

## Deep-Sea Crabs Collected by the R.V. *Hakuho Maru* during KH-05-01 Cruise off the Ryukyu Islands

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**Abstract** Deep-sea crabs from off the Ryukyu Islands collected with 4 m OREGON-type beam trawl during KH-05-01 cruise of the R.V. *Hakuho Maru* of the Japan Marine Science and Technology Center (JAMSTEC), are referred to 13 species of 9 families. Of them, *Homolodromia kai* Guinot, 1993 (Homolodromiidae), *Latreillia metanesa* Williams, 1982 (Latreillidae), and *Cymonomus soela* Ahyong et Brown 2003 (Cymonomidae) are newly recorded from Japanese waters. *Psopheticus musicus* Guinot, 1990 (Goneplacidae) is newly recorded in this report, but the previous records of occurrence of *P. stridulans* Wood-Mason in Japanese water is probably due to misidentification of this species. All the species are the typical deep-sea inhabitants.

**Key words:** Deep-sea crabs, Homolodromiidae, Homolidae, Latreillidae, Cyclodorippidae, Cymonomidae, Majidae, Atelecyclidae, Pilumnidae, Goneplacidae, Ryukyu Islands, Japan.

The research cruise KH-05-01 of the R.V. *Hakuho Maru* of the Japan Marine Science and Technology Center (JAMSTEC), was carried out in May, 2005, at the deep sea off the Ryukyu Islands under the command of S. Ohta, one of the present authors. The benthic animals were collected with 4 m OREGON-type beam trawl, but the sampling is not always exhaustive to get the overall knowledge of deep-sea bottom fauna off the Ryukyu Islands. This is apparent from the fact that the crabs obtained are only 13 species of 9 families, but considering the difficulty in getting the specimens from deep-sea bottom, the records of all the specimens are worthy of noting for the taxonomical and biogeographical studies of deep-sea crabs and faunae.

In the following lines the data of the sampling stations are recorded, together with names of the species and numbers of the specimens obtained. The species with an asterisk are new to Japanese waters.

- St. OT-05: West of Amami-Oshima I., 28°33.25'N, 126°58.11'E–28°22.09'N, 126°57.03'E, 334–348 m deep, 13–V–2005. — *Tymolus uncifer* (Ortmann) (Cyclodorippidae), 1 ♀; *Cyrtomaia owstoni* Terazaki (Majidae), 1 ♀, 1 juv.; *Platymaia wyvillethomsoni* Miers (Majidae), 5 young ♂, 4 young ♀, 54 juv.; *Psopheticus musicus* Guinot (Goneplacidae), 1 ♂.
- St. OT-06: West of Amami-Oshima I., 28°32.22'N, 127°01.84'E–28°31.05'N, 127°01.49'E, 576–594 m deep, 13–V–2005. — *Trichopeltarion ovale* Anderson (Atelecyclidae), 1 ♂.
- St. OT-07: West of Amami-Oshima I., 28°40.30'N, 127°06.16'E–28°39.24'N, 127°05.78'E, 747–772 m deep, 13–V–2005. — \**Cymonomus soela* Ahyong et Brown (Cymonomidae), 1 ♂, 1 ♀; *Cyrtomaia owstoni* Terazaki, 2 ♂, 2 ♀, and *Platymaia wyvillethomsoni* Miers (Majidae), 1 young ♂; *Trichopeltarion ovale* Anderson (Atelecyclidae), 1 ♂, 1 ♀.
- St. OT-09: North of Tokuno-shima I., 28°05.52'N, 128°55.30'E–28°04.86'N, 128°54.37'E, 728–748 m deep, 14–V–2005. — \**Homolodromia kai* (Guinot) (Homolodromiidae), 1 ♀; *Cyrtomaia suhmi* Miers (Majidae), 1 ♂.
- St. OT-14: Southwest of Kume-jima I., 25°30.96'N, 126°29.21'E–25°29.99'N, 126°29.55'E, 372–375 m deep, 15–V–2005. — \**Latreillia metanesa* Williams

(Latreillidae), 1♂; *Cyrtomaia lamellata* Rathbun, 3 juv., and *Rochinia veltina* (Miers), 1 young ♂, 2 young ♀ (Majidae); *Pilumnus orbitospinis* Rathbun (Pilumnidae), 1♀.

