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# Deep-sea Cymothoid Isopods (Crustacea: Isopoda: Cymothoidae) of Pacific Coast of Northern Honshu, Japan

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**Abstract:** During the project "Research on Deep-sea Fauna and Pollutants off Pacific Coast of Northern Japan", a small collection of cymothoid isopods was obtained at depths ranging from 150 to 908 m. Four species of cymothoid isopods including a new species are reported. *Mothocya komatsui* sp. nov. is distinguished from its congeners by the elongate body shape and the heavily twisting of the body. Three species, *Ceratothoa oxyrrhynchaena* Koelbel, 1878, *Elthusa sacciger* (Richardson, 1909), and *Pleopodias diaphus* Avdeev, 1975 were fully redescribed. *Ceratothoa oxyrrhynchaena* and *E. sacciger* were firstly collected from blackthroat seaperchs *Doederleinia berycoides* (Hilgendorf) and Kaup's arrowtooth eels *Synaphobranchus kaupii* Johnson, respectively.

**Key words:** *Ceratothoa oxyrrhynchaena*, *Elthusa sacciger*, *Mothocya*, new host record, new species, *Pleopodias diaphus*, redescription.

## Introduction

Cymothoid isopods are ectoparasites of marine, fresh, and brackish water fish. In Japan, about 45 species of cymothoid isopods are known (Saito *et al*., 2000), but deep-sea species have not been well studied. This paper deals with a collection of cymothoid isopods from the project "Research on Deep-sea Fauna and Pollutants off Pacific Coast of Northern Japan" conducted by the National Museum of Nature and Science, Tokyo. The collection obtained at depths ranging from 150 to 908 m includes a total of 36 specimens (apart from those not identifiable to species level) representing four species. On the basis of this material, I herein describe a new species, *Mothocya komatsui* sp. nov. and fully redescribe three poorly known species in Japanese waters, *Ceratothoa oxyrrhynchaena* Koelbel, 1878, *Elthusa sacciger* (Richardson, 1909), and *Pleopodias diaphus* Avdeev, 1975.

## Materials and Methods

The collection was made by using R/V *Wakataka-maru* of the Fisheries Research Agency (FRA). Collecting sites of the expeditions were located at depths ranging from 146 to 1521 m off the Pacific coast of northern Honshu, Japan. Stations where cymothoid isopods were recovered are shown in Table 1. Samples were fixed in 80% ethanol or 10% neutralized Formalin/sea water solution, and later preserved in 70% ethanol. Terminology follows Bruce (1986b). The common and scientific names of fishes follow those recommended by Froese and Pauly (2008). The material examined in this study is deposited in the National Museum of Nature and Science, Tokyo (NSMT).

Table 1. List of sampling data.

