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Some Subtidal Crabs (Crustacea, Decapoda, Brachyura) from Suruga Bay, Pacific Coast of Central Japan

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Abstract Of 14 crab species recently collected from shallow water of Suruga Bay, Pacific coast of central Japan, the following 7 species are studied in detail: *Leucosia rubripalma* Galil, 2003 (Leucosiidae), *Thranita cerasma* (Wee and Ng, 1995) and *Trionectes mariei* (Guinot, 1957) (Portunidae), *Pilodius miersi* (Ward, 1936) (Xanthidae), *Actumnus elegans* (De Man, 1887) and *Zehntneriana amakusae* (Takeda and Miyake, 1969) (Pilumnidae), and *Notonyx sagittifer* Ng and Clark, 2010 (Goneplacidae). Of these 7 species, *N. sagittifer* is new to Japanese waters, and the remaining 5 species other than *L. rubripalma* which has been reported from Suruga Bay as *L. perlata* De Haan, 1841, are new to Suruga Bay.

Key words: *Leucosia*, *Thranita*, *Trionectes*, *Pilodius*, *Actumnus*, *Zehntneriana*, *Notonyx*, crabs new to Suruga Bay, crabs new to Japan.

Introduction

Suruga Bay on the Pacific coast of central Japan at the west of the Izu Peninsula and the south of Mt. Fuji is the deepest bay in Japan, reaching 2,500 m depth, and surrounded by steep cliffs except for the undersea plateau at the southwest end. It is well known as a rich fishing ground for deep-sea fishes, crabs and shrimps, but the faunal studies of invertebrate animals based on the accurate identification of the species are poor contrary to Sagami Bay situated at the east of the Izu Peninsula. As regards the taxonomic studies on the crabs from Sagami Bay, there are many papers and reports including the symbolic publication by Sakai (1965). Takeda *et al.* (2006) mentioned 542 species and explained chronologically the history of taxonomical studies on the crabs from Sagami Bay. Compared with Sagami Bay, Takeda (1997) may be only a systematically compiled paper for the crabs from Suruga Bay, which is restricted to the deep-sea species. The subtidal crabs collected by the second author at the vicinity of Ose-zaki, sand spit jutted out at innermost place of Suruga Bay, may contribute partly to the knowledge of the crabs from Suruga Bay.

The crabs in the present collection were identified as 14 species of 7 families and listed in the following lines. Twelve species with an asterisk in the list are new to Suruga Bay, and of the remaining two species, *Leucosia rubripalma* Galil, 2003 (Leucosiidae) was recorded previously as *L. perlata* De Haan, 1841, by Minemizu (2000), and *Pilumnus hirsutissimus* Takeda and Komatsu, 2020 (Pilumnidae) has been recently recorded by Takeda *et al.* (2023). In the present paper, the noteworthy seven species of them indicated by boldface in the list are taxonomically dealt with in detail.

All the specimens are preserved in the Tsukuba Research Departments, National Museum of Nature and Science, Tokyo (NSMT). The size of the specimens is shown in mm, with abbreviations of cb (carapace breadth) and cl (carapace length). The other abbreviations: coll. (collected by), G1 (Male first gonopod), Jn (Japanese name), m (meters), and mm (millimeters).

Family Leucosiidae —***Leucosia rubripalma*** Galil, 2003 (Jn: Hohobeni-kobushigani) (1 ♀, NSMT-Cr 32421, inside of sand spit, interstice of bouldery rocks, 9.5 m depth, 2-IX-2023)

Family Inachidae —**Camposcia retusa* (Latreille, 1829) (Jn: Mokuzushoi) (1 ♀, NSMT-Cr 32420, end of sand spit, rocky reef, under rock, 12 m depth, 2-IX-2023)

Family Parthenopidae —**Pseudolambrus lobatus* (Flipse, 1930) (Jn: Ozaki-hishigani) (1 ♀, NSMT-Cr 32422, inside of sand spit, sandy bottom around bouldery rocks, 9 m depth, 30-IX-2023)

Family Portunidae —**Laleonectes nipponensis* (Sakai, 1938) (Jn: Naki-gazami) (1 ♀, NSMT-Cr 32427, end of sand spit, rocky reef, under rock, 6 m depth, 1-VI-2024); ****Thranita cerasma*** (Wee and Ng, 1995) (Jn: Marei-benitsukegani) (1 ♂, NSMT-Cr 32423, inside of sand spit, interstice of bouldery rocks, 7.5 m depth, 7-X-2023); ****Trionectes mariei*** (Guinot, 1957) (Jn: Komoro-hime-gazami) (1 ♂, NSMT-Cr 32426, inside of sand spit, sandy bottom, 6 m depth, 25-XI-2023)

Family Xanthidae —**Neoliomera intermedia* Odhner, 1925 (Jn: Tsubu-hira-ougigani) (1 ♀, NSMT-Cr 32419, end of sand spit, rocky reef, under rock, 7 m depth, 9-VII-2023);**Paraxanthias pachydactylus* (A. Milne-Edwards, 1867) (Jn: Futoyubi-hime-ougigani) (1 ♀, NSMT-Cr 32412, end of sand spit, rocky reef, under rock, 9.5 m depth, 10-XII-1923); ****Pilodius miersi*** (Ward, 1936) (Jn: Udewa-ougigani) (1 ovig. ♀, NSMT-Cr 32417, end of sand spit, rocky reef, under rock, 6 m depth, 24-VI-2023); 1 ♂, NSMT-Cr 32418, end of sand spit, rocky reef, under rock, 5 m depth, 11-V-2024); **Soliella melanospinis* (Rathbun, 1911) (Jn: Nagatoge-ougigani) (1 ♂, NSMT-Cr 32413, end of sand spit, rocky reef, under rock, 14 m depth, 25-XII-2022)

Family Pilumnidae —****Actumnus elegans*** (De Man, 1887) (New Jn: Minami-ibotegani) (1 ♂, NSMT-Cr 32415, end of sand spit, rocky reef, under rock, 6 m depth, 24-VI-2023; 1 ♂, NSMT-Cr 32416, end of sand spit, rocky reef, under rock, 4.5 m depth, 29-VII-2023; 1 ♂, NSMT-Cr 32717, end of sand spit, rocky reef, under rock, 4.5 m depth, 15-VI-2024); *Pilumnus hirsutissimus* Takeda and Komatsu, 2020 (Jn: Chou-kebukagani) (1 ♂, soft shell, NSMT-Cr 32414, end of sand spit, rocky reef, under rock, 11 m depth, 27-V-2022); ****Zehntneriana amakusae*** (Takeda and Miyake, 1969) (Jn: Amakusa-tsennah-gani) (1 ♀, NSMT-Cr 32424, end of sand spit, rocky reef, under rock, 9 m depth, 4-XI-2023)

Family Goneplacidae —****Notonyx sagittifer*** Ng and Clark, 2010 (New Jn: Kuriiro-kaku-enkougani) (1 ♂ infested by a sacculinid parasite, NSMT-Cr 32425, inside of sand spit, interstice of bouldery rocks, 6 m depth, 4-XI-2023; 1 ♀, NSMT-Cr 32447, sandy mud bottom, 2 m depth, 28-IX-2024)

Records of the Noteworthy Species

Family Leucosiidae Samouelle, 1819
Genus ***Leucosia*** Weber, 1795
Leucosia rubripalma Galil, 2003

(Fig. 1)

Leucosia perlata De Haan, 1841: Minemizu, 2000, p. 197, 1 fig.

Leucosia anatum (Herbst, 1783): Ng *et al.*, 2001, p. 8, fig. 1h.