St. PS-08: Land slope of Ryukyu Trench, 26°19.47'N, 128°21.20'E–26°20.09'N, 128°23.10'E, 1338–1396 m deep, 24–V–2005. — *Lamoha longirostris* (Chen) (Homolidae), 1 ovig. ♀.

All the specimens are preserved in the National Science Museum, Tokyo (NSMT). Abbreviations used in this report are as follows: cb—greatest breadth of carapace, and cl—length of carapace excluding rostral or pseudorostral spines or teeth.

### Taxonomic Account

Family HOMOLODROMIIDAE

*Homolodromia kai* Guinot, 1993

(Fig. 1A)

*Material examined.* St. OT-09, 1♀ (cb, 27.7 mm; cl excluding pseudorostral teeth, 31.7 mm), NSMT-Cr 16337.

*Remarks.* The genus *Homolodromia* was well studied by Guinot (1995), being known by *H. paradoxa* A. Milne Edwards from the western Atlantic, *H. robertsi* Garth from Peru and Chile in the eastern Pacific, *H. bouvieri* Doflein from the western Indian Ocean, and *H. kai* from the western and southern Pacific Ocean. The specimen at hand agrees well with the elaborate description, photographs and figures by the original author. Many characters to distinguish this species from another representative of the Indo-West Pacific, *H. bouvieri*, were enumerated by the original author. Most remarkable character for this species is the inward curved pseudorostral spines.

*Distribution.* Previously recorded by Guinot (1993: Kai Is., Indonesia, 688–694 m deep), Guinot (1995: New Caledonia, 680–830 m deep, Vanuatu, 775–850 m deep, Wallis and Futuna Islands, 705–711 m deep), Ho and Ng (1999: Tung-sha Is., South China Sea, 650 m deep). The photograph of an ovigerous female given by Chen and Sun (2002) is taken from just the spec-

imen reported by Ho and Ng (1999) from the South China Sea.

Family HOMOLIDAE

*Lamoha longirostris* (Chen, 1986)

(Fig. 1B)

*Material examined.* St. PS-08, 1 ovig. ♀ (cb, 17.7 mm; cl excluding rostrum, 20.0 mm), NSMT-Cr 16338.

*Remarks.* The genus *Lamoha* has been proposed by Ng (1998) as a replacement name for *Hypsophrys* Wood-Mason & Alcock, 1891, which was preoccupied by a genus name for freshwater fish.

The original description of *Hypsophrys longirostris* which is at present known as *Lamoha* as mentioned above was written in Chinese, without figure and any information about the specimen, and not well circulated. A new species, *H. futuna*, described by Guinot and Richer de Forges (1995) was quite unfortunately identical with *H. longirostris*, the identity of which was made clear by Ng and Chen (1999). Even if the French authors were aware of the original description of *H. longirostris*, it would not have been possible to ascertain the actual identity of *H. longirostris* from the original brief description in Chinese.

The present species is at present well established due to the good description and figures given by Ng and Chen (1999) based on the type specimens, and also by the original description of *H. futuna* given by Guinot and Richer de Forges (1995). The same figures in Ng and Chen (1999) were reprinted in Chen and Sun (2002). Recently, Marumura and Takeda (2003) recorded a male from Tosa Bay, with fine photographs.

*Distribution.* Tosa Bay in Japan, 630 m deep, East and South China Seas, 900–1265 m deep, and Wallis and Futuna Islands in the South Pacific, 1280–1300 m deep.