| Station | Date | Gear | Position in | Position out | Depth (m) | Temp. (℃) |
|---|---|---|---|---|---|---|
| WA05-F550 | 27 October 2005 | OT | 37° 41.0′ N, 142° 04.7′ E | 37° 42.0′ N, 142° 04.0′ E | 551–546 | 4.2 |
| WA05-G350 | 3 November 2005 | OT | 36° 56.3′ N, 141° 30.9′ E | 36° 58.0′ N, 141° 31.5′ E | 373–356 | 4.0 |
| WA05-H310 | 30 October 2005 | OT | 36° 29.0′ N, 140° 59.5′ E | 36° 30.5′ N, 141° 00.4′ E | 311–306 | 4.5 |
| WA05-H380 | 1 November 2005 | OT | 36° 29.1′ N, 141° 00.8′ E | 36° 30.0′ N, 141° 01.7′ E | 380–384 | 4.0 |
| WA05-H480 | 1 November 2005 | OT | 36° 32.3′ N, 141° 06.2′ E | 36° 33.1′ N, 141° 07.3′ E | 481–476 | 4.1 |
| WA06-B450 | 13 October 2006 | OT | 40° 14.9′ N, 142° 15.3′ E | 40° 13.3′ N, 142° 16.1′ E | 461–475 | 2.8 |
| WA06-E510 | 3 November 2006 | OT | 38° 22.6′ N, 142° 06.3′ E | 38° 23.9′ N, 142° 05.7′ E | 514–506 | 3.4 |
| WA06-E900 | 2 November 2006 | OT | 38° 29.8′ N, 142° 21.6′ E | 38° 29.1′ N, 142° 21.5′ E | 905–908 | 2.8 |
| WA06-F150 | 29 October 2006 | OT | 37° 35.3′ N, 141° 33.2′ E | 37° 36.7′ N, 141° 33.9′ E | 150–165 | 13.7 |
| WA06-F380 | 30 October 2006 | OT | 37° 38.5′ N, 141° 50.5′ E | 37° 40.1′ N, 141° 50.6′ E | 386–379 | 3.8 |
| WA06-F480 | 31 October 2006 | OT | 37° 41.7′ N, 141° 59.0′ E | 37° 39.9′ N, 141° 59.0′ E | 483–478 | 3.6 |
| WA06-G550 | 28 October 2006 | OT | 36° 58.1′ N, 141° 38.0′ E | 36° 59.2′ N, 141° 38.8′ E | 558–554 | 4.2 |
| WA06-G650 | 28 October 2006 | OT | 36° 50.2′ N, 141° 34.3′ E | 36° 50.9′ N, 141° 35.2′ E | 648–648 | 3.8 |
| WA06-H550 | 14 November 2006 | OT | 36° 31.8′ N, 141° 08.7′ E | 36° 32.6′ N, 141° 09.8′ E | 561–557 | 4.1 |
| WA07-B510 | 12 October 2007 | OT | 40° 16.0′ N, 142° 16.0′ E | 40° 17.3′ N, 142° 15.6′ E | 510–509 | 3.4 |
| WA07-B550 | 12 October 2007 | OT | 40° 16.9′ N, 142° 16.6′ E | 40° 18.0′ N, 142° 16.5′ E | 544–555 | 3.4 |
| WA07-C410 | 14 October 2007 | OT | 39° 50.3′ N, 142° 17.9′ E | 39° 48.5′ N, 142° 17.9′ E | 409–415 | 3.7 |
| WA07-C450 | 17 October 2007 | OT | 39° 42.3′ N, 142° 18.0′ E | 39° 40.6′ N, 142° 17.7′ E | 467–458 | 3.7 |
| WA07-C550 | 16 October 2007 | OT | 39° 35.5′ N, 142° 18.6′ E | 39° 34.2′ N, 142° 18.5′ E | 552–559 | 3.6 |
| WA07-D510 | 17 October 2007 | OT | 39° 04.2′ N, 142° 11.8′ E | 39° 05.3′ N, 142° 12.0′ E | 505–513 | 3.6 |
| WA07-D650 | 5 October 2007 | OT | 39° 02.3′ N, 142° 14.7′ E | 39° 03.3′ N, 142° 14.9′ E | 640–661 | 3.6 |
| WA07-E480 | 27 October 2007 | OT | 38° 23.5′ N, 142° 04.9′ E | 38° 22.9′ N, 142° 05.2′ E | 475–478 | — |
| WA07-F510 | 4 November 2007 | OT | 37° 38.3′ N, 142° 01.1′ E | 37° 39.4′ N, 142° 01.2′ E | 506–508 | 4.0 |
| WA07-G150 | 2 November 2007 | OT | 36° 59.6′ N, 141° 17.4′ E | 37° 00.5′ N, 141° 17.7′ E | 151–151 | 12.9 |

## Taxonomy

### Family Cymothoidae Leach, 1818

### Genus ***Ceratothoa*** Dana, 1852
［New Japanese name: Higebuto-uo-no-e-zoku］

### ***Ceratothoa oxyrrhynchaena*** Koelbel, 1878
［Japanese name: Soko-uo-no-e］
(Figs. 1–2)

*Ceratothoa oxyrrhynchaena* Koelbel, 1878: 401–403, Tafel I fig. 1 (type locality: “Mare Japonicum”); Schioedte and Meinert, 1883: 368–371, table XVI (Cym. XXIII) figs. 10–14; Avdeev, 1982: 72; Rokicki, 1985: 97 (table 1), 99, 103–104 (tables 2–3), 106, 110, 112–113, 122, fig. 6; Trilles, 1986: 624, 631 (table); Trilles *et al*., 1989: 292, fig. 10; Trilles, [1994]: 34 (list), 124; Horton, 2000: 1046 (key), 1048, fig. 7; Bariche and Trilles, 2005: 57–58; Ramdane *et al*., 2007: 69 (table 1), 71, 73 (list); Ramdane and Trilles, 2008: 175–177 (table 1).

