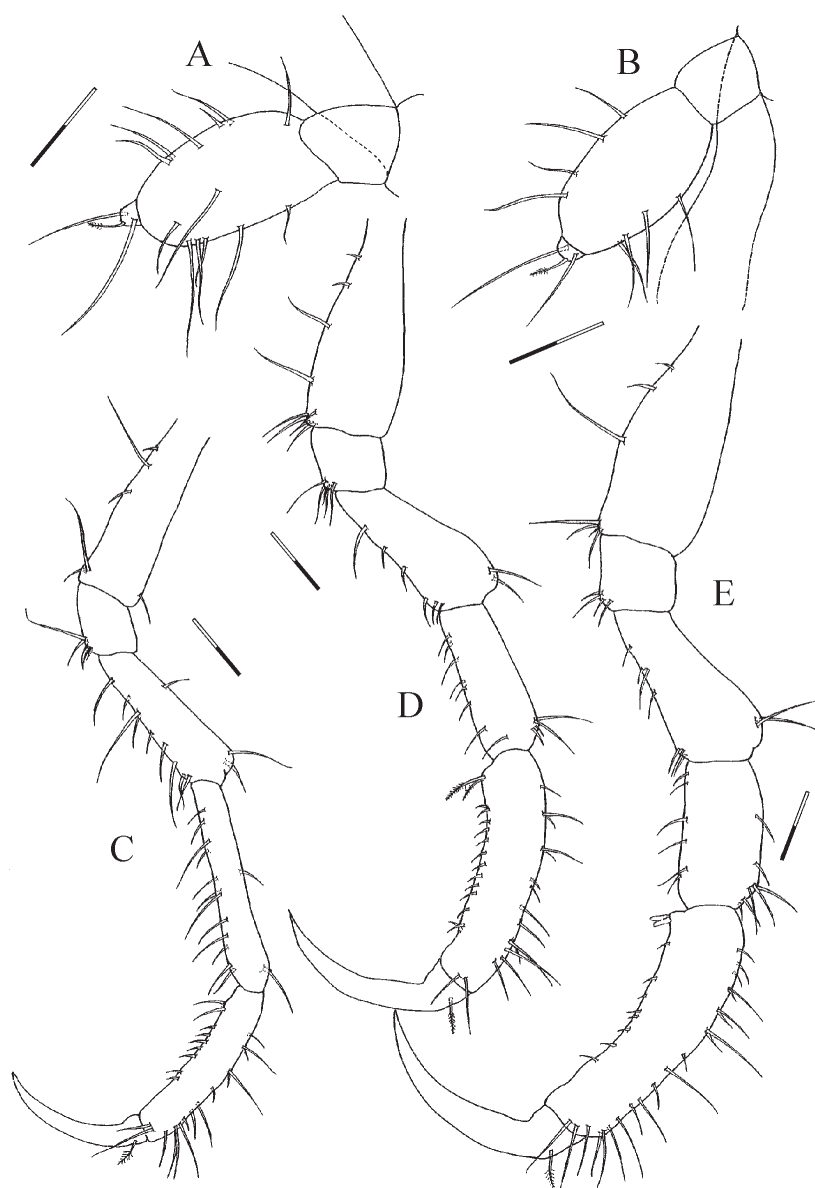
Although no adult male specimen was available, comparison between the present material of *Paraprotella saltatrix* and the diagnosis and



**Figure 2** *Paraprotella saltatrix* sp. nov. Mature female, holotype, PMBC 14936. A, antenna I; B, antenna II; C, gnathopod I; D, gnathopod II. Bars indicate 0.2 mm.

description of the mature female of *P. prima* (Mayer, 1903; Arimoto, 1976) provided a clear difference in the species diagnosis. 1) In *P. saltatrix* head and pereonite II lack lateral projections, while in *P. prima* these two somites carry distinct projections. 2) In *P. saltatrix*, pereonites III and IV lack the lateral projections, while in *P. prima* these pereonites III and IV carry distinct projections. 3) In *P. saltatrix* the uropod of the mature female is vestigial and has degenerated into

one seta, while in *P. prima* new species it is uniramous. Of the above three diagnostic points, the uropod character has usually been regarded as of generic significance. Recently, the uropod on the abdomen of *Caprella* has been observed to develop from single seta to be probably uniramous during postmarsupial growth (Takeuchi, 1989; Mori, 1999). This, together with the lack of male specimens, suggests that the difference between the uropods of *P. saltatrix* and *P. prima* is not