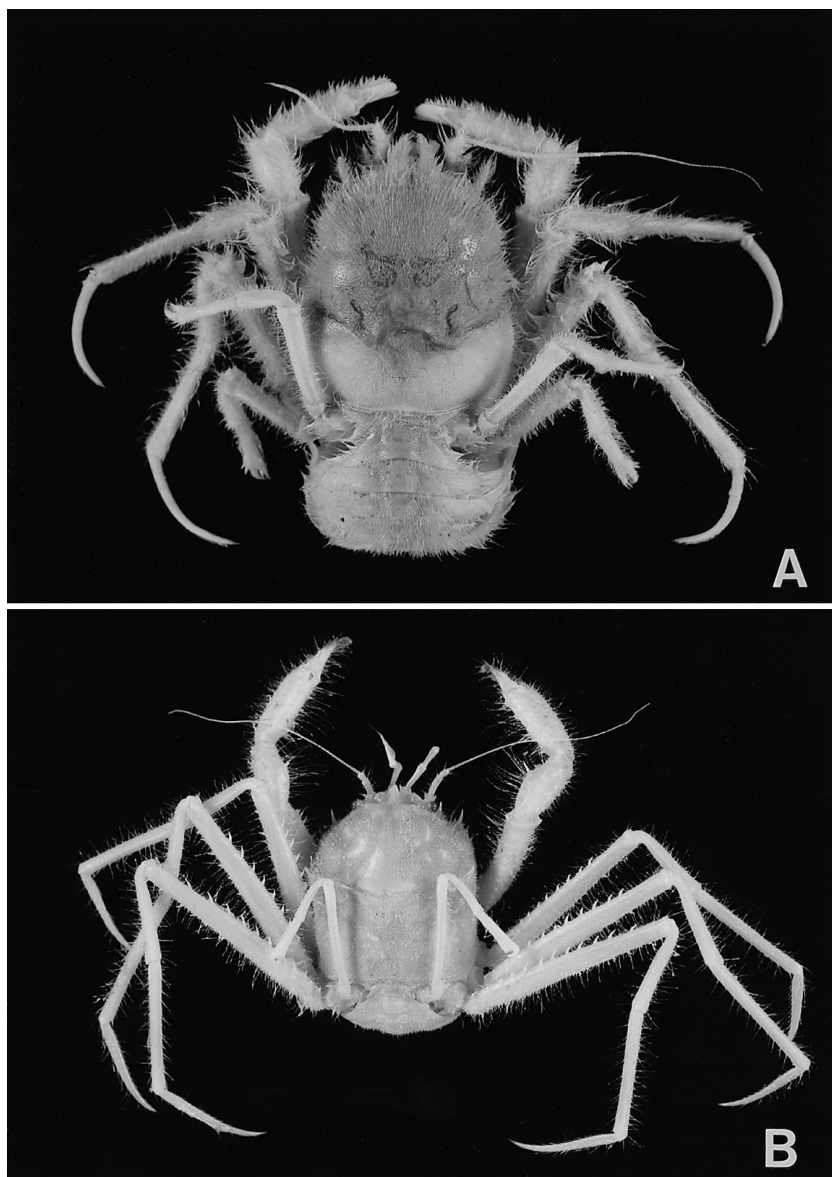


Fig. 1. A, *Homolodromia kai* Guinot, ♀ (cb, 27.7 mm), NSMT-Cr 16337; B, *Lamoha longirostris* (Chen), ovig. ♀ (cb, 17.7 mm), NSMT-Cr 16338.

Family LATREILLIDAE

*Latreillia metanese* Williams, 1982

(Fig. 3B)

*Material examined.* St. OT-14, 1♂ (cb, 3.7 mm; cl excluding pseudorostral spine, 6.6 mm; pseudorostral spine, 5.5 mm; last leg, 28.2 mm — merus, 15.5; carpus, 7.5; propodus, 4.6; dactylus,

0.6), NSMT-Cr 16339.

*Remarks.* The genus *Latreillia* was revised in detail and divided into two genera, *Latreillia* s.s. and *Eplumula* by Williams (1982) chiefly based on the morphological difference in the last pair of legs. Recently, these two genera were further studied by Castro *et al.* (2003), being known by five species of *Latreillia* and two species of

*Eplumula*.

The specimen at hand is of fragile appearance, with the carapace much narrower than that of *L. valida* de Haan; each pseudorostral spine is as long as the eyestalk, and the dactylus of the last leg is exceedingly short, turned upward and forms a small subchela with the propodus. The absence of the middorsal gastric spine in the specimen is inconsistent with the original description, but the wide variations in the armature were indicated by Castro *et al.* (2003) based on many specimens.

