THE CAPRELLIDEA (MALACOSTRACA: AMPHIPODA) FROM MIRS BAY, HONG KONG, WITH THE DESCRIPTION OF A NEW GENUS AND TWO NEW SPECIES

J. M. Guerra-García and I. Takeuchi

(IMGG, correspondence) Laboratorio de Biología Marina, Departamento de Fisiología y Biología Animal, Facultad de Biología, Universidad de Sevilla, Aptdo. 1095, E-41080, Sevilla, Spain (e-mail: jmguerra@us.es); (IT) Department of Life Environment Conservation, Faculty of Agriculture, Ehime University, 3-5-7 Tarumi, Matsuyama, Ehime 790-8566, Japan (e-mail: takeuchi@agr.ehime-u.ac.jp)

ABSTRACT

The taxonomic study on the Caprellidea collected from the shallow waters of north-west area of Mirs Bay, Hong Kong revealed the distribution of four species in this area. Of them, Tropiicaprella minuta, new genus, new species, and Caprella hirayamae, new species, are described. Tropiicaprella, new genus, is close to Heterocaprella Arimoto, 1976, but differs by the absence of the clavate projection on the peronite 4, the elongate pereopods 3 and 4 and the five-articulate pereopod 5. The closest species to Caprella hirayamae, n. sp., are Caprella californica Stimpson, 1857, and Caprella scabra Templeton, 1836, but C. hirayamae can be easily distinguished by less elongated peronite 1, short basis of gnathopod 2 and oval propodus with dorsal setae in gnathopod 2.

Since the publication of Mayer’s monographs of the Caprellidea of the world (Mayer, 1890, 1903), no systematic studies on the Caprellidea from the Chinese coasts have been carried out. According to McCain and Steinberg (1970), the following nine species of the Caprellidea were reported from Chinese coasts: Hemiaegina minuta Mayer, 1890; Caprella acanthogaster Mayer, 1890; C. bacillus Mayer, 1903; C. bispinosa Mayer, 1890; C. californica Stimpson, 1856; C. drepapachir Mayer, 1890; C. equilibra Say, 1818; C. penantis Leach, 1814; and C. rhopalochir Mayer, 1890. In addition, several species of Caprella have been reported in scattered ecological studies (e.g., Brawley and Fei, 1987, 1988; Huang et al., 1992). Especially, Brawley and Fei (1987, 1988) reported the presence of five species of Caprella from the northern coast of China: C. equilibra Say, 1818; C. irregularis Mayer, 1890; C. kroyeri de Haan, 1849; C. scabra Templeton, 1836; and C. septentrionalis Kröyer, 1838.

Recently, the necessity for conserving marine habitats along the Hong Kong coast has been reflected by the designation in 1996 of Hong Kong’s first Marine Parks and Reserves. Two parks and one reserve received designation on 5 July 1996 (Morton, 2000). These areas possess a wide diversity of marine intertidal and subtidal habitats and high richness of corals, mangroves, seagrasses, dynamic sand beaches, and lagoons. The amphipods were collected from various marine habitats to 24 meters depth from the Tolo Channel area of northeastern New Territories, Hong Kong, including the two marine parks, Yan Chau Tong Park and Hoy Ha Wan Park, during the Second International Marine Biological Workshop in April 1984. Of the collections, Hirayama (1986a, b; 1991) published a series on the taxonomy of the Gammaridea, including twelve species of Corophium, Corophiidae (Hirayama, 1986a), four species of Dexamiiniidae (Hirayama, 1986b), and six species of Ampeliscidae (Hirayama, 1991). Based on this collection, Hirayama (1986a) estimated that the gammaridean amphipod fauna of Hong Kong and its adjacent regions is less diverse than other waters of the West Pacific in the Northern Hemisphere.

In the present study, four species of the Caprellidea belonging to Hirayama’s collection from Hong Kong, and containing one new genus and two new species, are reported. Taking into account that phylogeny and higher classification of the Caprellidea is still under debate (e.g., Laubitz, 1993; Takeuchi, 1993; Larsen, 1997), the genera have been grouped considering the smaller number of families, following Takeuchi (1993).