Leucosia rubripalma Galil, 2003, pp. 183 (in key), 188, figs. 1D, 2G–H. —Galil & Ng, 2007, p. 85, fig. 2E; 2015, p. 476, fig. 5E. —Ng *et al.*, 2008, p. 95 (in list). —Maenosono, 2021b, p. 34, fig. 9A–B. —Poore & Ahyong, 2023, fig. 48 m.

Material examined. Ose-zaki, Suguga Bay, 9.5 m depth, 1 ♀ (cb 21.6 mm, cl 22.7 mm), NSMT-Cr 32421, 2-IX-2023, coll. H. Takakura.

Remarks. Galil (2003) strictly restricted the

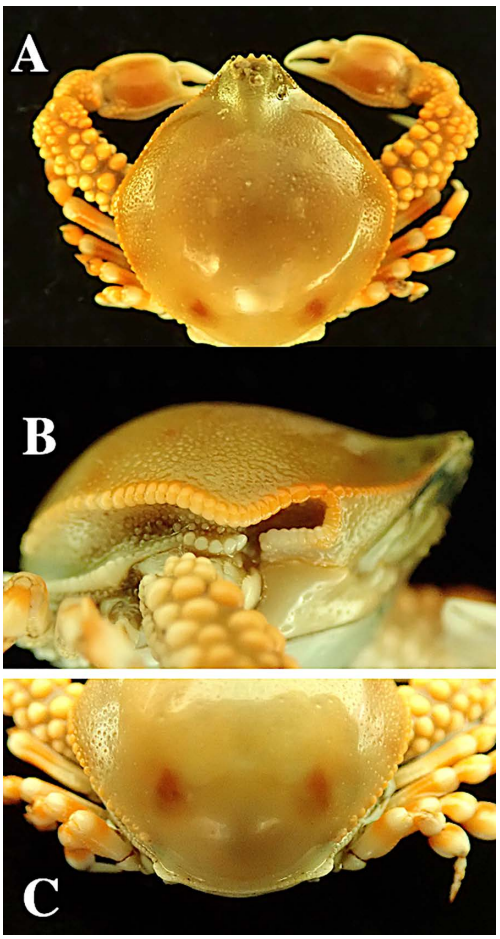

Fig. 1. *Leucosia rubripalma* Galil, ♀ (NSMT-Cr 32421; cb 21.6 mm, cl 22.7 mm). A, habitus, dorsal view; B, thoracic sinus of right side; C, lateral lobes of carapace posterior margin.

genus *Leucosia* to four species, *L. craniolaris* (Linnaeus, 1758), *L. moresbiensis* Haswell, 1880, *L. punctata* Bell, 1855, and *L. rubripalma* sp. nov., by having the male first gonopod with screw-like coiled shaft. The four species share a pair of dark spots at the posterior part of the carapace dorsal surface (Fig. 1A, C). The specimen examined is a female and therefore cannot be comparable with the known species on the male first gonopod characters, but the other morphological features such as the laterally bulged branchial regions of the carapace (Fig. 1A), the distinctly tridentate front (Fig. 1A), the carapace posterior margin expanded laterally to form a lobate corner (Fig. 1A, C), the granulated floor of the thoracic sinus (Fig. 1B), the thoracic sinus beaded with granules and anteriorly defined by rectangular margin of the pterygostomian region (Fig. 1B), and the dorsally carinate ambulatory carpi (Fig. 1A) clearly show that the present specimen belongs to *L. rubripalma*.

The dorsal and lateral views of a female from Okinawa-jima Island, Ryukyus, were given by Maenosono (2021b) who mentioned that *Leucosia perlata* De Haan, 1841 reported from Ose-zaki, Suruga Bay, by Minemizu (2000) should be really referred to *L. rubripalma*.

Distribution. Noumea and St. Vincent Bay, New Caledonia (12–30 m); Amboina, Indonesia; Papua New Guinea (3–17 m); Singapore; Bohol, Philippines (0–2 m); Okinawa-jima Island, Ryukyu Islands, and Suruga Bay, Japan (2–10 m).

Family Portunidae Rafinesque, 1815
Genus ***Thranita*** Evans, 2018
Thranita cerasma (Wee and Ng, 1995)

(Fig. 2)

Thalamita cerasma Wee & Ng, 1995, pp. 11 (in key), 62, figs. 30–32. —Takeda & Marumura, 1997, p. 16, fig. 1C–D. —Ng *et al.*, 2008, p. 168 (in list).

Thalamita cerasma rectifrons Crosnier & Moosa, 2002, p. 395, figs. 6–7.

Thalamita cerasma cerasma: Naruse & Shokita, 2003, p. 44, figs. 2–3.

Thranita cerasma: Evans, 2018, p. 43 (in list). —Takeda *et al.*, 2019, p. 41 (in discussion). —Huang & Shih, 2021, pp. 6 (in Table 1), 28, figs. 4E, 17; 2023, pp. 39 (in Tables 1–3), 67, figs. 8A–B, 9A–B.

Material examined. Ose-zaki, Suguga Bay, 7.5 m depth, 1 ♂ (cb 64.2 mm, cl 42.1 mm), NSMT-Cr 32423, 7-X-2023, coll. H. Takakura.

Remarks. The present male specimen from Suruga Bay has morphological characters typical for the genus *Thalamita* s.l. as follows: the flattened carapace dorsal surface covered thickly with short setae (Fig. 2E), the six lobed, subtruncated carapace frontal margin (Fig. 2A), the remarkably developed inner lobe of the supraorbital margin (Fig. 2B), the five strong carapace

