



Two Penaeid Shrimps (Crustacea, Decapoda) from Jeju Island, Korea

Jung Nyun Kim^{*}, Jung Hwa Choi¹, Dae Hyun Kim², Hyung Kee Cha³,
Yong Gun Kong², Chang Hoon Lee² and Chang Hee Han⁴

Institute of Fisheries Sciences, Pukyong National University, Busan 612-012, Korea

¹*Korea Inter-University Institute of Ocean Sciences, Pukyong National University,
Busan 608-737, Korea*

²*Resources Enhancement Institute, National Fisheries Research and
Development Institute, Jeju 690-192, Korea*

³*Fisheries Resources Research and Management Division, National Fisheries Research
and Development Institute, Busan 619-902, Korea*

⁴*Department of Biology, Donggeui University, Busan 614-054, Korea*

Two penaeid shrimps, *Melicertus latisulcatus* (Kishinouye, 1896) and *Metapenaeopsis mogiensis mogiensis* (Rathbun, 1902), collected from Jeju Island are described and illustrated with color photographs. *Melicertus latisulcatus* is previously known but without detailed description in Korean waters and *M. mogiensis mogiensis* is recorded for the first time. Distributional and morphological accounts of these two species are briefly discussed.

Key words: Penaeidae, *Melicertus latisulcatus*, *Metapenaeopsis mogiensis mogiensis*, Jeju Island, Korean fauna

Introduction

Penaeid shrimps, which include a lot of commercially important species, inhabit shallow and inshore tropical and subtropical waters (Dall et al., 1990). Recently, Pérez Farfante and Kensley (1997) revised the superfamily Penaeoidea and presented 26 genera containing 226 species and subspecies in the family Penaeidae.

Of the 17 penaeid shrimps known to Korean waters (Kim, 1977; Cha et al., 2001; Je et al., 2002; Kim et al., 2002), the following five species were reported from Jeju Island, where is the only place characterized as the subtropics in Korea (Kim and Kim, 1988; Je et al., 2002): *Marsupenaeus japonicus* (Bate, 1888), *Melicertus latisulcatus* (Kishinouye, 1896), *Metapenaeopsis dalei* (Rathbun, 1902), *Parapenaeus fissuroides* Crosnier, 1986, and *Trachysalambria curvirostris* (Stimpson, 1860).

In September 2002, two interesting penaeids were collected off Hamduck, Jeju Island, by a set net at a depth of 80 m. They were identified as *Melicertus*

latisulcatus (Kishinouye, 1896) and *Metapenaeopsis mogiensis mogiensis* (Rathbun, 1902). Both seem to be new members of the Korean fauna. Although many authors (e.g., Kubo, 1949; Holthuis, 1980; Yu and Chan, 1986; Liu and Zhong, 1988; Pérez Farfante and Kensley, 1997) previously recorded *M. latisulcatus* from Korean waters, their records were only erroneous citations or only an underwater photograph without detailed description (Je et al., 2002). *Metapenaeopsis mogiensis mogiensis* was previously known only in Japan (Crosnier, 1991). Based on actual specimens, a morphological description and illustrations with a color photograph are given for each species.

Specimens examined are deposited in the Laboratory of Invertebrate Zoology, Department of Marine Biology, Pukyong National University (PUIZ). Postorbital carapace length (CL) is used as an indication of the size of the specimens. Terminology mainly followed Pérez Farfante and Kensley (1997).