MATERIALS AND METHODS

The amphipod material was collected with a 0.25 m² Van Veen grab, a small-size beam trawl, or direct handling without gears, from 4 to 24 April 1986 from Tolo Haubour, Tolo and
Fig. 1. *Metaproto* sp. Lateral view. A, male; B, female. Scale bar: 1 mm.

northwest Mirs Bay of northeastern New Territories, Hong Kong (114°20'N, 22°30'E). A map and details of the stations were included in Hirayama (1986a). Additional specimens were collected from metal panels which had been immersed in Tai Tam Bay, south of Hong Kong Island, by Prof. B. Morton. The specimens were fixed in 70% ethanol after preservation in 5% Formalin after the collection. Several specimens were dissected under a stereomicroscope, and permanent mounts were made in polyvinyl-lactophenol. All figures have been drawn with the aid of a camera lucida. The type specimens are deposited in the Australian Museum, Sydney.

**SYSTEMATICS**

Family Phthiicidae Vassilenko, 1968

Genus *Metaproto* (Haswell, 1880)

*Metaproto* sp.

Fig. 1

*Material Examined.*—1 male, 1 female, st. 4, 16 m deep, 4 April 1986, Van Veen grab (114°20'N, 22°30'E).

*Remarks.*—The genus *Metaproto* comprises
Family Caprellidae Leach, 1814

**Tropicaprella**, new genus


**Gender**.—Feminine.

**Etymology**.—The name *Tropicaprella* was chosen because the species was found very close to Tropic of Cancer.

**Remarks**.—*Tropicaprella*, new genus, is most closely related to the genus *Heterocaprella* Arimoto in flagellum of antenna 2 two-articulate, pereopods 3 and 4 uniarticulate, gills on pereonites 3 and 4, and mandibular palp absent, while molar present. The genus *Heterocaprella* is, so far, composed of two species, *Heterocaprella clavigera* Arimoto, 1976, described based on specimens collected from the Korean Strait (Arimoto, 1976a), and *H. krishnaensis* Swarupa and Radhakrishna, 1983, collected from Indian waters (Swarupa and Radhakrishna, 1983). *Tropicaprella* can be distinguished from *Heterocaprella* by the following characters: (1) males of *Tropicaprella* possess a striking clavate projection of pereonite 4, carrying the gills and pereopods at its distal end—this projection, unique in the Caprellidea, is lacking in males of the new genus *Tropicaprella*; (2) the pereopods 3 and 4 are two-articulate in *Heterocaprella* and uniarticulate in *Tropicaprella*; (3) the pereopod 5 is 3–4-articulate in *Heterocaprella* and 5-articulate in *Tropicaprella*. The two species of *Heterocaprella* show abdominal specific variations, which are usually considered as generic characters in the group (see McCain, 1968; Takeuchi, 1993); males and females of *Heterocaprella clavigera* have a pair of appendages on the abdomen (Arimoto, 1976a), whereas these appendages are absent in the species *H. krishnaensis* (Swarupa and Radhakrishna, 1983).

**Tropicaprella minuta**, new species

Figs 2–6

**Type Material**.—Holotype male (AM P61575), st. 19, 17 m deep, 4 April 1986, Van Veen grab (114°20'N, 22°30'E). Allotype female (AM P61576), st. 25, 18 m deep, 8 April 1986, Van Veen grab, Mirs Bay outer Tolo Channel (114°20'N, 22°30'E). Paratypes (AM P61577): 2 females, st. 17, 18 m deep, 9 April 1986, on crinoids, Port Islands; 1 male, st. 18, 17.5 m deep, 8 April 1986, Van Veen grab (114°20'N, 22°30'E); 1 female, st. 20, 17 m deep, 8 April 1986, Van Veen grab (114°20'N, 22°30'E); 6 females, st. 23, 18 m deep, 8 April 1986, Van Veen grab, Mirs Bay outer Tolo Channel; 1 male, st. 24, 18 m deep, 8 April 1986, Van Veen grab, Mirs Bay outer Tolo Channel.

**Description**.—Holotype male (AM P61575). Body length 3.2 mm.

Lateral view: Body smooth provided with few dorsal setulae. Head rounded. Pereonites 2–5 subequal in length; pereonite 7 the shortest.

Gills elongated, length about 2.5 times width.

Antenna 1 about 1/4 of body length; peduncular article 1 subequal to article 3 in length but wider; flagellum 5-articulate. Antenna 2 as long as antenna 1; swimming setae absent; basal article of peduncle with acute projection.