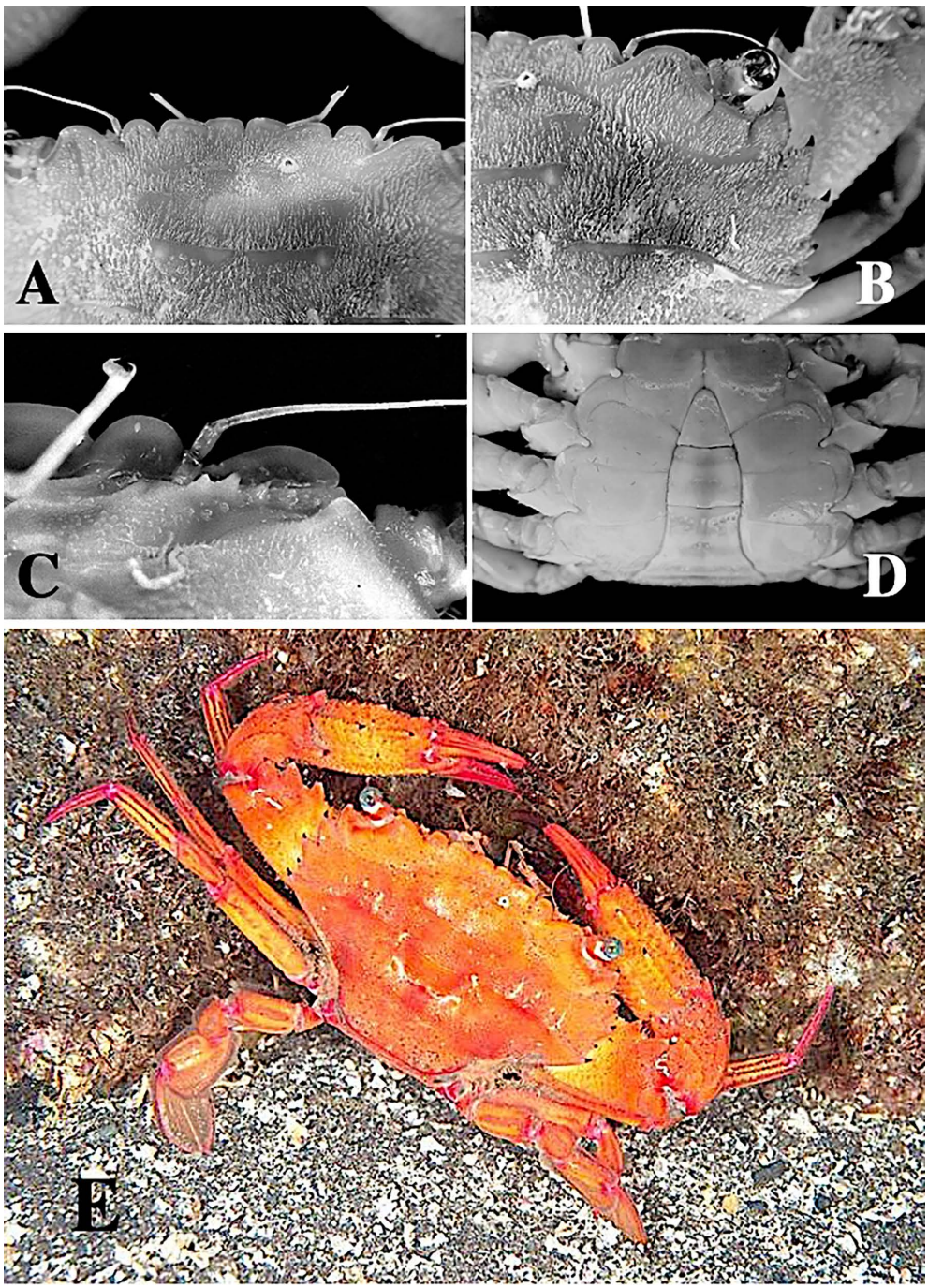

Fig. 2. *Thalamita cerasma* Wee and Ng, ♂ (NSMT-Cr 32423; cb 64.2 mm, cl 42.1 mm). A, frontal lobes; B, anterolateral teeth of right side; C, antennal basal segment of left side; D, pleon; E, live color in the field.

anterolateral teeth each tipped with a horny spine (Fig. 2B), the fourth anterolateral tooth distinctly smaller than the others (Fig. 2B), and the concave carapace posterolateral margin retreating rapidly towards the carapace posterior margin (Fig. 2E).

The specimen examined is identified as *T. cerasma* by having the following characters used in the key prepared to the species of the genus *Thalamita* of Wee and Ng (1995): 1) frontal border cut into more than two lobes excluding inner supraorbital lobes, 2) frontal border cut into six teeth excluding inner supraorbital lobes, 3) anterolateral border cut into five teeth, last not the smallest; frontal and mesogastric ridges present, 4) basal antennal segment with several sharp spines. *Thalamita cerasma* is placed close to *T. spinimana* Dana, 1852, *T. prymna* (Herbst, 1803) and *T. pelsarti* Montgomery, 1931, but the morphological differences among these species are distinct and the details are referred to the accounts given by Wee and Ng (1995). The characters of the frontal lobes, carapace anterolateral teeth, basal antennal segment and male pleon agree well with the line drawings of *T. cerasma* in the original description and the additional notes by Takeda and Marumura (1997). Some minor differences are present in the present specimen, including the stronger carapace dorsal ridges, the granulated outer and inner surfaces of the cheliped palm, and the slightly flared distal part of the male first gonopod, which is considered to be not interspecific, but intraspecific variations.

Thalamita cerasma rectifrons (Crosnier and Moosa, 2002), reported from French Polynesia was considered to be synonymous with the nominate subspecies by Naruse and Shokita (2003) and approved by Ng *et al.* (2008). Another close relative, *T. rubridens* Apel and Spiridonov, 1998 from the Arabian Gulf (Apel and Spiridonov, 1998; Naderloo and Türkay, 2012; Naderloo, 2017) was compared with *T. cerasma* as for the morphological characters of the carapace and chelipeds as well as the color in life by Naruse and Shokita (2003). The validity of this Arabian Gulf species seems to be not always clear as far as the literature concerned.

The color of the present male from Suruga Bay (Fig. 2E) was mostly brick red and marginally pale yellowish, being quite similar to two photographs of a male from off Shirahama, Kii Peninsula given by Takeda and Marumura (1997: fig. 1C–D) and somewhat different from a photograph of a female from the Ryukyu Islands, in which the carapace dorsal surface is basically bright olive, with the vermilion margins and ridges (Naruse and Shokita, 2013: fig. 2a). Based on the color in life, Huang and Shih (2021) doubted the identification of *Thalamita cerasma* by Takeda and Marumura (1997) and suggested that the species from Japan is similar to *Thranita rubridens* (Apel and Spiridonov, 1998) from the Arabian Gulf.

Thalamita cerasma has been designated as the type species of a new genus *Thranita* established by Evans (2018) with the results of the molecular analysis. The known 17 *Thranita* species hitherto been referred to the *Thalamita prymna* group by Stephenson and Hudson (1957) attain the big size, having the six-lobed frontal margin and the long and tapering G1. Poore and Ahyong (2023) mentioned that the genera *Thalamonyx* A. Milne-Edwards, 1873, *Thranita* Evans, 2018, and *Trierachus* Evans, 2018, are as junior synonyms of *Thalamita* without any comments, but in this paper, the genus *Thranita* is considered as valid based on the combination of the morphological characters absent in the other *Thalamita* clade, and therefore this species is referred to *Thranita* as mentioned in Takeda *et al.* (2019).

Distribution. Pacific Ocean, 10–30 m. —French Polynesia; Singapore (type locality); Ryukyu Islands, off Kii Peninsula and Suruga Bay, Japan.

Genus ***Trionectes*** Koch, Spiridonov and Duriš, 2022
Trionectes mariei (Guinot, 1957)

(Fig. 3)

Portunus (Hellenus) mariei Guinot, 1957, p. 476, figs. 1–2, 5–7. —Takeda & Hayashi, 1973, p. 71, pl. 1 fig. D. —Marumura & Kosaka, 2003, p. 42.

Portunus mariei: Crosnier, 1962, pp. 43 (in key), 61, figs. 103–106. —Stephenson, 1972, pp. 14 (in key), 40 (in list). —Crosnier & Thomassin, 1974, p. 1106, fig. 5a–b.

Portunus (Xiphonectes) mariei: Ng *et al.*, 2008, p. 166 (in list).

Trionectes mariei: Koch *et al.*, 2022, p. 37 (in list).