*Meinertia oxyrrhynchaena*; Thielemann, 1910: 36–38, 98–99 (Table), figs. 35–36, Tafel. I figs. 10–15; Nierstrasz, 1915: 89 (list); Gurjanova, 1936a: 84–86, fig. 41; 1936b: 258 (list); Trilles, 1972a: 1208–1212, figs. 137–155, plate I–III; 1972b: 1250–1251; Yamaguchi and Baba, 1993: 193, fig. 20.

*Meinertia oxyrhynchaena* (sic); Komai, 1927: 1148, fig. 2215; Iwasa, 1947: 816 (?part).

*Codonophilus oxyrhynchaenus* (sic); Nierstrasz, 1931: 132 (list); Shiino, 1965b: 544 (?part); Saito *et al*., 2000: 65 (list); Tatsu, 2002: 41 (list).

*Ceratothoa oxyrhanchaenus* (sic); Nunomura, 2006: 36.

Not *Meinertia oxyrhynchaena* (sic); Yamaguti, 1938: 27; Iwasa, 1947: 816 (?part), no. 2351. (See Remarks.)

Not *Codonophilus oxyrhynchaenus* (sic); Shiino, 1965b: 544 (?part), no. 728. (See Remarks.)

Not *Ceratothoa oxyrrhynchaena*; Bruce, 1980: 320, figs. 3–4; Yu and Li, 2003: 224–227, fig. 2. (See Remarks.)

*Material examined.* 2 males (19.5 mm, 18.0 mm), 2 ovig. females (40.0 mm, 35.0 mm), WA07-G150, ex blackthroat seaperchs *Doederleinia berycoides* (Hilgendorf, 1879) (Acropomati-

dae), coll. T. Kuramochi, NSMT-Cr 19588.

*Description of ovigerous female.* Body (Fig. 1A) stout, bilaterally symmetrical, about 2.1 times as long as maximum width, widest at pereonites 4–5; dorsal surface (Fig. 1B) smoothly vaulted. Cephalon (Fig. 1C) triangular; anterior margin acute, visible ventrally (Fig. 1D). Eyes distinct, occupying 0.43–0.57 width of cephalon. Pereonite 1 (Fig. 1C) sharply produced on anterolateral sides; anterolateral angles reaching level of eyes; pereonite 1 longest; pereonites 5–7 distinctly shorter, progressively concave posteriorly; posterolateral margins of pleonites (Fig. 1B) rounded. Pleon (Fig. 1A) strongly immersed in pereonite 7; pleonites becoming wider towards posterior side; pleonite 1 distinctly less wide than others; pleonite 5 (Fig. 1E) wider than preceding pleonites with sinuate posterior margin. Pleotelson (Fig. 1E) 0.53–0.54 times as long as maximum width; lateral margins evenly rounded; posterior margin almost straight or shallowly convex.

Antennule (Fig. 2A) with 7 articles, extending to anterior of pereonite 1; first 3 articles wider than others. Antenna (Fig. 2B) with 7 articles, extending to anterior of pereonite 1; outer margin smooth. Mandible palp (Fig. 2C) without setae; article 3 smaller than others. Maxillule (Fig. 2D) with 4 spines. Maxilla lateral lobe (Fig. 2E) with about 15 spines; medial lobe with 8 spines. Maxilliped (Fig. 2F) article 3 with 9 spines.

Pereopod 1 (Fig. 2G) basis with weakly developed carina; merus with anterior expansions. Pereopods 2–3 (Fig. 2H) bases with triangular carina; meri with anterior expansions. Pereopods 4–6 (Fig. 2I) bases with developed carina; meri with weak anterior expansion. Pereopod 7 (Fig. 2J) basis with well developed carina; merus with anterior expansion.

Pleopods 1–5 (Figs. 2K–L) approximately equal in size. Pleopod 1 (Fig. 2K) lamellar. Pleopods 2–5 (Fig. 2L) with weekly folded endopods. Uropod endopod (Fig. 2M) longer than exopod, curve medially, narrowing gradually to round apexes.

*Coloration.* Pale tan in alcohol.

*Remarks.* The present specimens closely agree with the previous descriptions of *Ceratothoa oxyrrhynchaena* collected from Japanese water (Koelbel, 1878; Schioedte and Meinert, 1883; Thielemann, 1910; Horton, 2000). *Ceratothoa oxyrrhynchaena* is very similar to *C. collaris* Schioedte and Meinert, 1883, redescribed in detail by Bariche and Trilles (2008) based on the holotype and many specimens obtained mainly from Lebanese coast. However, *C. collaris* can be distinguished from *C. oxyrrhynchaena* by the indented outer margin of antenna.