Mouthparts remarkably tiny (about 0.05 mm length). Upper lip symmetrically bilobed,
smooth. Mandibular process present; left mandible with incisor 5-toothed, lacinia mobilis 5-toothed followed by row of three pectinate setae; right mandible with incisor 5-toothed, lacinia mobilis not toothed (or minutely serrated), followed by two pectinate setae; molar flake absent. Inner lobes of lower lip round: inner and outer lobes smooth apically. Maxilla 1 outer lobe with 7 serrated spines apically; article 2 of palp with 4 marginal setae and 2 lateral ones. Maxilla 2 inner lobe with 6 apical setae, outer lobe with 10 setae. Inner plate of maxilliped rectangular, with 4 setae on distal end; outer plate with one apical setae and 2 lateral ones; palp 4-articulate, scarcely setose.

Fig. 2. *Tropicaprella minuta*, n. g., n. sp. Lateral view. A, male; B, female. Scale bar: 1 mm.
Fig. 3. *Tropicaprelia minuta*, n. g., n. sp. Male. A, Upper lip; B, Lower lip; C, Maxilliped; D, right mandible; E, left mandible; F, maxilla 1; G, maxilla 2. Scale bars: 0.05 mm.
Fig. 4. *Tropicaprella minuta*, n. g., n. sp. Male. A, antenna 1; B, antenna 2; C, gnathopod 1; D, gnathopod 2. Scale bars: 0.2 mm.
Gnathopod 1 unique in the Caprellidea; carpus with two strong spines; palm of propodus without proximal grasping spines, with small, acute projection proximally, followed by rounded expansion, minutely serrate and provided with 7 setae, and small projection distally; dactylus elongate, strongly divided distally. Gnathopod 2 inserted near distal end of pereonite 2; basis about 1/3 as long as pereonite 2; propodus elongated, length about 3 times width; palm with proximal projection bearing robust spine and another two small projections distally.

Pereopods 3 and 4 uniarticulate, small, length about 1/4 of gills; pereopod 3 with 4 distal setae, pereopod 4 with one distal seta. Pereopod 5, inserted at middle of pereonite 5, five-articulate, although articles 4 and 5 not completely separated. Pereopods 6 (missing in male holotype) and 7 elongate, similar in characteristics but increasing in length respectively; basis to propodus setose, dactylus long, curved; propodus palm without grasping spines.

Abdomen with pair of appendages uniarticulate, short, rounded, with pair of lateral lobes and single dorsal lobe. Penes elongate.
**Allotype female.**—(AM P61576).—Body length 2.4 mm. Gnathopod 2 inserted on anterior half of pereonite 2, similar to male gnathopod 2 although propodus slightly elongated. Brood lamellae of pereonite 3 and 4 setose. Gills more elongate than in male. Pereopod 5 inserted on anterior half of pereonite 5. Abdomen without appendages, with pair of lateral lobes and dorsal lobe.

**Etymology.**—The specific name “minuta” refers to the small size of the new species.

**Remarks.**—The tiny new species, although closer morphologically to *Heterocaprella* species, superficially resembles *Liopus minimus* Mayer, 1890, especially in size and shape of the body, but differs easily by the following characters: (1) pereopod 5 is 2-articulate in *Liopus minimus* and 5-articulate in *Tropicaprella minuta*; (2) *Liopus minimus* has a 3-articulate mandibular palp, and the palp is absent in *Tropicaprella minuta*; (3) the shape of gnathopod 1 and the length and characteristics of pereopods 6 and 7 differ between the species.

*Tropicaprella minuta*, n. sp., possesses extremely long pereopods 6 and 7. They could be useful in some way as an adaptation to living on sediments.

**Genus Caprella Lamarck, 1801**

*Caprella scabra* Templeton, 1836

**Fig. 7**

*Caprella scabra* Templeton, 1836: 191, 192, pl. 20, fig. 6; Mayer, 1890: 70–73, pl. 4, figs. 40–51, pl. 6, fig. 41, pl. 7, figs. 2, 35, 36; Mayer, 1903: 117–120, pl. 5, figs. 13–18, pl. 10, fig. 11; McCain, 1968: 40–44, figs. 17, 18, 55.

*Caprella nodosa* Templeton 1836: 192–194, pl. 21, fig. 7.