Systematic Accounts

Melicertus latisulcatus (Kishinouye, 1896)

*Corresponding author: jnkim@mail1.pknu.ac.kr

(Figs. 1, 3A)

Korean name: *Nambang-bori-saewoo*
 남방보리새우 (신칭)

Penaeus latisulcatus Kishinouye, 1896: 372 [type

locality: Japan]; 1900: 12, 13, pl. 2, fig. 2;
 Rathbun, 1902: 37; De Man, 1911: 108, pl. 9,
 fig. 35a (in part); Parisi, 1919: 65; Schmitt, 1926:
 365; Yoshida, 1941: 9 (key), pl. 11, fig. 1; Kubo,
 1949: 278, figs. 1Q, 7E, 15G-L, 20B, 24D, E,

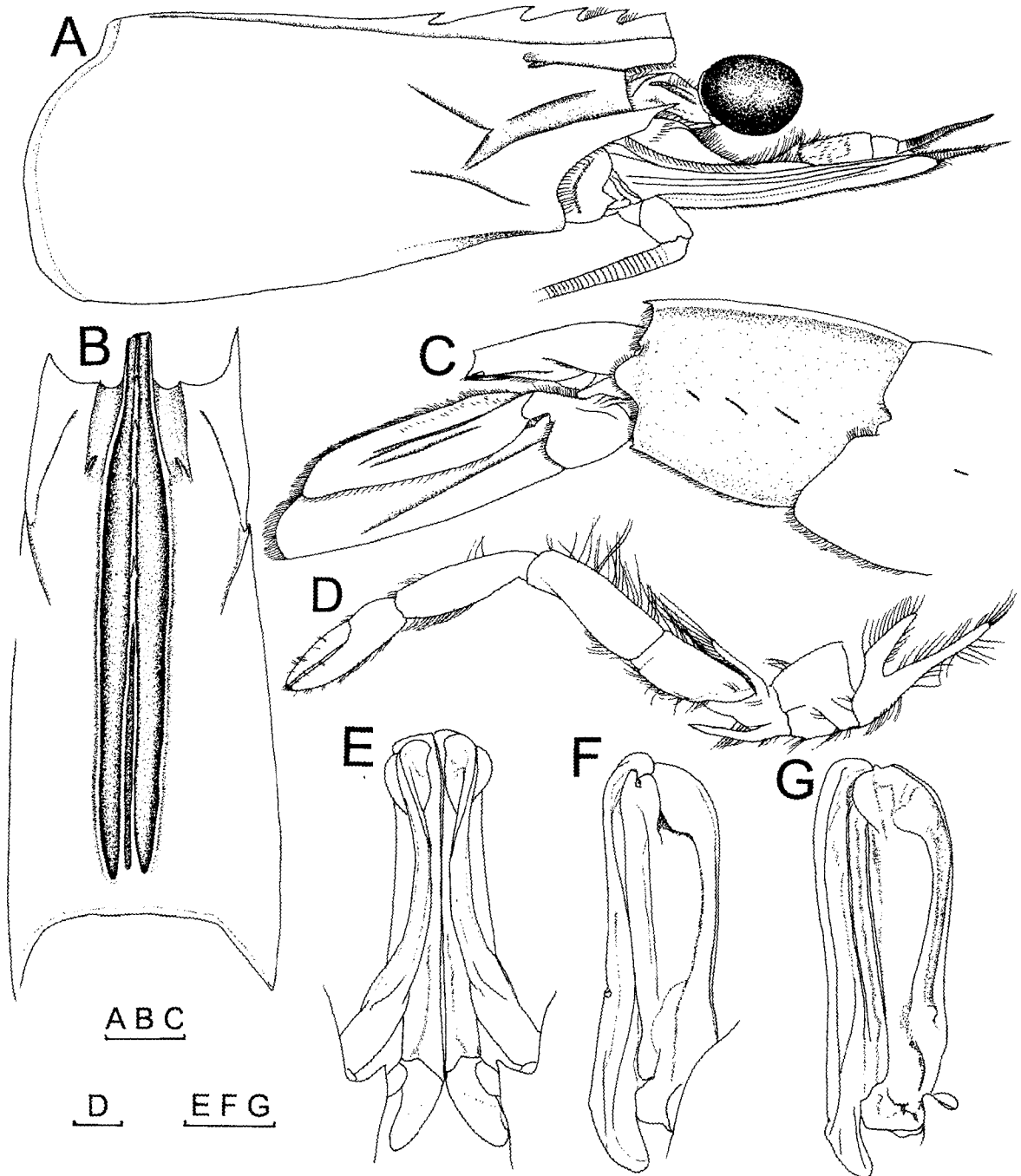


Fig. 1. *Melicertus latisulcatus* (Kishinouye, 1896). Male (CL 33.4 mm, PU1Z 156) from Jeju Island. A, carapace and cephalic appendages, lateral; B, carapace, dorsal; C, sixth abdominal somite, telson and uropods, lateral; D, first pereopod, lateral; E, petasma, ventral; F, right piece of petasma, lateral; G, left piece of petasma, mesial. Scales: A-C, 5 mm; D-G, 2 mm.

39, 49J, 56, 58B, 67A-D, 73B, H, 77O, 109 (middle), 111; Hall, 1956: 72; 1962: 14, fig. 80; Dall, 1957: 149, fig. 4; Burkenroad, 1959: 81, fig. 7a; Racek and Dall, 1965: 12; Starobogatov, 1972: 367, pl. 4, fig. 28; Yu and Chan, 1986: 91, 2 unnumbered figs.; Chan, 1998: 918, 3 unnumbered figs.

Penaeus (Melicertus) latisulcatus – Holthuis, 1980: 48 (in part); Miyake, 1982: 7, pl. 3, fig. 1; 1991: 7, pl. 3, fig. 1; Motoh and Buri, 1984: 37, figs. 22B, 23B, 24B, E, 25, 26; Hayashi, 1986: 71, 246, fig. 31; 1992: 131, figs. 68e, 69e, 71c; Liu and Zhong, 1988: 120, text-figs. 62-64, pl. 2, fig. 6.

Penaeus (Melicertus) latisulcatus latisulcatus – Miquel, 1984: 105, figs. 1c, 2b.