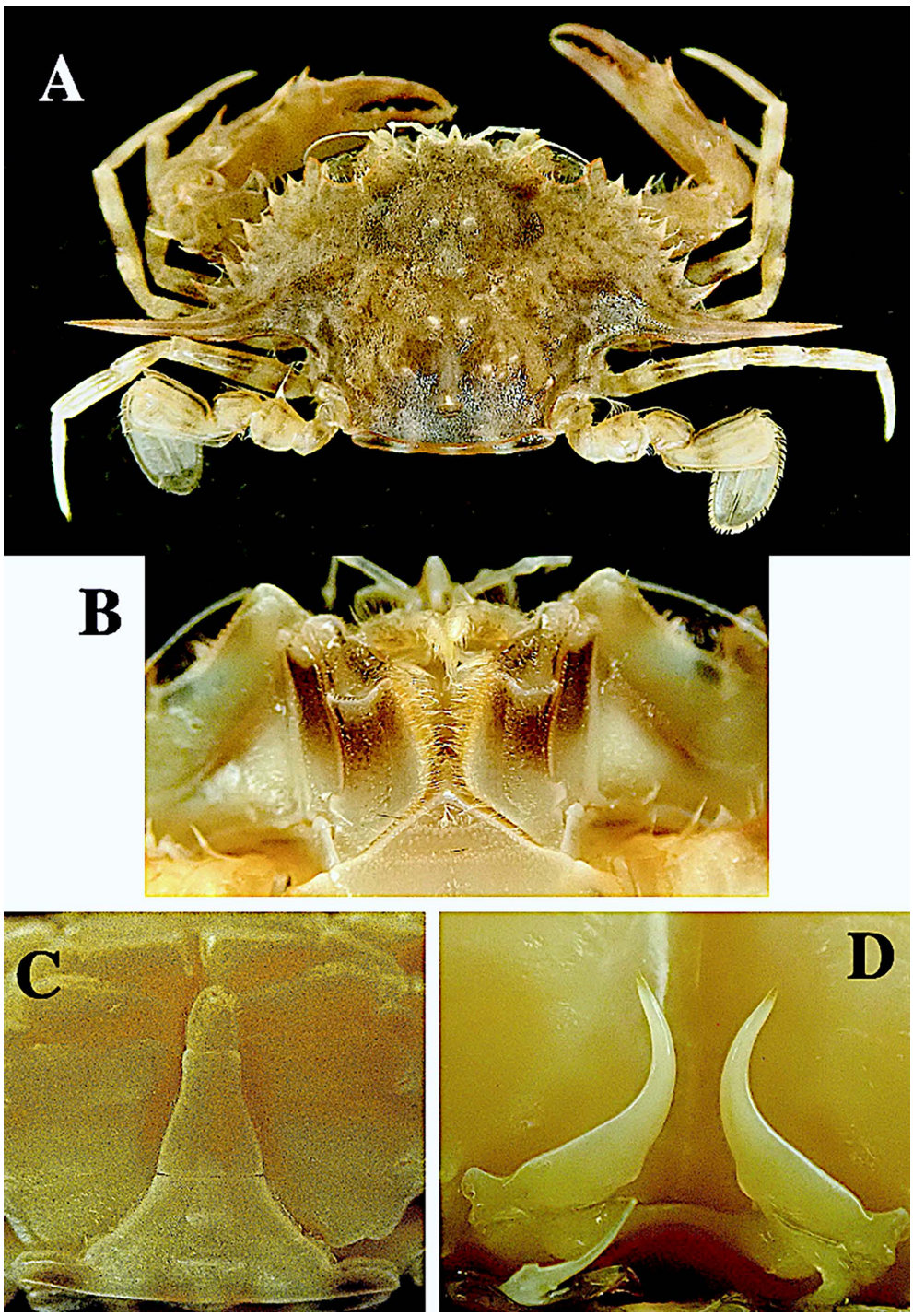

Fig. 3. *Trionectes mariei* (Guinot), ♂ (NSMT-Cr 32426; cb including epibranchial teeth of both sides, 41.5 mm, cl including frontal tooth, 18.1 mm). A, habitus, dorsal view; B, third maxillipeds; C, pleon; D, first and second gonopods *in situ*.

Material examined. Ose-zaki, Suruga Bay, 6 m depth, 1 ♂ (cb including epibranchial teeth of both sides, 41.5 mm, cl including frontal tooth, 18.1 mm), NSMT-32426, 25-XI-2023, coll. H. Takakura.

Remarks. Marumua and Kosaka (2003) recorded a female of *Portunus (Hellenus) mariei* from Kayama-jima Island, the Ryukyu Islands, without mention about the specimen itself and the distributional information in Japanese waters. In the present male specimen from Suruga Bay, both of the frontal lateral teeth of the carapace are broken off just like the holotype specimen (Fig. 3A–B), but all the distinguishing characters agree well with the original description and additional notes and figures of this species by Crosnier (1962) and Crosnier and Thomassin (1974).

The general shape of the carapace (Fig. 3A) is typical for the *Portunus* s.l. species, but differentiated in having the remarkably long epibranchial spine and eight sharp anterolateral teeth including the external orbital tooth, and the protogastric, mesogastric, cardiac and intestinal regions each with two bosses arranged side by side. Of eight carapace anterolateral teeth, fourth and sixth teeth are apparently smaller than the others. Each lateral end of the carapace posterior margin is more or less lobate and rather angulated, but not tuberculated. The third maxilliped is as represented in Fig. 3B, with the merus outer part strongly produced forwards as an elongate lobe. The male pleon and first gonopod in situ are as in Fig. 3C–D, respectively. In the male pleon (Fig. 3C), the lateral margins of the penultimate pleonite are weakly concave at about distal one-third, and the telson is somewhat elongate and rounded along the distal margin. The male first gonopod (Fig. 3D) is stout, strongly curved, and not so long.

Distribution. Mayotte Island, Comoro Islands in the Mozambique Channel; Nosy Be, Madagascar (intertidal zone); Palau Islands; Kayama-jima Island, Ryukyu Islands, and Sugura Bay (6 m depth), Japan.

Family Xanthidae MacLeay, 1838
Genus ***Pilodius*** Dana, 1851
Pilodius miersi (Ward, 1936)

(Fig. 4)

Chlorodopsis granulata Stimpson, 1858: Sakai, 1936, p. 164, pl. 49 fig. 1; 1939, pp. 502 (in key), 503, fig. 41, pl. 62 fig. 1, pl. 97 fig. 6. —Serène & Nguyen, 1959, pp. 307, 338 (in key), figs. 1A, 2E–F, pl. 1 fig. D, pl. 3 figs. C, F.

Chlorodopsis miersi Ward, 1936, p. 4, pl. 2 figs. 1–3.

Pilodius granulatus (Stimpson, 1858): Sakai, 1965, pp. 148 (in English part), 63 (in Japanese part), pl. 73, fig. 6; 1976, pp. 459 (in key) & 460 (in English vol.), pp. 279 (in list) & 280 (in Japanese vol.), pl. 164 fig. 3. —Serène, 1984, pp. 239 (in key), 240 (in key). —Dai *et al.*, 1986, pp. 305 (in key), 306, fig. 165B(2), pl. 43 fig. 3; Dai & Yang, 1991, pp. 328 (in key), 329, pl. 43 fig. 3, fig. 165B(2).

Pilodius luomi Serène, 1971, p. 913; 1984, pp. 239 (in key), 240 (in key).

Pilodius miersi: Clark & Galil, 1993, pp. 1136, 1159 (in key), figs. 7, 34A, 41D. —Ng *et al.*, 2008, p. 197 (in list). —Lee & Ko, 2011, p. 187, figs. 5–6.

Material examined. Ose-zaki, Suruga Bay, 6 m depth, 1 ovig. ♀ (cb 15.2 mm, cl 10.6 mm), NSMT-Cr 32417, 24-VI-2023, coll. H. Takakura; Ose-zaki, 5 m depth, 1 ♂ (cb 18.0 mm, cl 12.3 mm), NSMT-Cr 32418, 11-V-2024, coll. H. Takakura.

Remarks. In Japan, this species has been known as *Chlorodopsis granulata* Stimpson by Sakai (1936, 1939) or *Pilodius granulatus* (Stimpson) by Sakai (1965, 1976), but the Japanese species are known as *P. miersi* Ward since the revision of the genus *Pilodius* by Clark and Galil (1993), which is through, with many photographs and detailed line drawings of the distinguishing characters, and made clear the synonymy of 12 known and 3 new species. However, on the results of analyses of mitochondrial and nuclear gene sequences, Lasley *et al.* (2015) concluded that the genus *Pilodius* is restricted to 10 species and that the others are transferred to the genera *Cyclodius* Dana, 1851, and *Soliella* and *Luniella* erected by Lasley *et al.* (2015). *Pilodius miersi* is one of 10 constituent species of the genus *Pilodius*.