*Caprella cornuta* Dana, 1853: 816, 817.

*Caprella attenuata* Dana, 1853: 817–819.

A more extensive list of synonyms for this species is included in McCain and Steinberg (1970).

**Material Examined.**—1 male, st. 7, 16 m deep, 8 April 1986, Northern coast of Kat Ochan (114°20'N, 22°30'E); 2 males and 1 premature female, st. 8, 15 m deep, 5 April 1986, algal bed, Kung Tau (114°20'N, 22°30'E); 1 male, st. 9, 14 m deep, April 1986, algal bed, Kung Tau (114°20'N, 22°30'E); 1 female, st. 11, 14 m deep, 9 April 1986, benthic trawl.

**Remarks.**—*Caprella scabra* was reported to be distributed widely among pier pilings in the same area as the present collection prior to the present study (Huang et al., 1992). This species is distributed widely along temperate regions all over the world (McCain, 1968; McCain and Steinberg, 1970). *Caprella scabra* was first described by Templeton (1836) based on material from Mauritius, South Indian Ocean. Seven varieties have been described by Mayer.
(1890, 1903) and Utinomi (1947). Of these varieties, McCain (1968) re-established C. californica Stimpson, 1857, and remanded the others as junior synonyms of Caprella scaura Templeton. The specimens examined in the present study are in good agreement with the figures and descriptions of Caprella scaura typica Mayer, 1890 from Brazil (Mayer, 1890; Arimoto, 1976b) and of Caprella scaura of McCain (1968) from the Western North Atlantic. This species shows a wide variation of substrates, indicating no specific selection of the habitats. Caprella scaura has been frequently recorded in association with the bryozoan
Bugula neritina and other erect bryozoans of the genus Scrupocellaria, with the seaweeds Sargassum spp. and Cystoseira spp., and with the seagrasses Halodule uninervis and Halophila ovalis (see Lim and Alexander, 1986). Takeuchi and Hino (1997) found the species attaching to the seagrasses Zostera marina and Z. caulescens, and Serejo (1998) reported the presence of the species clinging to the sponge Dysidea fragilis. In Coquimbo, the species has been found living on Bugula neritina and the seaweeds Polysiphonia spp. and Gracilaria spp. (Guerra-García and Thiel, 2001). Caprella scaura is one of the caprellid species for which the behaviour is well described (Lim and Alexander, 1986; Aoki, 1999; Schultz and Alexander, 2001).

Caprella hirayamai, new species
Figs. 8–11
Fig. 9. *Caprella hirayamai*, n. sp. Male. A, Upper lip; B, Lower lip; C, Maxilliped; D, right mandible; E, left mandible; F, maxilla 2; G, maxilla 1. Scale bars: 0.2 mm.
Fig. 10. *Caprella hirayamai*, n. sp. A–D, male. A, antenna 1; B, antenna 2; C, gnathopod 1; D, gnathopod 2. E, female gnathopod 2. Scale bars: A, B, D, E: 1 mm; C: 0.5 mm.
Type Material.—Holotype male (AM P61578), st. 1, 20 m deep, 4 April 1986, Van Veen grab (114°20'N, 22°30'E). Allotype female (AM P61579), st. 13, 14 m deep, 9 April 1986, on crinoids, Port Island (114°20'N, 22°30'E). Paratypes (AM P61580): 4 juveniles collected together with the allotype female in the same sample; 5 males, 2 premature females, 1 immature female, st. 2, 24 m deep, 4 April 1986, Van Veen grab (114°20'N, 22°30'E); 8 females, 1 immature female, 4 juveniles, st. 5, 16 m deep, 9 April 1986, on the crinoid Tropiometa afric (114°20'N, 22°30'E); 1 female, st. 6, 15 m deep, 5 April 1986, on algae (114°20'N, 22°30'E); 1 female, st. 16, collected from fouling community on metal panels at Tai Tam.

Diagnosis.—Head with well-developed acute projection. Body dorsally smooth except for pair of small tubercles on pereonite 6 in males and on pereonites 6 and 7 in females; females also provided with dorsal humps on pereonites 6.
2–5. Basis of gnathopod 2 with distolateral projection in males; small dense setulae dorsally on distal half of male propodus.

**Description.**—Holotype male (AM P61578). Body length 9.4 mm.


Gills elongated, length about 3 times width.