Melicertus latisulcatus – Pérez Farfante and Kensley, 1997: 102 (list); Miyake, 1998: 7, pl. 3, fig. 1; Lee et al., 1999: 445; Sakaji et al., 2000: 17.

Penaeus latisulcatus var. *australiensis* – De Man, 1902: 905. Not *P. latisulcatus* var. *australiensis* Bate, 1888 [= *Melicertus plebejus* (Hess, 1865)].

Penaeus latisulcatus (sic) – Je et al., 2002: 225, unnumbered fig.

Not *Penaeus latisulcatus* – De Bruin, 1965: 74 [= *Melicertus hathor* (Burkenroad, 1959)].

Material examined

Hamduck, Jeju Island, 80 m, set net, 16 Sep. 2002, coll. D.H. Kim, 1♂ (CL 33.4 mm), PUIZ 156.

Description

Integument smooth. Rostrum (Fig. 1A, B) broken and missing distally, 3 teeth on carapace; epigastric tooth slightly more separated from posterior-most tooth of rostral series than interval among posterior-most tooth and other rostral teeth; adrostral sulcus long, reaching almost posterior margin of carapace; postrostral carina long, extending backward nearly to distal end of adrostral sulcus, narrower than adrostral sulcus, with distinct median sulcus. Carapace (Fig. 1A, B) with gastrofrontal sulcus deep, bifid posteriorly; antennal spine large, hepatic and orbital spines small, pterygostomial angle rounded; gastro-orbital carina long, extending anteriorly 3/4 of distance from hepatic spine to orbital margin; antennal carina well-marked; hepatic carina prominent, curving downwards anteriorly; cervical carina sharp, accompanying sulcus deep. Abdominal somites with middorsal carina from posterior half of 4th to