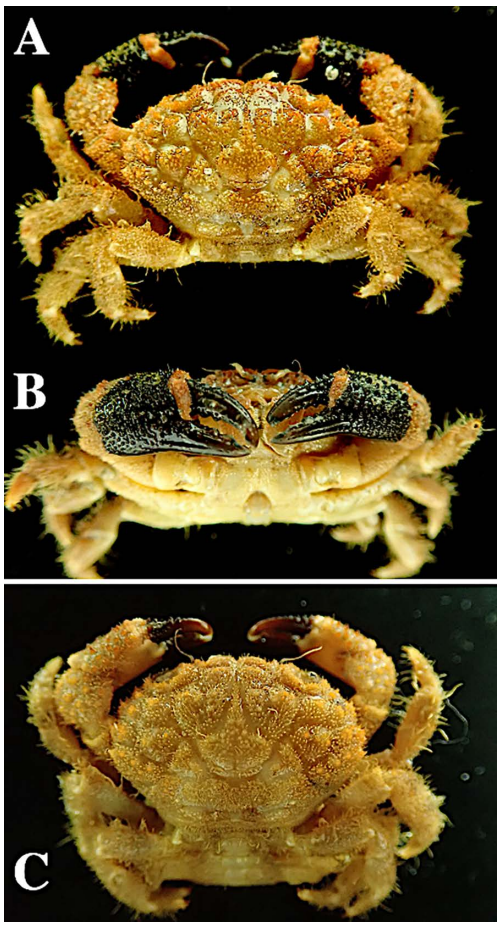

Fig. 4. *Pilodius miersi* (Ward), ♂ (NSMT-Cr 32418; cb 18.0 mm, cl 12.3 mm). A, habitus, dorsal view; B, chelipeds, outer view. Ovig. ♀ (NSMT-Cr 32417; cb 15.2 mm, cl 10.6 mm). C, habitus, dorsal view.

Following the key to the *Pilodius* species provided by Clark and Galil (1993), *P. miersi* is distinguished from the congeners by the combination of the following characters of the carapace:1) the protogastric region is divided into two longitudinally, 2) the mesogastric region is tripartite, and 3) the anterior lobe of the mesogastric region surpassing anterior margin of the protogastric region.

The specimens examined are briefly noted in the following lines. The carapace (Fig. 4A, C) is transversely ovate, but proportionally wider in the male than the female. The regions of the carapace dorsal surface are distinctly isolated by deep furrows and wholly covered with short setae and sharp granules; the protogastric region is not perfectly divided into two by a longitudinal furrow, leaving the posterior part undivided, and the subdivision of the mesogastric region is not clear. The carapace anterolateral margin is cut into four teeth, each of which is armed with a main spine and some accessory spinules. In the male cheliped (Fig. 4A–B), the palm is covered and encircled with blackish color extended from the immovable finger. The close congener, *Pilodius nigrocrinitus* Stimpson, 1858, is different from this species primarily by having the carapace covered with black setae instead of brownish setae in this species and having no blackish color extended onto the palm of the male cheliped. The male first gonopod of the present specimen agrees well with the figures given by Clark and Galil (1993, fig. 7), in having the distal part with a thick fringe of longish stout setae.

Distribution. West Pacific, from Japan and Korea to the Queensland coast of Australia through the Philippines and the South China Sea, with a distributional map by Clark and Galil (1993, fig. 22).

Family Pilumnidae Samouelle, 1819
Genus ***Actumnus*** Dana, 1851
Actumnus elegans De Man, 1887

(Figs. 5–7)

Actumnus elegans De Man, 1887 (1887–1888), p. 47. —Alcock, 1898, p. 206. —Chopra & Das, 1937, p. 408, figs. 12–13. —Takeda & Miyake, 1969a, pp. 95 (in list), 96 (in key), 97, figs. 1, 2d–f. —Ng *et al.*, 2008, p. 139 (in list).

Material examined. Ose-zaki, Suruga Bay, 6 m depth, 1 ♂ (cb 9.3 mm, cl 7.5 mm), NSMT-Cr 32415, 24-VI-2023, coll. H. Takakura; 4.5 m depth, 1 ♂ (cb 9.3 mm, cl 7.2 mm), NSMT-Cr 32416, 29-VII-2023, coll. H. Takakura; 4.5 m depth, 1 ♂ (cb 10.8 mm, cl 8.5 mm), NSMT-Cr 32717, 15-VI-2024, coll. H. Takakura.

Remarks. Three males examined agree well

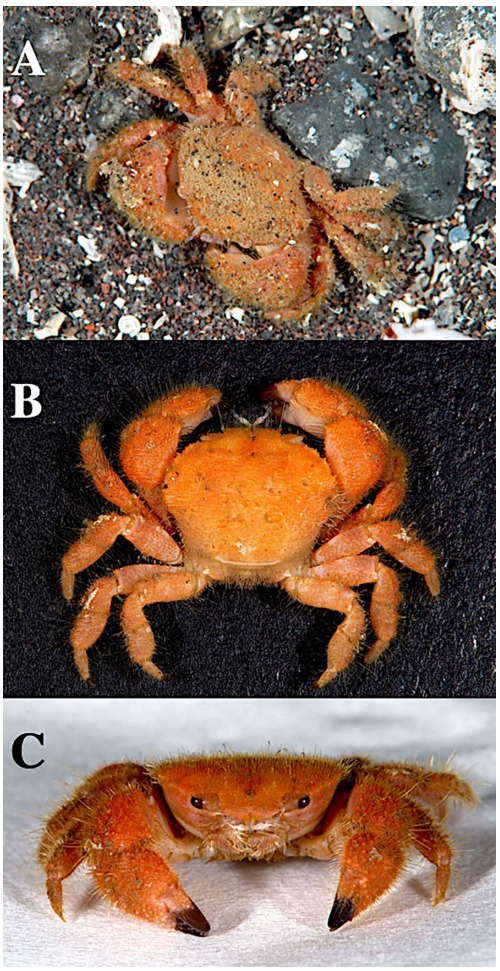

Fig. 5. *Actumnus elegans* (De Man), ♂ (NSMT-Cr 32415; cb 9.3 mm, cl 7.5 mm). A, live color in the field; B–C, habitus, dorsal (B) and frontal (C) views.

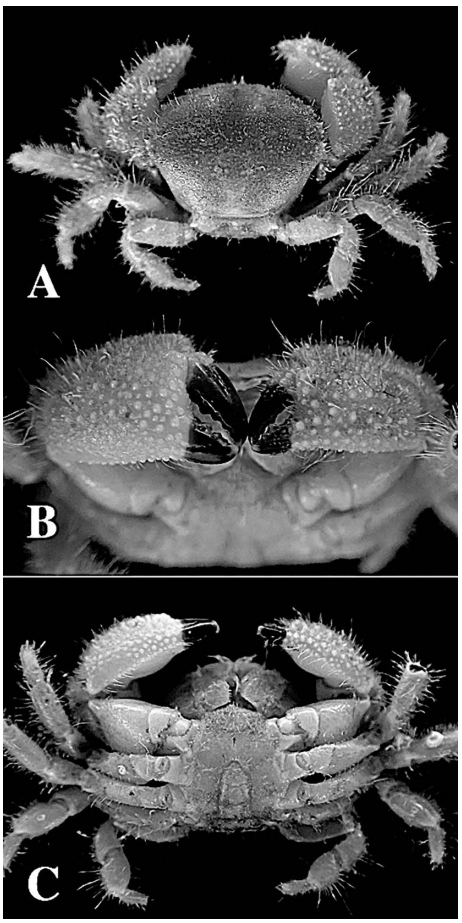

Fig. 6. *Actumnus elegans* (De Man), ♂ (NSMT-Cr 32416; cb 9.3 mm, cl 7.2 mm). A, C, habitus, dorsal and ventral views; B, chelae.