*Distribution.* As shown on the map by Castro *et al.* (2003), this species is widely distributed in the Indo-West Pacific from Hawaii and the Philippines southward to New Caledonia and the Tuamotu Islands, and westward to the western Indian Ocean. It is also known from the Sala y Gómez and Nazca submarine ridges in the eastern Pacific. Its bathymetric range is from 22 to 806 m. The geographical distribution was extended further north to off the Ryukyu Islands in the western Pacific.

## Family CYCLODORIPPIDAE

*Tymolus uncifer* (Ortmann, 1892)

*Material examined.* St. OT-05, 1 ♀ (cl, 5.0 mm) infested by a bopyrid, NSMT-Cr 16340.

*Remarks.* The left branchial area of the carapace is spherically deformed with parasitic isopod crustacean.

*Distribution.* As summarized by Takeda (2001) and additionally recorded by Ho *et al.* (2004), this species is known from Japan, 55–452 m deep, Taiwan, 262–266, 600, and 650 m deep, the Andaman Sea, 475 and 730 m deep, and East Africa, 463–638 m deep. In Japanese waters, this species is not uncommon from northern Honshu to Kyushu along both coasts, together with the congener having the shorter ambulatory legs, *T. japonicus* Stimpson.

## Family CYMONOMIDAE

*Cyonomus soela* Ahyong et Brown 2003

(Fig. 2)

*Material examined.* St. OT-07, 1 ♂ (cb, 8.8 mm; cl excluding rostrum, 8.3 mm) infested by a *Sacculina*, 1 ♀ (cb, 8.2 mm; cl, 7.6 mm), NSMT-Cr 16341.

*Remarks.* Ahyong and Brown (2003) made a key to the Indo-West Pacific species of the family Cyonomidae. The known Indo-West Pacific species are one species of *Elassopodus*, two species of *Cyonomoides*, and 12 species of *Cyonomus*. Most of them are the deep-sea inhabitants and described on a few specimens.

The specimens at hand are referred to the *quadratus* group in *Cyonomus* defined by Griffin and Brown (1976) having the rostrum shorter than the eyestalk. The known species in chronological order are *C. andamanicus* Alcock, 1905, *C. curvirostris* Sakai, 1965, *C. bathamae* Dell, 1971, *C. umitakae* Takeda, 1981, *C. sagamiensis* Sakai, 1983, *C. hakuhoae* Takeda et Moosa, 1989, and *C. soela* Ahyong et Brown, 2003. There may be the variations regarding divergent angle of the fixed eyestalk, comparative length of the rostrum to the eyestalk and also to the lateral frontal projection of the carapace, tuberculation or granulation of anterolateral margin of the carapace and the third maxilliped.

Following the key made by Ahyong and Brown (2003), the present specimens are keyed out to *C. soela* described by them from Australia, because the eyestalks are not subparallel to each other like in *C. hakuhoae*, *C. umitakae* and *C. sagamiensis*, but divergent strongly. Each lateral frontal projection is so developed as to reach the rostral tip differing from that of *C. andamanicus*, to which the general formation of the carapace is close. Only the discrepancy between the specimens at hand and the original description of *C. soela* is that the rostrum is rather triangular and about one third as long as the eyestalk in the present specimens, while the rostrum is narrow, tapering and nearly half as long as the eyestalk in *C. soela*. In addition, the third maxilliped is only