6th somites, that of 6th somite ending in spine; 5th somite with 1 cicatrice; 6th somite (Fig. 1C) stout and short, 1.8 times as long as posterior deep, bearing 3 cicatrices, posteroventral angle with small spine. Telson (Fig. 1C) distally broken and missing, but showing 1 movable spine. Antennule (Fig. 1A) with dorsolateral flagellum shorter than ventrolateral one; stylocerite reaching mid-length of first antennular segment. Antenna (Fig. 1A) with scaphocerite longer than antennular peduncle. First pereopod (Fig. 1D) reaching distal margin of carpocerite of antenna, ischium with rudimental spine ventrodistally, basis with distinct spine. Second pereopod reaching beyond distal margin of carpocerite of antenna by dactylus, ischium without spine, basis with large spine. Third pereopod reaching distal margin of first segment of antennular peduncle. Fourth and fifth pereopod reaching distal margin of basicerite of antenna. Each of thoracic appendages with exopod. Petasma (Fig. 1E, F, G) symmetrical, distomedian projections short, slightly overhanging distal margin of costae.

Coloration in freshly preserved specimen

Body generally bright yellow to reddish brown; each of pleura of abdominal somites with short transverse crimson red band; rostrum and carinae on body reddish brown to dark brown; eyes dark brown to black; antennae bright pink to dark brown with red transverse bands proximally, flagella uniformly light brown; thoracic appendages white with small bluish brown spots; pleopods dark brown tipped with bright yellow; uropods basically right yellow and reddish brown in distal half margined with dark blue (Fig. 3A).

Distribution

Occurred in the eastern Indian Ocean and the West Pacific and reported from Malay Archipelago, South China Sea, Taiwan, Japan, Korea, New Guinea, Australia and Fiji (Pérez Farfante and Kensley, 1997; Je et al., 2002). Found from near shore to depths about 90 m, on bottoms of sand, mud, or gravel, with a clear preference for sandy substrates (Chan, 1998; Je et al., 2002). Commercially important in the countries around the Indian Ocean (Holthuis, 1980). Rare in Korea, only around Jeju Island (Je et al., 2002; present study).

Remarks

Although the distal parts of rostrum and telson are broken, the present specimen agrees well with the previous descriptions of *Penaeus latisulcatus* or

P. (Melicertus) latisulcatus (Kubo, 1949; Dall, 1957; Motoh and Buri, 1984; Liu and Zhong, 1988) except for the relative length between thoracic and cephalic appendages. In the present specimen, the first pereopod reaches the distal margin of the carpocerite of antenna. It is longer than that of Australian material, in which it reaches the base of carpocerite (Dall, 1957), but in Japanese material the first pereopod reaches beyond the end of carpocerite (Kubo, 1949). The third pereopod extends to the distal margin of the first segment of antennular peduncle in the present specimen, whereas it exceeds the end of the second antennular peduncle in Japanese and Philippine materials (Kubo, 1949; Motoh and Buri, 1984). These discrepancies, which could be within the range of intraspecific variation, may be due to geographical variation or differences in allometric growth.

Burkenroad (1959) separated *Penaeus latisulcatus* into two subspecies, *P. latisulcatus latisulcatus* from Southeast Asia and Japan, and *P. latisulcatus hathor* from the Red Sea and the western Indian Ocean. At present, *P. latisulcatus hathor* is treated as a species, *Melicertus hathor* (see Pérez Farfante and Kensley, 1997; Galil, 1999).

Since Kubo (1949) included Korea in the geographical distribution range of *Melicertus latisulcatus* (as *Penaeus latisulcatus*) based on Yoshida (1941), many authors (e.g., Dall, 1957; Holthuis, 1980; Yu and Chan, 1986; Liu and Zhong, 1988; Pérez Farfante and Kensley, 1997) followed him. However, Yoshida's (1941: pl. 11, fig. 1) specimen of *Penaeus latisulcatus* was actually from not Korea, but from Yamaguchi Pref. (Aio), Japan. In Korea, therefore, the first record of this species was the one recently reported by Je et al. (2002) based on an underwater photograph.