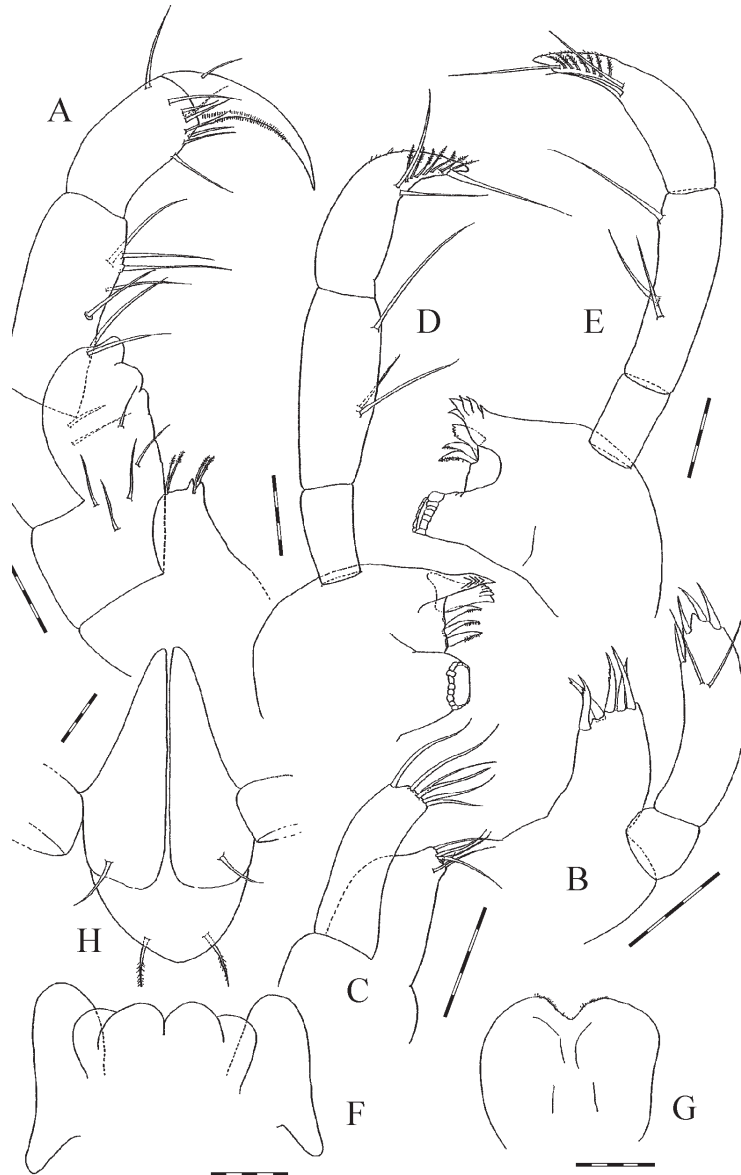
**Figure 3** *Paraprotella saltatrix* sp. nov. Mature female, holotype, PMBC 14936. A, pereopod III; B, pereopod IV; C, pereopod V; D, pereopod VI; E, pereopod VII. Bars indicate 0.5 mm.

necessarily sufficient to justify a new genus.

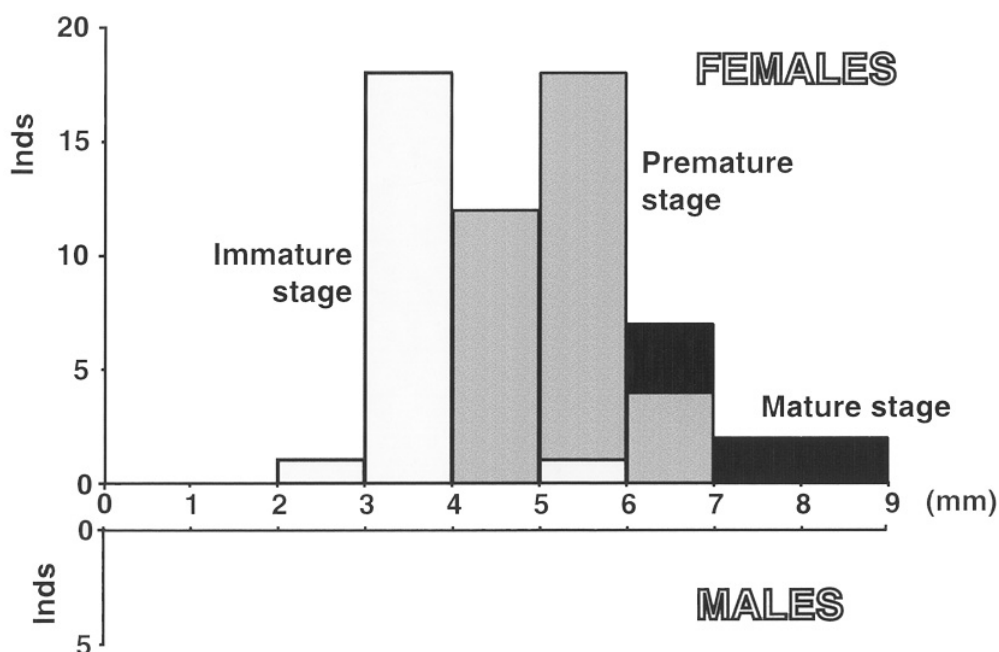
Although *Paraprotella secunda* has not been as well-described as *P. prima* (Mayer, 1903), Mayer (1903) described the presence of large lateral projection on pereonite VI of male, 7 mm in body length, and feature of female, 8 mm in body length. *Paraprotella saltatrix* which of a similar size to *P. secunda*, but the lack of lateral projection in *P. saltatrix* allows the clear separation from *P.*