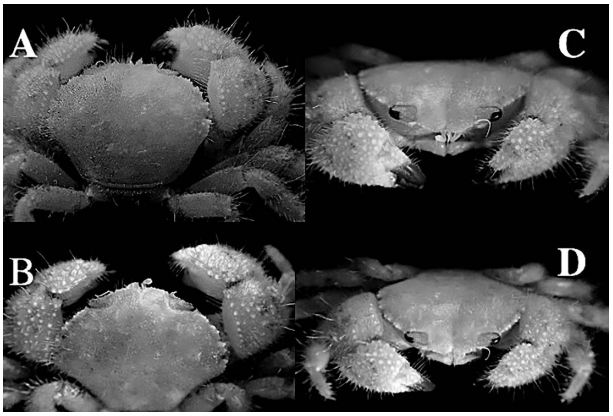

Fig. 7. *Actumnus elegans* (De Man), ♂ (NSMT-Cr 32415; cb 9.3 mm, cl 7.5 mm). A–D, carapace in different views.

with the notes on *Actumnus elegans* (De Man, 1887) by Takeda and Miyake (1969a) in which two males and one female from Kyushu, Japan were recorded hesitantly. Takeda and Miyake (1969a) wrote that, in their specimens, the carapace anterolateral margin is rather distinctly cut into four teeth and each tooth is bordered with four or five granules, one or two of which are more prominent than the others. In the present specimens, the four teeth of the carapace anterolateral margin may be better noted as lobate teeth, but each tooth marginally armed with some granules of different sizes is the same form with that of the specimens from Kyushu. The original description (De Man, 1887) noted that *A. elegans* is distinguished at first sight from *A. obesus* Dana, 1852, by the carapace anterolateral margin being armed with six acute spiniform granules, behind the acute granuliform external angle, arranged in three groups, two together. According to Alcock (1898), the anterolateral margin is armed with seven acute spinuliform granules, in three pairs, with an odd one between the first pair and the orbital angle.

Alcock (1898) left the comments that *A. elegans* seems to be better placed in *Pilumnus* rather than *Actumnus*, because it might be close to *P. scabriusculus* Adams and White, 1849. Chopra and Das (1937) and Takeda and Miyake (1969a) followed the precedent literature as for the generic affiliation to the genus *Actumnus*.

In the present specimens, the carapace is rather narrow, with 1.24 (NSMT-Cr 32415), 1.29 (NSMT-Cr 32416) and 1.27 (NSMT-Cr 32717) in the ratio of cb to cl, and strongly convex anteriorly and rather concave in the posterolateral dorsal surface, showing the close affinity to *Actumnus*. The carapace dorsal surface is ill-defined and covered thickly and uniformly with yellowish stiff hairs mixed with scant longish, club-shaped soft hairs for the most part, being possibly referred to the generic characters of both of *Actumnus* and *Pilumnus* (Figs. 5–7). The armature of the carapace anterolateral margin is, as mentioned above, shows its systematic position in *Actumnus*, because the *Pilumnus* species are characterized by the carapace anterolateral margin armed with stout triangular teeth in dorsal view, or with narrower, more or tubercular teeth each terminating in a horny tip, or with sharp spiniform teeth directed obliquely forwards. In *Actumnus*, the carapace is typically much narrower and higher, and the thoracic sternum is narrower, with the rather elongated male pleon. In the present specimens (Fig. 6C), the male pleon is not remarkably narrow and somewhat like the *Pilumnus*-type rather than the *Actumnus*-type. Otherwise, in the present specimens, the carapace front (Fig. 7B–D) is markedly developed forwards and obliquely downwards, and the inner half of the supraorbital margin is longitudinal in dorsal view, as specially mentioned by Takeda and Miyake (1969a). In the present paper, the specimens examined are placed in the genus *Actumnus* and identified to *A. elegans* as the preceding studies.

Distribution. Mergui Archipelago, Myanmar (Burma); Ariake Sea and Okino-shima Island in the west and north of Kyushu, and Suruga Bay, Japan.

Genus ***Zehntneriana*** Ng and Takeda, 2010
Zehntneriana amakusae
(Takeda and Miyake, 1969)

(Figs. 8–9)

Litocheira amakusae Takeda & Miyake, 1969b, p. 10, fig. 1.

Zehntneria amakusae: Takeda, 1972, p. 40 (in discussion). —Yamaguchi *et al.*, 1987, p. 22, pl. 10 figs. 4–5. —Takeda & Marumura, 1995, p. 3, pl. 1 fig. 6. —Ng *et al.*, 2008, p. 144 (in list).

Zehntneriana amakusae: Ng & Takeda, 2010, p. 49 (in discussion). —Lee *et al.*. 2011, p. 193, figs. 3–4. —Ko & Lee, 2012, pp. 4 (in list), 30, pl. 11A. —Ng & Lin, 2015, p. 264, fig. 4. —Maenosono, 2019, pp. 16, 19 (in key).

Pseudolitochira integra (Miers, 1884): Machida, 2017, p. 53, figs. 2–3.

Material examined. Ose-zaki, Suguga Bay, 9 m depth, 1 ♀ (cb 6.3 mm, cl 4.9 mm), NSMT-Cr 32424, 4-XI-2023, coll. H. Takakura.

Remarks. *Zehntneriana* is a replaced name

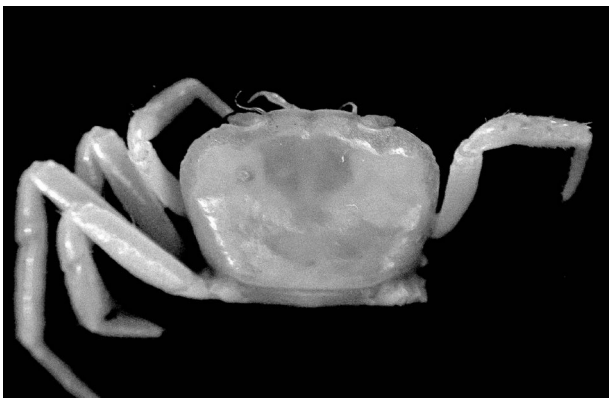

Fig. 8. *Zehntneriana amakusae* (Takeda and Miyake), ♀ (NSMT-Cr 32424; cb 6.3 mm, cl 4.9 mm). Habitus, dorsal view.