***Metapenaeopsis mogiensis mogiensis*
(Rathbun, 1902)**

(Figs. 2, 3B)

Korean name: *Jeju-kal-kal-saewoo*

제주갈갈새우 (신칭)

The full synonymy is well known by Crosnier (1991), so this study shows a restricted synonymy reported mainly from East Asian waters.

Parapenaeus mogienis Rathbun, 1902: 39, fig. 6-8 [type locality: Mogi, Nagasaki Pref., Japan].

Penaeopsis mogiensis—Balss, 1914: 9; 1924: 44; Parisi, 1919: 63, pl. 5, fig. 6; Schmitt, 1926: 39 (in passim), pl. 61, fig. 4.

Metapenaeus mogiensis—Urita, 1921: 215.

Ceratopenaeus mogiensis—Yokoya, 1933: 7.

Metapenaeopsis mogiensis—Miyake, 1961: 7 (list); 1982: 172 (list); 1991: 172 (list); Miyake et al., 1962: 122 (list); Harada, 1968: 82; Matsumiya and Oka, 1977: 339; Fujino, 1978: 20 (list); Hayashi, 1992: 89, figs. 47d, 48d, 49d, 50d; Sakaji and Horikawa, 1995: 122, fig. 1 (top).

Metapenaeopsis mogiensis mogiensis—Crosnier, 1991: 213, figs. 34d-e, 35, 37a-f, 38a, b, 39; Miyake, 1998: 171 (list); Sakaji et al., 2000: 21.

?*Metapenaeus mogiensis*—Rathbun, 1906: 904, pl. 20, fig. 3.

Not *Penaeopsis mogiensis*—Chyung, 1956: 759 [= *Trachysalambria curvirostris* (Stimpson, 1860)].

Material examined

Hamduck, Jeju Island, 80 m, set net, 16 Sep. 2002, coll. D.H. Kim, 1♂ (CL 20.8 mm), 2♀ (CL 24.4, 24.9 mm), PUIZ 157.

Description

Integument thick, pubescent. Rostrum (Fig. 2A) short, straight, slightly arched dorsal margin, reaching or beyond mid-length of second segment of antennular peduncle, 0.5-0.6 times as long as carapace, armed with 6-7 dorsal teeth and no ventral tooth; epigastric tooth considerably separated from posterior-most tooth of rostral series; adrostral carina well defined; postrostral carina absent. Carapace (Fig. 2A) with orbital spine small, antennal, pterygostomian and hepatic spines well developed; antennal carina feeble; cervical sulcus weak, hepatic sulcus relatively well defined; no stridulating ridges. Abdominal somites (Fig. 2A, B) with middorsal carina from posterior part of 2nd somite to distal end of sixth somite; 3rd to 6th somites with middorsal carina on entire length; middorsal carina of 3rd somite dorsally flattened, those of 4th and 5th somites bifid posteriorly, each ending in spine, that of 6th somite produced posteriorly in sharp spine with pair of small additional spines inferiorly; 6th somite moderately stout and short, 1.5 times as long as 5th somite, 1.7-1.9 times as long as posterior deep, posteroventral angle with small spine, lacking cicatrices. Telson (Fig. 2A, B) tapering, as long as uropod, with 1 pair of fixed and 3 pairs of movable teeth laterally. Antennule (Fig. 2A) with peduncle falling short of distal margin of scaphocerite; first segment longer than distal 2 segments combined, bearing vestigial