Although identical illustrations of the species were used in Iwasa (1947) and Shiino (1965b), the illustrations are considerably different from the true *C. oxyrrhynchaena*. For example, the cephalon is elliptical, and its anterior margin weekly produced; the anterolateral sides of pereonite 1 are bluntly produced; the pleon is weekly immersed in pereonite 7; and the uropod rami are subequal in length and very short. There is no doubt that the illustrations in Iwasa (1947) and Shiino (1965b) were based on other cymothoid species. Furthermore, descriptions of the species in Iwasa (1947) and Shiino (1965b) are scanty and lacking information of diagnostic features. Therefore, it is impossible to be certain of the identity of the species shown by Iwasa (1947) and Shiino (1965b).

A specimen collected from *Scolopsis* sp. (Nemipteridae) in Hong Kong was identified as "*C. oxyrrhynchaena* (?)" by Bruce (1980), and specimens collected on the body surface of shrimp scads *Alepes djedaba* (Forsskål, 1775) (as *Carnax kalla* [sic], Carangidae) in Chinese water were identified as *C. oxyrrhynchaena* by Yu and Li (2003). The specimens recorded by Bruce (1980) and Yu and Li (2003) might actually represent other cymothoid species because of following characters in these specimens: cephalon anterior margin not produced, pereopod 7 basis without well developed carina, and pereopod 7 merus without anterior expansion.

Yamaguti (1938) recorded *Meinertia oxyrhynchaena* (sic) collected from the mouth cavity of the red seabream *Pagrus major* (Temminck and Schlegel, 1843) (as *Pagrosomus unicolor* Quoy