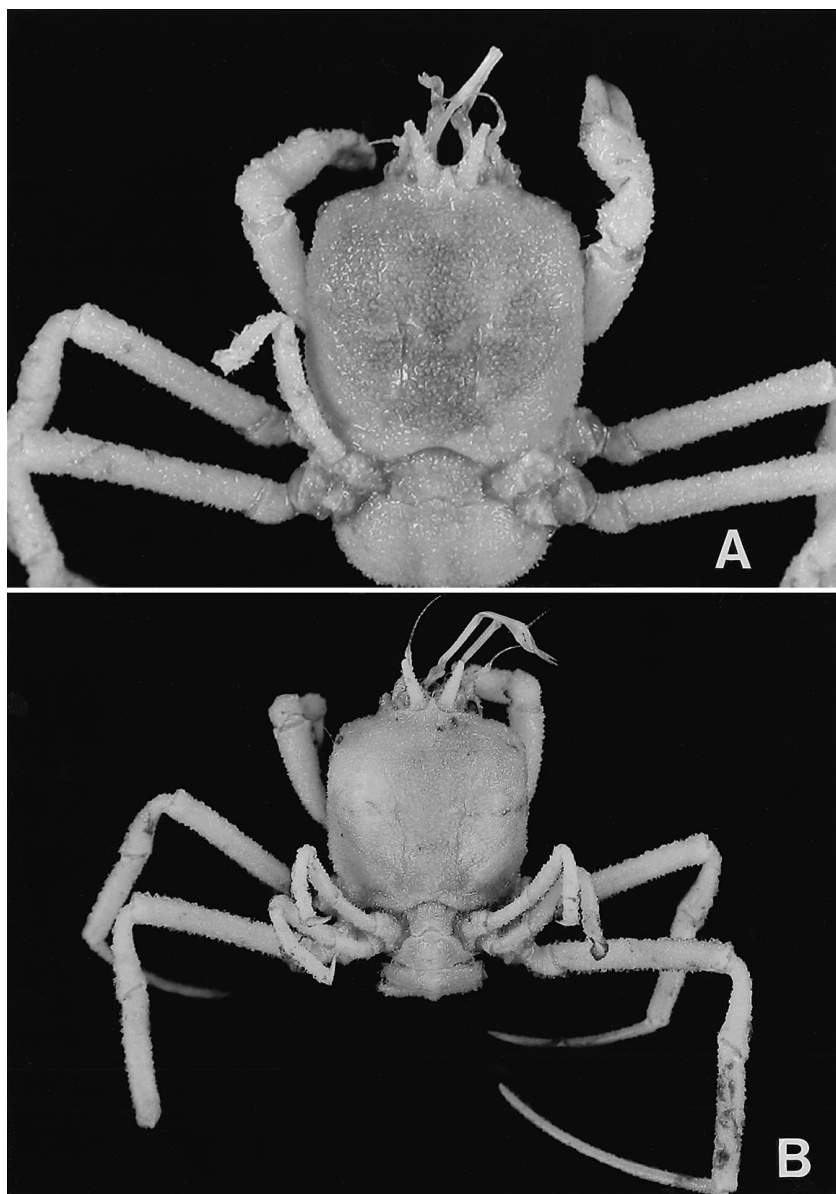


Fig. 2. *Cymonomus soela* Ah Yong et Brown, ♀ (A: cb, 8.2 mm), ♂ infested by a *Sacculina* (B: cb, 8.8 mm), NSMT-Cr 16341.

microscopically granulated for all the surfaces, differing from the heavily granulated maxilliped figured in the original description. Notwithstanding these differences that may be specific, we hesitate to describe a new species only on two female specimens.

*Distribution.* *Cymonomus soela* is previously known by two females from off St. Patricks

Head, Tasmania, Australia, 940–990 m deep.

#### Family MAJIDAE

#### *Cyrtomaia lamellata* Rathbun, 1906

*Material examined.* St. OT-14, 3 juv. (NSMT-Cr 16343).

*Remarks.* The smallest specimen is only

4.0 mm in breadth and length of carapace excluding branchial and peduncular spines, and the biggest is 6.5 mm. The antennal peduncular segments are more or less lamellate, with bifid spines at distal part of its basal segment, differing from that of *C. owstoni* Terazaki, the basal segment of which is armed with three strong spines.

In this report, we adopt *C. lamellata* for the specimens from Japanese waters following Griffin and Tranter (1986) who considered *C. lamellata* Rathbun, *C. hispida* Borradaile and *C. platypes* Yokoya as synonyms against Guinot and Richer de Forges (1982). It seems to be almost impossible to distinguish these three species based on the literature.

*Distribution.* Pacific, from Hawaii and Japan southward to New Zealand, ca. 70–270 m deep.