*secunda*.

In general, seta formula of the third article of mandibular palp in *Paraprotella* and related genera was expressed by formula '1-x-y-1' (Mayer, 1903; McCain, 1968; Arimoto, 1976). This formula indicates the presence of 1 long seta at either end of row of variable number of short setae (x) and intermediate one (y) (McCain, 1968). The setal row of the third article of mandibular palp in *P.*



**Figure 4** *Paraprotella saltatrix* sp. nov. Mature female, holotype, PMBC 14936. A; maxilliped; B, maxilla I; C, maxilla II; D; left mandible; E, right mandible; F, lower lip; G, upper lip; H, ventral view of abdomen. Bars indicate 0.05 mm.



**Figure 5** Size distribution of body length (mm) in *Paraprotella saltatrix* sp. nov. collected from two stations, Aeo Island and Cape Panwa, both off the south-east coast of Phuket Island.

*saltatrix* has 2 long setae near proximal end followed by 6 short setae and 1 long setae. Thus, the setal formula for the present species is newly assigned as 2 (long setae near proximal end)-x (number of short setae)-1(long setae near apical end).

*Paraprotella saltatrix* may be first recorded case of parthenogenesis in the Caprellidea. No males were found among the 71 specimens of *P. saltatrix* collected from Aeo Island and the Cape Panwa (Fig. 5). The immature stage of *P. saltatrix* ranged 2.95–5.25 mm in body length, the premature stage from 4.00–6.40 mm, and mature stage reached a maximum of 8.20 mm. This biased sex ratio is not expected from the mating system of the Amphipoda and from the previous studies on the sex ratio of the Caprellidea. *Caprella*, the most well-studied genus of the Caprellidea, and *Deutella* are reported not to be extremely biased from 1:1 (males: females) (e.g., Lewbel, 1978; Bynum, 1978; Caine, 1979; Takeuchi and Hirano, 1991, 1992). Generally, females of Amphipoda do not store sperm, and females are able to successively produce embryos several times after sexual maturity (e.g., Borowsky, 1991). Thus, once a female attains the mature stage, a male must accompany the female for each time of fertilisation

which occurs after every moulting. Parthenogenesis in the Amphipoda has been suspected only in a few species of the suborders Gammaridea and Hyperidea; e.g., *Corophium bonnelli* Milne Edwards, 1830 (Crawford, 1937; Moore, 1981; Myers *et al.*, 1989), and *Rhabdosoma*, a pelagic genus of the Hyperidea (Fage, 1954; Charniaux-Cotton, 1960). In the near future, laboratory rearing experiments on *P. saltatrix* from newly hatched juveniles until their maturation in isolation are expected to elucidate their life history, and allow their reproductive behaviour to be detailed, especially whether this species is parthenogenesis or not.

#### ACKNOWLEDGEMENTS

The authors express their sincere thanks to Mr. Somchai Bussarawit and staff of the Phuket Marine Biological Center for their kind help for the sampling near the Center, and Dr. Niel L. Bruce for kindly arranging the submission of the present paper to the Proceedings of the Workshop: Biodiversity of Crustacea in the Andaman Sea. The present study was partially supported by the Cooperative International Research on Marine and Coastal Environment.



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