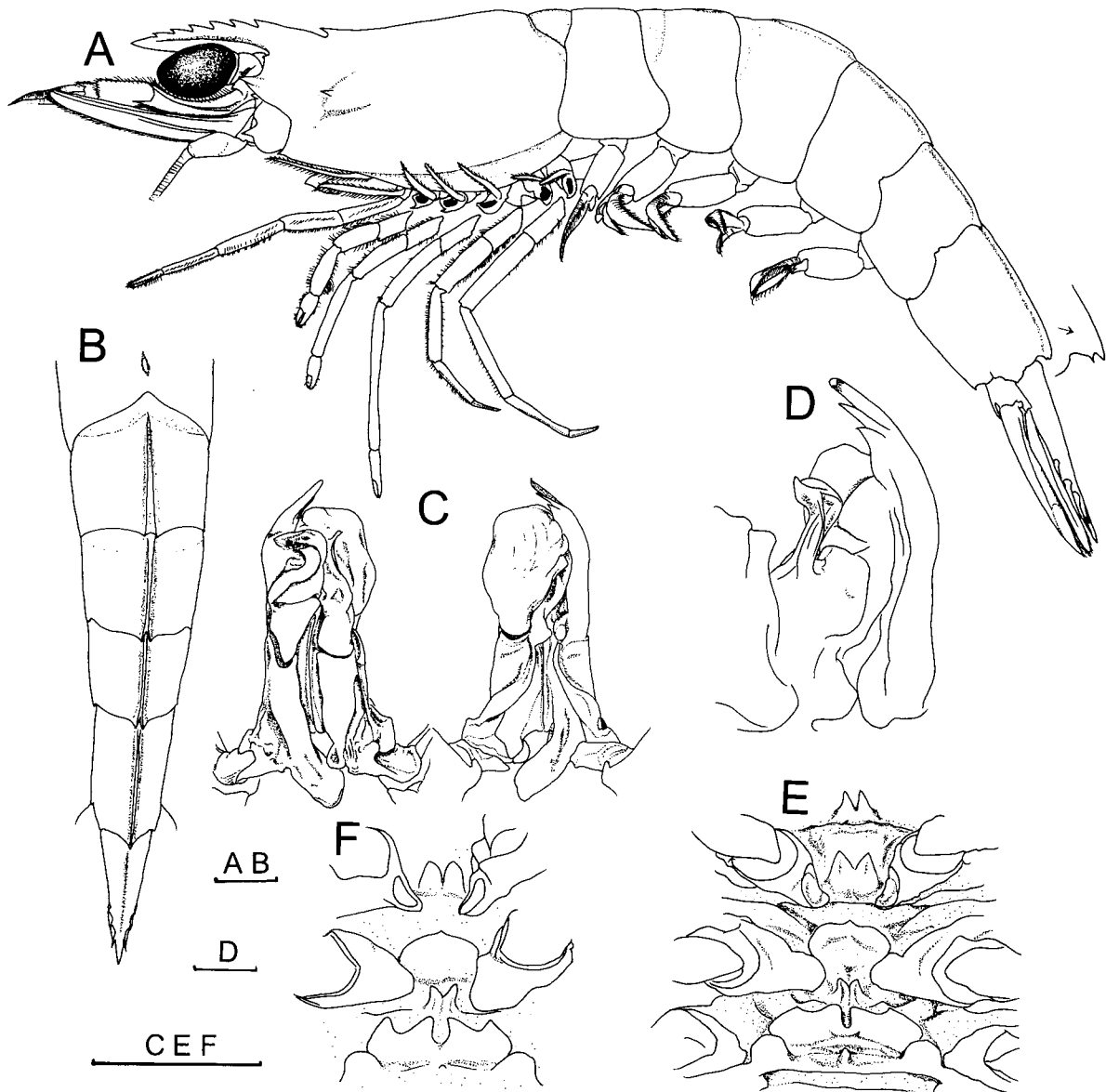


Fig. 2. *Metapenaeopsis mogiensis mogiensis* (Rathbun, 1902). A-D, male (CL 20.8 mm, PUIZ 157) from Jeju Island; E, female (CL 24.4 mm, same lot); F, female (CL 24.9 mm, same lot). A, entire animal, lateral; B, abdominal somites and telson, dorsal; C, petasma, dorsal (left) and ventral (right); D, distoventral element and left distoventral projection of petasma, ventral; E, F, thelycum, ventral. Scales: A-C, E, F, 5 mm; D, 2 mm.