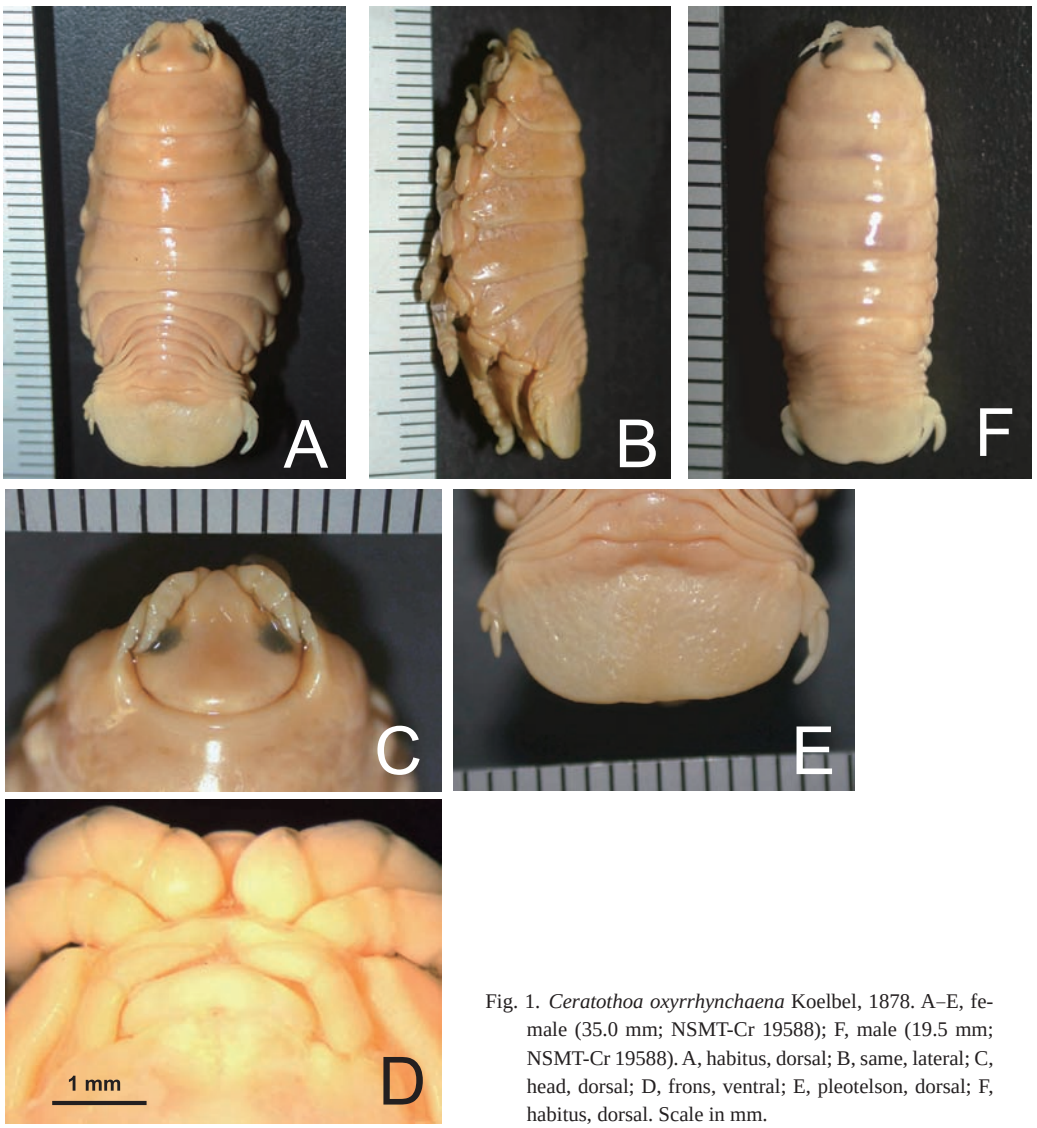


Fig. 1. *Ceratothoa oxyrrhynchaena* Koelbel, 1878. A–E, female (35.0 mm; NSMT-Cr 19588); F, male (19.5 mm; NSMT-Cr 19588). A, habitus, dorsal; B, same, lateral; C, head, dorsal; D, frons, ventral; E, pleotelson, dorsal; F, habitus, dorsal. Scale in mm.

and Gaimard, Sparidae) in the Inland Sea, Japan. This record might be attributable to misidentification because only another cymothoid species inhabits in the mouth cavity of *P. major* in Japanese water (Yamauchi, unpublished data).

The blackthroat seaperch *Doederleinia berycoides* is commercially caught in Japanese waters. The species is highly appreciated as food, being expensive fish in the country. More study is needed on *C. oxyrrhynchaena* in Japan because little is known about the pathology of fishes due to *C. oxyrrhynchaena*.

*Distribution.* Previous records were summarized by Horton (2000): Japan, China, Mediterranean (France, Italy, Tunisia, Algeria, Montenegro, Yugoslavia), and north-east Atlantic coasts (Mauritania). In Japanese water, *C. oxyrrhynchaena* was recorded from Sea of Japan coast of Honshu, Uchiura, Ishikawa Prefecture (Tatsu, 2002), Pacific coast of northern Honshu eastward to Onahama, Fukushima Prefecture (present study), and Sagami bay (Thielemann, 1910; Nunomura, 2006), at the depths of 110–151 m (Thielemann, 1910; present study).