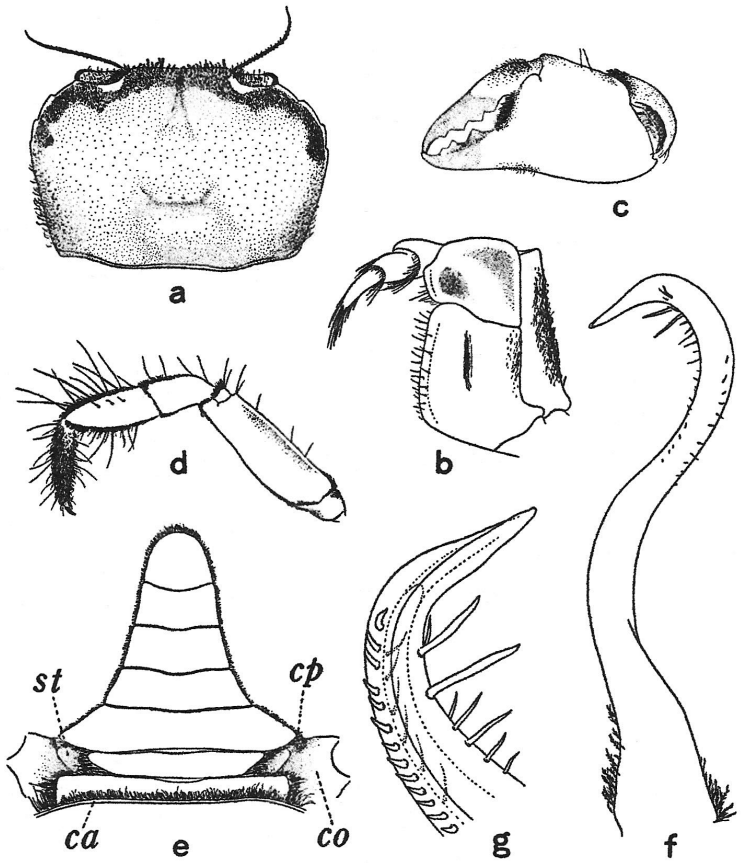

Fig. 1. ***Litocheira amakusae*** **sp. nov., ♂ (Paratype, No. 13268-1; 4.3×6.0 mm). a, Carapace, ×7.5; b, third maxilliped, ×10; c, left (smaller) chela, ×7.5; d, left fourth ambulatory leg, ×7.5; e, abdomen, hairs being omitted, ×12.5; f, left pleopod in sternal view, ×40; g, distal part of the same in abdominal view, ×100. Abbreviations.** ***ca*****, posterior border of carapace;** ***co*****, coxa of fourth ambulatory leg;** ***cp*****, inner prolongation of coxa, at its extremity genital duct opening;** ***st*****, 8th sternite carring fourth ambulatory leg.**

Fig. 9. *Zehntneriana amakusae* (Takeda and Miyake). Figures of the paratype, quoted from Takeda and Miyake (1969b, p. 10, fig. 1).

of the genus *Zehntneria* Takeda, 1972, because it is a junior homonym of the same name for African orthopteran insect (cf. Ng and Takeda, 2010). The genus is at present composed of six species from the West Pacific, and five of them are known from Japanese waters —*Z. amakusae* (Takeda and Miyake, 1969), *Z. miyakei* (Takeda, 1972), *Z. novaeinsulicola* (Takeda and Miyake, 1977), *Z. tadafumii* Lee, Kim and Ng, 2015, and *Z. serrta* Ng and Lin, 2015. They were well studied by Maenosono (2019, 2021a) based on the specimens from the Ryukyu Islands, with comments on *Z. amakusae*.

The present female (Fig. 8) lacks both chelipeds and the right second to fourth ambulatory legs, but agrees quite well with *Zehntneriana amakusae* (Takeda and Miyake, 1969), which was described on an ovigerous female (holotype) and three males and three females (paratypes) from the Amakusa Islands, west of Kyushu. The original description and figures (Takeda and Miyake, 1969b), and also the color photograph and line drawings (Lee *et al.*, 2011) seem to be thorough for the identification, with several subsequent records from Japan and Korea.

The female examined is characteristic in having the fur of short soft hairs along the frontal, orbital and anterolateral margins of the carapace. This character is obscurely seen in the present monochrome photograph (Fig. 8), but traceable as a shallow depression and comparable with the original figure (Fig. 9). The carapace anterolateral margin (Fig. 9) is typically cut into three low teeth, but as mentioned in the original description, the teeth are not always sharp just as in the present female.

As realized from the key to Japanese species of the genus *Zehntneriana* by Maenosono (2019), this species is most close to *Z. miyakei* from the Palau and Ryukyu Islands, and also to *Z. novaeinsulicola* from the Nishino-shima Island in the Ogasawara Islands, some islands of the Ryukyu Islands, and Shiono-misaki at the Kii Peninsula, Pacific coast of central Honshu. However, *Z. miyakei* is characteristic in having the bare carapace without fur and the remarkably long first to third ambulatory legs, with the meri serrulated throughout the anterior margins, and *Z. novaeinsulicola* is characterized by the rather oval carapace bearing fur not defined clearly along the frontal, supraorbital and anterolateral margins of the carapace

Distribution. The type locality is the Amakusa Islands, west of Kyushu, Japan, ca. 40 m depth. The geographical range is from Suruga Bay recorded in this paper to the south and west of Kyushu, Japan, and Jejudo Island, southern Korea. From intertidal zone to the depth of 100 m.

Family Goneplacidae MacLeay, 1838
Genus ***Notonyx*** A. Milne-Edwards, 1873
Notonyx sagittifer Ng and Clark, 2010

(Figs. 10–12)

Notonyx nitidus A. Milne-Edwards, 1873: Serène & Umali, 1972, p. 82, figs. 90–95, pl. 8 figs. 9–10.
Notonyx sagittifer Ng & Clark, 2010, p. 31, figs. 1–3.
Notonyx aff. *sagittifer*: Takeda, 2023, p. 28, fig. 11C–E.

Material examined. Ose-zaki, Suruga Bay, 6 m depth, 1 ♂ infested by a sacculinid parasite (cb 14.9 mm, cl 11.0 mm), NSMT-Cr 32425, 4-XI-2023, coll. H. Takakura; Ose-zaki, 2 m depth, sandy mud bottom, 1 ♀ (cb 15.0 mm, cl 10.5 mm), NSMT-Cr 32447, 28-IX-2024, coll. H. Takakura.

Remarks. The type species of the genus *Notonyx*, *N. nitidus* A. Milne-Edwards, 1873, was explained in detail based on the holotype from New Caledonia and the topographical and other specimens by Clark and Ng (2006). It is remarkable that ten of twelve known species were described during six years from 2006 to 2011. The known species are well described and figured, but the definite identification is rather difficult due to the small size, less than cb 15 mm, and the smooth carapace of closely similar shape.

The present male infested by a sacculinid parasite has the short first and elongated other pleopods deformed with parasitism. The carapace,

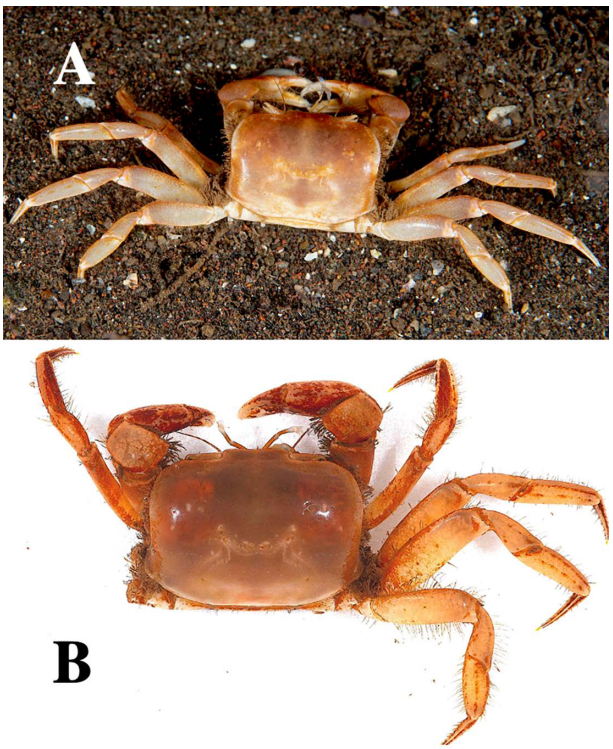

Fig. 10. *Notonyx sagittifer* Ng and Clark. A, ♀ (NSMT-Cr 32447; cb 15.0 mm, cl 10.5 mm), habitus in the field; B, ♂ (NSMT-Cr 32425; cb 14.9 mm, cl 11.0 mm) infested by a sacculinid parasite, dorsal view.