#### *Cyrtomaia owstoni* Terazaki, 1903

*Material examined.* St. OT-05, 1 ♀ (cb excluding branchial spines, 26.3 mm; cl excluding rostrum, 24.0 mm), 1 juv. (cb, 8.3 mm; cl, 8.3 mm), NSMT-Cr 16342; St. OT-07, 2 ♂ (cb, 19.0 mm; cl, 17.8 mm/cb, 27.2 mm; cl, 25.7 mm), 2 ♀ (cb, 17.8 mm; cl, 19.5 mm/cb, 21.0 mm; cl, 20.3 mm), NSMT-Cr 16349.

*Remarks.* In the juvenile specimen, the carapace is not so strongly expanded laterally at the branchial regions of both sides, with longer gastric, cardiac, branchial, external orbital, and hepatic spines, but the antennal basal segment is armed with three strong spines just like in the adult specimens.

*Distribution.* West Pacific from Sagami Bay, central Japan, southward to Vietnam, 65–915 m deep.

#### *Cyrtomaia suhmi* Miers, 1886

*Material examined.* St. OT-09, 1 ♂ (cb excluding branchial spines, 22.2 mm; cl excluding rostral spines, 24.3 mm), NSMT-Cr 16344.

*Remarks.* Griffin and Tranter (1984) discussed the systematic status of *C. curviceros* Bouver which was considered by Guinot and Richer de Forges (1982) as valid, and thus this

species has been reduced to a synonym of *C. suhmi*.

*Distribution.* Its geographical range is from Japan to Australia and India through the Philippines and Indonesian waters, ca. 360–575 m deep.

#### *Platymaia wyvillethomsoni* Miers, 1886

*Material examined.* St. OT-05, 5 young ♂ (biggest—cb excluding branchial spines, 24.3 mm; cl excluding rostral spine, 22.0 mm), 4 young ♀ (biggest—cb, 19.8 mm; cl, 17.2 mm), 54 juv., NSMT-Cr 16352; St. OT-07, 1 young ♂ (cb, 11.7 mm; cl, 11.0 mm), NSMT-Cr 16345.

*Remarks.* At present, we follow Griffin and Tranter (1986) who examined a good series of the specimens and concluded that *P. wyvillethomsoni* is a western Pacific species against the Indian Ocean representative, *P. alcocki* Rathbun, 1916. *Platymaia remifera* Rathbun, 1916 was synonymized with this species by Griffin (1976) who examined many specimens from the Philippines.

*Distribution.* West Pacific from Japan through the East and South China Seas and Indonesian waters to Australia, ca. 150–450 m deep. The type locality is the Admiralty Islands, 270 m deep.

#### *Rochinia veltina* (Miers, 1886)

*Material examined.* St. OT-14, 1 young ♂ (cb excluding branchial spines, 5.2 mm; cl excluding rostral spines, 7.3 mm), 2 young ♀ (cb, 5.1 mm; cl, 7.5 mm/cb, 4.0 mm; cl, 5.5 mm), NSMT-Cr 16346.

*Remarks.* This species is rather rare, having a strongly cupped external orbital tooth with flattened outer surface, a sharp-tipped ear-like hepatic spine with truncated outer surface, a small oval plate just outside of the buccal flame, and a big oval plate at the base of the cheliped. In the rather young specimens at hand, the hepatic spine is as long as the branchial spine and directed rather obliquely outward, with its truncated outer surface weakly directed posteriorly.