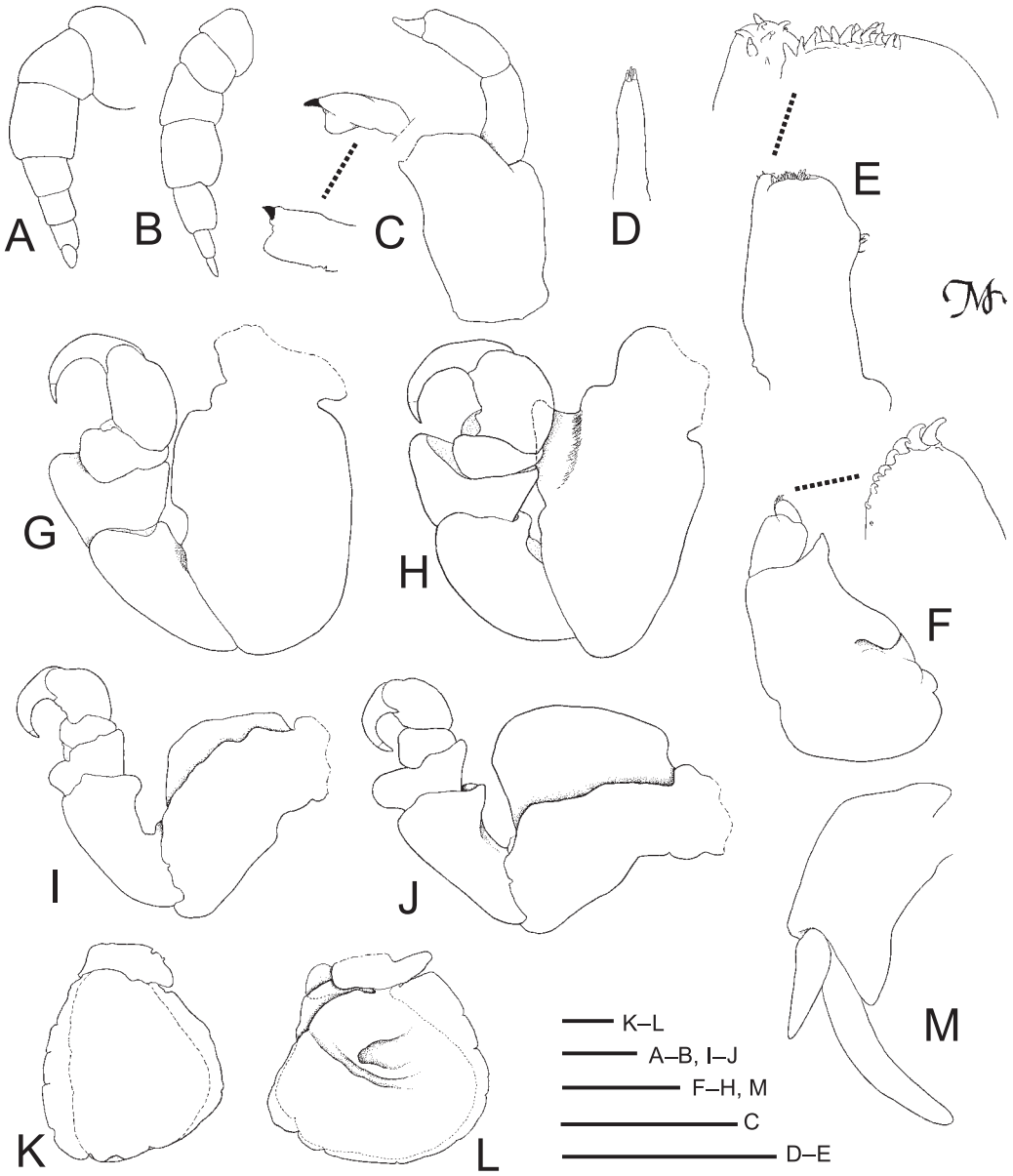


Fig. 2. *Ceratothoa oxyrrhynchaena* Koelbel, 1878. A–B, G–H, K–L, female (35.0 mm; NSMT-Cr 19588); C–F, I–J, M, female (40.0 mm; NSMT-Cr 19588). A, left antennule, dorsal; B, left antenna, dorsal; C, left mandible, ventral; D, left maxillule, ventral; E, left maxilla, ventral; F, left maxilliped, ventral; G, left pereopod 1, ventral; H, left pereopod 2, ventral; I, left pereopod 6, medial; J, left pereopod 7, medial; K, left pleopod 1, ventral; L, left pleopod 5, dorsal; M, left uropod, dorsal. Scales: 2 mm.

*Host.* Previous records were summarized by Bariche and Trilles (2005) and Ramdane *et al*. (2007): the bogue *Boops boops* (Linnaeus, 1758), the striped seabream *Lithognathus mormyrus* (Linnaeus, 1758) (Sparidae), the blotched picarel *Spicara maena* (Linnaeus, 1758), the picarel *Spicara smaris* Linnaeus, 1758 (Centracanthidae), the John dory *Zeus faber* Linnaeus, 1758 (Zeidae), the nursehound *Scyliorhinus stellaris* (Linnaeus, 1758) (Scyliorhinidae), the spotted torpedo *Torpedo marmorata* Risso, 1810 (Torpedinidae), the starry ray *Raja asterias* Delaroche, 1809, and

the thornback ray *Raja clavata* Linnaeus, 1758 (Rajidae). In the present study, *D. berycoides* is newly recorded as a host.

## Genus ***Elthusa*** Schioedte and Meinert, 1884
［New Japanese name: Eru-uo-no-e-zoku］

### ***Elthusa sacciger*** (Richardson, 1909)
［Japanese name: Hora-anago-no-e］
(Figs. 3–4)

*Livoneca sacciger* Richardson, 1909: 87–88, fig. 12 (type locality: station 4957, by way of Bungo Channel and Inland Sea at Mizimoko Shima Light N. 22° W., 29 miles, lat. 32°36′N, long. 132°23′E, at a depth of 437 fathoms, Japan); Gurjanova, 1936a: 90–91, fig. 45; 1936b: 258 (list); Shiino, 1951: 86, fig. 2A; 1965a: 544, no.727; Saito *et al*., 2000: 66–67 (list).