distomesial spine (parapenaeid spine) and well developed distolateral spine; stylocerite slightly exceeding distal margin of first antennular segment; flagella subequal in length. Antenna (Fig. 2A) with scaphocerite 0.8 times as long as carapace, 2.6 times as long as wide; distolateral spine reaching distal margin of blade. Thoracic appendages (Fig. 2A) with exopod; third maxilliped falling short of second antennular

segment; first pereopod with small ischial spine and distinct basal spine; second pereopod with basal spine. Petasma (Fig. 2C) asymmetrical, right distoventral projection broadly rounded, distoventral element (Fig. 2D) swollen distally; left distoventral projection slender, with 3 distal processes increasing in length dorsally. Thelycum (Fig. 2E, F) with central plate on 7th thoracic sternite pointed medially;

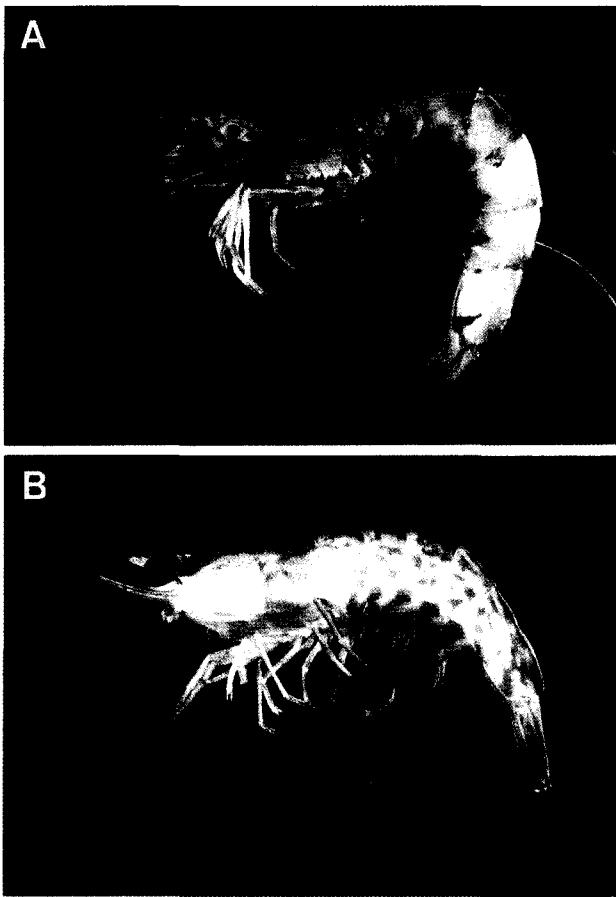


Fig. 3. A, *Melicertus latisulcatus* (Kishinouye, 1896), male (CL 33.4 mm, PUIZ 156); B, *Metapenaeopsis mogiensis mogiensis* (Rathbun, 1902), male (CL 20.8 mm, PUIZ 157).

transverse plate on 8th thoracic sternite with large median and two semicircular excavations, median excavation U-shaped, external lobes reaching or slightly beyond internal lobes; large subacute or bluntly divergent tubercles on 8th sternite between central and transverse plates.

Coloration in freshly preserved specimen

Body white to pale pink, with bright red stripes and patches; eyes dark brown; scaphocerites pale pink with red markings distally and medially, flagella reddish brown; lateral surface of carpi of fourth and fifth pereopods red, other thoracic appendages pale yellow; lateral surface of protopods of pleopods with red spots; distal half of uropods red (Fig. 3B).

Distribution

Known from the southern coasts of Japan, and Jeju Island, Korea, at depths between 15-150 m,

usually found less than 82 m in summer (Balss, 1914; Crosnier, 1991; Sakaji et al., 2000; present study). The present specimens represent the first record of this species from Korean waters.