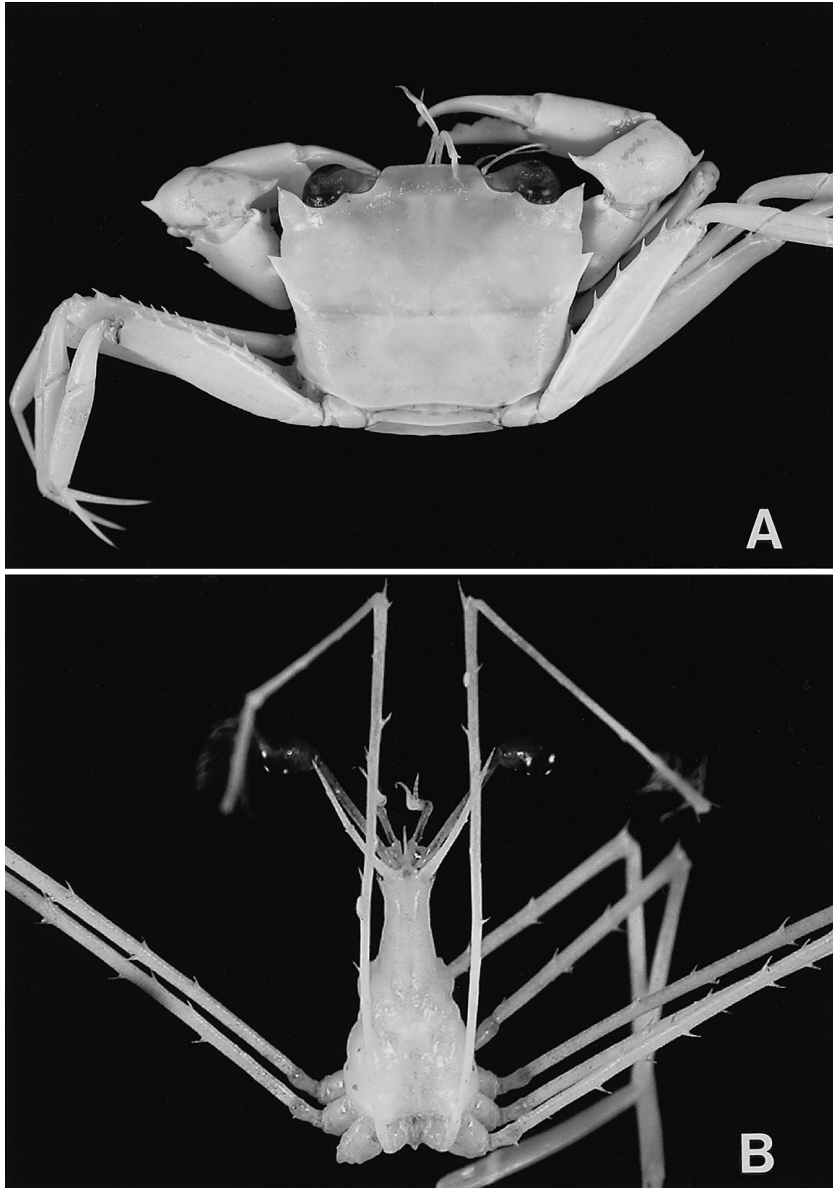


Fig. 3. A, *Psopheticus musicus* Guinot, ♂ (cb including lateral teeth, 18.5 mm), NSMT-Cr 16348; B, *Latreillia metanesa* Williams, ♂ (cb, 3.7 mm), NSMT-Cr 16339.

In the National Science Museum, Tokyo, there are some specimens from the Sagami-Nada Sea, central Japan, recorded as follows.

Oomuro-dashi Bank, off Izu-Oshima I., Sagami-Nada Sea, R.V. *Shinyo-Maru*, st. 3 (34°32.19'N, 139°22.95'E, 143 m deep), 1 ovig. ♀ (NSMT-Cr 10991), st. 8 (34°28.06'N,

139°25.98'E, 193 m deep), 1 ♂, 2 ovig. ♀, 3 juv. (NSMT-Cr 11014), 1 ex. infested by a *Sacculina* (NSMT-Cr 11015), 1 ♂, 1 juv. (NSMT-Cr 11023); 10–IX–1989; T. Okutani leg.

*Distribution.* Hitherto been recorded from south of Omae-zaki, 187 m deep and Kii Minabe, Japan (Yokoya, 1933; Sakai, 1976), between

Cebu and Bohol, 158 m deep, Philippines (Griffin, 1976, as *Sphenocarcinus velutinus*), South China Sea (Serène & Lohavanijaya, 1973), and Kai Islands, Indonesia, 252 m deep (Miers, 1886) and 233–250 m deep (Griffin & Tranter, 1986).