chelipeds and ambulatory legs are considered to show the original characteristics (Figs. 10–12), and the female is of nearly same size as the male, with undifferentiated shape from the male. The two specimens examined are relatively large (cb 14.9 and 15.0 mm) and comparable with the larger five species in the genus, *N. rayneri* Ng and Clark, 2010 (cb 17.3 mm), *N. falcatus* Rahayu, 2011 (cb 16 mm), *N. guinotae* Rahayu and Ng, 2010 (cb 15.5 mm), and *N. kumi* Naruse and Maenosono, 2009 (cb 13.0 mm). In the present specimens, however, the carapace (Figs. 10, 12A) is rather narrow, 1.36 wider than long in male and 1.43 in female. Although the carapace form may vary individually or with photographing, the carapace anterolateral margin of these specimens is so as to be sub-rectangular, being different from these large species. Among the known smaller species, the carapace proportion of the present male just agrees with that of *N. sagittifer*, the holotype of which is the old specimen from Mindanao, previously recorded by Serène and Umali (1972) as *N. nitidus* A. Milne-Edwards, 1873 (Ng and Clark, 2010). The present male is apparently larger than the holotype of *N. sagittifer* (cb 8.74 mm), but it may be difficult to show the definite differences as regards the carapace shape and chela between the Philippine and Japanese specimens. In the present specimens examined, the frontal margin is almost straight, without median interruption (Fig. 11B); the posterior margin of the epistome is divided into three parts, with the median part weakly convex and medially incised (Fig. 11B); the male pleon is wide and triangular as a whole (fig. 11C); and both chelae are compressed and strongly crested along the whole lower margins of the palm and immovable finger (Fig. 11A, C). The male first gonopod is similar to the line drawings of that of the original description of *N. sagittifer*, but its tip is rather sharp and not so distinctly truncated as in the original figures,

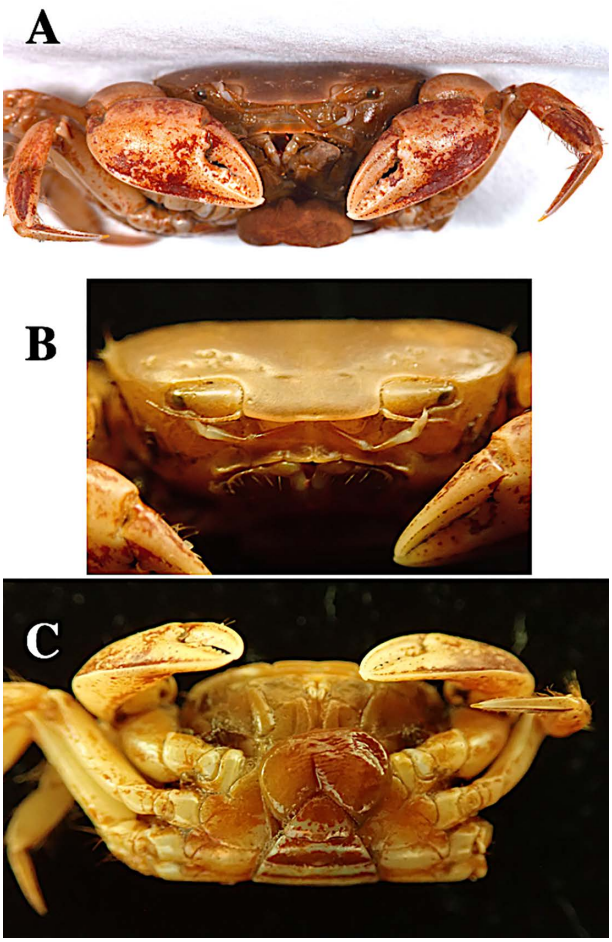

Fig. 11. *Notonyx sagittifer* Ng and Clark, ♂ (NSMT-Cr 32425; cb 14.9 mm, cl 11.0 mm) infested by a sacculinid parasite. A, chelae, outer view; B, front-orbital part, frontal view; C, habitus, ventral view.

with more crowded tubercles at the subterminal part. The male second gonopod is so abnormally elongated like the female pleopod that its tip is not the form of arrow-head.

The female pleon is wide and covers the whole sternum, with the widest fourth pleonite and the telson slightly longer than the preceding pleonites. Each vulva is large, transversely ovate, with the anterior margin more strongly convex than the posterior margin, and located just on the suture between the fifth and sixth thoracic sternites, each occupying one-third as wide as each sternite.

Takeda (2023) recorded a small male (cb 5.0 mm) from the Palau Islands as *Notonyx* aff. *sagittifer*. In the specimen, unfortunately, the male pleon and first gonopod, and all the ambulatory legs are missing. The specimen was not positively identified to *N. sagittifer*, but may be not matured stage of that species, with fragile chelipeds.

Color in life. Wholly chestnut-color and partly paler, as reproduced in Fig. 10.

Distribution. Definitely known only from Tawi-Tawi, Mindanao, Philippines, and probably from the Palau Islands. New to Japanese waters.

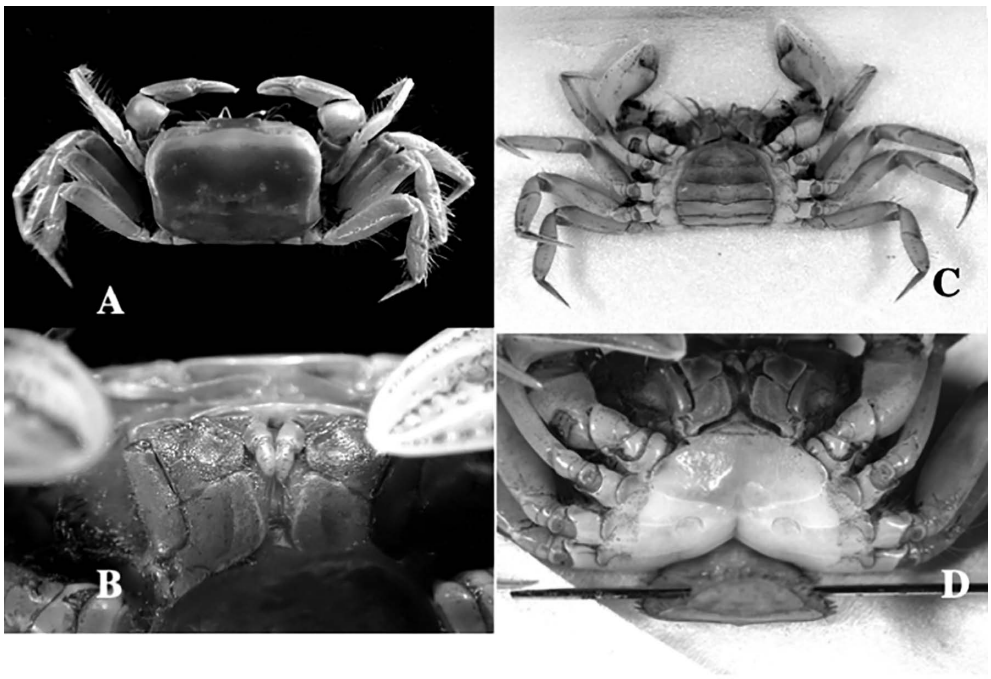

Fig. 12. *Notonyx sagittifer* Ng and Clark, 2010. A, C, D: ♀ (NSMT-Cr 32447; cb 15.0 mm, cl 10.5 mm), habitus, dorsal and ventral views (A, C), and thoracic sternum, showing vulvae (D). B: ♂ infested by a sacculinid parasite (NSMT-Cr 32425; cb 14.9 mm, cl 11.0 mm), third maxillipeds, outer view.

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