Remarks

Metapenaeus mogiensis was first described by Rathbun (1902) as *Parapenaeus mogiensis* based on two males and five females from Mogi, Nagasaki Pref., Japan. Subsequently, the species was reported from various localities in the Indo-West Pacific (e.g., Dall, 1957; Hall, 1961; De Bruin, 1965; Yu and Chan, 1986; De Freitas, 1987; Liu and Zhong, 1988; Hayashi, 1992). During the revision of the Indo-West Pacific species of *Metapenaeopsis*, Crosnier (1991) proposed a subspecific division of *M. mogiensis* with some hesitation. He described four subspecies, *M. mogiensis mogiensis* from Japan, *M. mogiensis consobrino* (Nobili, 1904) from the Indian Ocean except for northern Australia, Strait of Malacca and eastern Indonesia, *M. mogiensis complanata* Crosnier, 1991 from northern Australia, Chesterfield Islands and New Caledonia, and *M. mogiensis intermedia* Crosnier, 1991 from Thailand, the Philippines, northern Indonesia, South China Sea and Taiwan. The present specimens, which may be the largest specimens (CL 20.8 mm in male, CL 24.9 mm in female) among known materials of this species, support Crosnier's (1991) division, since they agree well with Crosnier's (1991) description of *M. mogiensis mogiensis* in having the following characters. (1) The middorsal carina on the third abdominal somite is flattened or slightly sulcate in the Korean specimens (Fig. 2B), while distinctly sulcate in the other subspecies; (2) the distoventral element of right piece of petasma is swollen distally in the Korean specimens (Fig. 2D), but flattened in the other subspecies; (3) the transverse plate of thelycum is provided with the narrow U-shaped median excavation in the Korean specimens (Fig. 2E, F), but with wider or V-shaped median excavation in the other subspecies; and (4) the external lobes of transverse plate of the thelycum is as high as the internal lobes in the Korean specimens (Fig. 2E, F), while they are higher or lower than the internal lobes in the other subspecies. The present specimens have a pair of small spines (Fig. 2C) inferior to the posterior spine of middorsal carina on the sixth somite. This feature was not mentioned previously by any authors.

From the Hawaiian Islands, Rathbun (1906) reported *Metapenaeus mogiensis* based on a male

and a female with an illustration depicting the entire female in lateral view. Rathbun's (1906) species was synonymized with *M. mogiensis mogiensis* by Crosnier (1991) without any discussion. However, Crosnier (1991) did not directly examine Rathbun's (1906) material and also excluded Hawaiian Islands in the distributional record of *M. mogiensis mogiensis*. Therefore, the specific status of Rathbun's (1906) *Metapenaeus mogiensis* is ambiguous so far.

Chyung's (1956) *Penaeopsis mogiensis* reported from Kyongki Province, Korea, was referred to *Trachypenaeus curvirostris* Stimpson, 1860 (= *Trachysalambria curvirostris*) by the Korean authors (Kim and Park, 1972; Kim, 1976; 1977), though Crosnier (1991) questionably included it in the synonymy of *Metapenaeopsis mogiensis mogiensis*. The present study confirms that Chyung's (1956) *P. mogiensis* is *Trachysalambria curvirostris* (Stimpson, 1860).

In Korean waters, *M. mogiensis mogiensis* is very similar to *M. dalei* (Rathbun, 1902) in general morphology except for their genital organs. In *M. mogiensis mogiensis*, the left distoventral projection of petasma has three unbranched processes distally (Fig. 2D), whereas it has a few branched processes in *M. dalei*. The intermediate plate of thelycum situated between the central and transverse plates is composed of a pair of large subacute or blunt divergent tubercles in *M. mogiensis mogiensis* (Fig. 2E, F), rather than a pair of low processes in *M. dalei*. Moreover, color pattern is distinguished from the other; the red stripes and patches of *M. mogiensis mogiensis* (Fig. 3B) are much broader and sparser than those of *M. dalei*.

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