Antenna 1 longer than half of body; peduncular article 1 subequal to article 3; flagellum broken distally. Antenna 2 as long as antenna 1 peduncle; swimming setae present.

Upper lip symmetrically bilobed, slightly pubescent apically. Mandibular process strong; incisor and lacinia mobilis 5-toothed in both mandibles; left mandible with three pectinate setae, right mandible with two pectinate setae; molar flake small, rounded, setose. Inner lobes of lower lip round; inner and outer lobes pubescent apically. Maxilla 1 outer lobe with 7 serrated spines apically; article 2 of palp with 9 marginal setae and 15 lateral ones disposed along surface. Maxilla 2 inner lobe with 20 apical setae, outer lobe with 17 setae. Inner plate of maxilliped rectangular, with 9 plumose setae and 3 nodular setae (like teeth) on distal end; outer plate with 7 nodular setae (like teeth).

Gnathopod 1 propodus with two proximal grasping spines, dactylus minutely serrated. Gnathopod 2 inserted near distal end of pereonite 2; basis about half of pereonite 2 in length, with well-developed projection; propodus oval, length about 2.5 times width; palm with projection bearing robust spine, another projection followed by “U” notch distally.

Pereopods 5, 6, and 7 increasing in length, respectively; basis with carina on posterior margin; palm of propodus with pair of proximal grasping spines.

Abdomen with pair of appendages uniarticulate, pair of lateral lobes and single dorsal lobe. Penes triangular, acute distally.

**Allotype Female** (AM P61579).—Body length 8.1 mm. Body with pair of small tubercles on pereonites 6 and 7 and dorsal humps in pereonites 2–5. Pereonites 2–5 subequal in length. Gnathopod 2 inserted on anterior half of pereonite 2; inner projection on basis lacking; propodus without “U” notch. Brood lamellae of pereonite 3 setose; brood lamella on pereonite 4 not setose. Abdomen with pair of lateral lobes carrying 1 single seta and 1 dorsal lobe.

**Etymology.**—The species is dedicated to Dr. Akira Hirayama for his contribution to the knowledge of Amphipoda from Indo-Pacific areas. He provided us with the caprellid specimens for taxonomic studies.

**Remarks.**—The new species is close to *Caprella californica* Stimpson, 1857, and *C. scuara* Templeton, 1836, in the general lateral view and the marked acute projection on the head. Based on the comparison using the representative descriptions of *C. californica* (McCain, 1968; Arimoto, 1976b) and *C. scuara* (Mayer, 1890; Arimoto, 1976b), the males of *Caprella hirayamai*, n. sp., can be easily distinguished from these two species mainly by the following characteristics: (1) in *C. hirayamai*, pereonite 1 is not longer than pereonites 3 and 4, while in *C. californica* and *C. scuara*, pereonite 1 is elongate, more than twice of pereonite 3 in length; (2) in *C. hirayamai*, the basis of gnathopod 2 is shorter than half of the pereonite 2, whereas in *C. californica* and *C. scuara*, it is clearly longer than half of the pereonite 2; (3) in *C. hirayamai*, the propodus of gnathopod 2 is oval and provided with dorsal setulae near distal end, but it is elongate and without dorsal setae in *C. scuara*, in which it is covered with numerous fine setae on all its surface; (4) the distal article of the peduncle of antenna 1 is short in *C. hirayamai* and elongate in *C. californica* and *C. scuara*.

The females of *Caprella hirayamai*, n. sp., strongly resemble females of *C. californica* and *C. scuara*. However, the relative larger and wider gills distinguish *C. hirayamai* from *C. californica* and *C. scuara* even in females. *Caprella hirayamai*, n. sp., has been found from sediments, on algae, crinoids, and as a part of the fouling community during the present study. This indicates that *Caprella hirayamai*, as well as *C. scuara*, shows no substrate specificity, being a common species around Hong Kong, and probably along the southern coast of China.

**Acknowledgements.**

We are very grateful to Dr. Akira Hirayama for providing the specimens of the Caprellidea for the present work. This study was partially supported by a grant "Formación de Profesorado Universitario" from the Spanish Ministry of Education, Culture and Sport to JMGG, and the Special Research Fund from the Ehime University to IT.
LITERATURE CITED


RECEIVED: 1 April 2002.