#### Family ATELECYCLIDAE

##### *Trichopeltarion ovale* Anderson, 1896

*Material examined.* St. OT-06, 1♂ (cb excluding lateral spines, 62.0 mm; cl excluding frontal teeth, 69.0 mm), NSMT-Cr 16350; St. OT-07, 1♂ (cb, 45.0 mm; cl, 52.0 mm), 1♀ (cb, 53.5 mm; cl, 60.0 mm), NSMT-Cr 16351.

*Remarks.* The biggest male has the right cheliped of enormous size, and the smaller male has an abnormal bifid rostrum instead of usual trifid rostrum.

Recently Salva and Feldmann (2001) reevaluated the family Atelecyclidae based on a cladistic analysis as well as systematic observations, and showed that the cladistic analysis including the fossil species supported the conclusions drawn from classical systematic observations in placing the genera into four separate families, Belliidae Guinot (4 genera), Thiidae Dana (2 genera) Cheiragonidae Ortmann (3 genera) and Atelecyclidae Ortmann (5 genera). According to them, *Trachycarcinus* has to be reduced to the synonym of *Trichopeltarion*, although both genera were dealt as distinct from each other by Guinot (1989) who transferred this species from *Trichopeltarion* to *Trachycarcinus* and doubted the identification of the specimens from Japan and the Philippines as *T. ovale*. In this report, the identification followed the precedents.

*Distribution.* Off southwest coast of Sri Lanka, 325–380 m deep, Makassar Straits, 595–592 m deep, and Suruga Bay, off Mikawa Bay and Tosa Bay, Japan, 100–450 m deep.

#### Family PILUMNIDAE

##### *Pilumnus orbitospinis* Rathbun, 1911

*Material examined.* St. OT-14, 1♀ (cb excluding lateral spines, 8.9 mm; cl, 7.2 mm),

NSMT-Cr 16347.

*Remarks.* The specimen at hand is not fully matured, but agrees well with the original and supplementary descriptions by Rathbun (1911) and Takeda and Miyake (1968). This species is characteristic in having the ill-defined carapace covered with stiff long setae, the sharp anterolateral spines, a distinct spine at the infraorbital angle, a line of some sharp spines on the upper margins of chelipedal merus, carpus and palm, a long terminal spine of each carpus of the ambulatory legs, and two or three spinules on the upper margin of each meri of the first three ambulatory legs.

*Distribution.* Previously known from the Chagos Archipelago, 100–200 m deep, and Sagami and Tosa Bays, Japan, 85–200 m deep.

#### Family GONEPLACIDAE

##### *Psopheticus musicus* Guinot, 1990

(Fig. 3A)

*Material examined.* St. OT-05, 1♂ (cb including lateral teeth, 18.5 mm; cl, 13.6 mm), NSMT-Cr 16348.

*Remarks.* The general shape of the carapace is close to that of *P. stridulans* Wood-Mason, but following the key and notes given by Guinot (1990), this species is identified with *P. musicus* described by her from the Philippines. In the specimen at hand, the carpi and propodi of the first to fourth ambulatory legs are unarmed, its armature differing from that of *P. stridulans* Wood-Mason from the Andaman Sea and also from that of *P. aff. stridulans* from La Réunion defined by Guinot (1990).

The records of *P. stridulans* from Japan and the South China Sea by Sakai (1955, 1976) and Zarenkov (1972), respectively, were contradicted by Guinot (1990) who mentioned the possibility of referring to *P. musicus*. In the line drawing given by Sakai (1955), the carpi of the second and third ambulatory legs are armed with some spinules, but in the colored figure given by Sakai (1976) they are unarmed. Two males and one female from Sagami Bay in the photographs given



by Ikeda (1998) seem to have the ambulatory legs with the unarmed carpi and propodi. The identity of the specimens from Japanese waters should be confirmed based on the additional specimens, but it is highly probable that the Japanese population was misidentified with this species.

*Distribution.* Definitely known from some localities in the Philippines, 320–440 m deep, and doubtfully from Sagami, Tosa, and Mikawa Bays in the Pacific coast of Japan, 250–320 m deep, and the South China Sea off Viet Nam, 300–360 m deep.

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