*Lironeca saccigera*; Nierstrasz, 1931: 144 (list).

*Lironeca sacciger*; Kussakin, 1979: 300–301, fig. 168; Brusca, 1981: 124; Avdeev, 1982: 70–71, fig. 2; Trilles, [1994]: 37 (list), 189–190.

*Elthusa sacciger*; Bruce, 1990: 254, 255 (key), 268–270, figs. 13–15; Yamauchi *et al*., 2004: 2–3.

*Material examined.* 1 ovig. female (45.5 mm), WA05-F550, NSMT-Cr 19589; 1 male (16.5 mm), WA05-H480, NSMT-Cr 19590; 1 male (12.0 mm), WA05-H380, NSMT-Cr 19591; 1 female (26.5 mm), WA06-F480, NSMT-Cr 19592; 1 male (19.5 mm), WA06-E510, NSMT-Cr 19593; 1 male (14.5 mm), WA06-F150, NSMT-Cr 19594; 1 male (16.0 mm), WA06-G550, NSMT-Cr 19595; 1 male (15.0 mm), WA06-G650, on the body surface of a broadbanded thornyhead *Sebastolobus macrochir* (Günther, 1877) (Sebastidae), NSMT-Cr 19596; 1 ovig. female (39.0 mm), WA06-H550, NSMT-Cr 19597; 1 ovig. female (42.5 mm), WA06-B450, NSMT-Cr 19598; 1 ovig. female (46.5 mm), WA07-C550, NSMT-Cr 19599; 1 ovig. female (49.0 mm), WA07-C450, NSMT-Cr 19600; 4 ovig. females (34.0, 34.5, 40.0, 41.0 mm), WA07-B510, ex Kaup's arrowtooth eels *Synaphobranchus kaupii* Johnson, 1862 (Synaphobranchidae), NSMT-Cr 19601; 1 ovig. female (40.0 mm), 1 male (19.5 mm), WA07-F510, in gill chamber of *S. kaupii*, NSMT-Cr 19602; 1 ovig. female (52.0 mm), WA07-B550, NSMT-Cr 19603; 1 ovig. female (39.0 mm), 1 male (23.0 mm), WA07-E480, in gill chamber of *S. kaupii*, NSMT-Cr 19604; 1 ovig. female (42.0 mm), WA07-D510, NSMT-Cr 19605; 4 males (20.5, 21.0, 21.0, 21.5 mm), WA07-B510, NSMT-Cr 19606; 1 male (19.5 mm), WA07-D650, NSMT-Cr 19607; 1 male (17.0 mm), WA07-C410, NSMT-Cr 19608.

*Description of ovigerous female.* Body (Fig. 3A) bilaterally symmetrical, 1.6–1.8 times as long as maximum width, widest at pereonites 4–5; dorsal surface (Fig. 3B) smoothly vaulted. Cephalon (Fig. 3C) chestnut-shaped; anterior margin acute, not ventrally folded (Fig. 3D); with notches in proximal sides. Eyes distinct or indistinct, occupying about 0.2 width of cephalon. Pereonites 5–6 longest; pereonite 7 shorter than 5–6, concave posteriorly. Coxae of pereonites 6–7 (Fig. 3A) project laterally, bulbous. Pleon (Fig. 3A) strongly immersed in pereonite 7; pleonite 1 laterally overlapped by pereonite 7. Pleotelson (Fig. 3E) semicircular, 0.7–0.8 times as long as maximum width; posterior margin evenly rounded.

Antennule (Fig. 4A) with 8 articles, extending to pereonite 1; basal articles in contact (Fig. 3D). Antenna (Fig. 4B) extending about halfway along pereonite 1, with 12 articles; bases set wide apart (Fig. 3D); articles 4 and 5 distinctly longer than 1–3; articles 6–12 short, becoming progressively shorter. Mandible palp (Fig. 4C) with abundant short setae on distolateral margin of articles 2. Maxillule (Fig. 4D) with 1 large and 4 small spines. Maxilla (Fig. 4E) with 2 spines each on medial and lateral lobes. Maxilliped (Fig. 4F) article 3 with 7 curved spines.

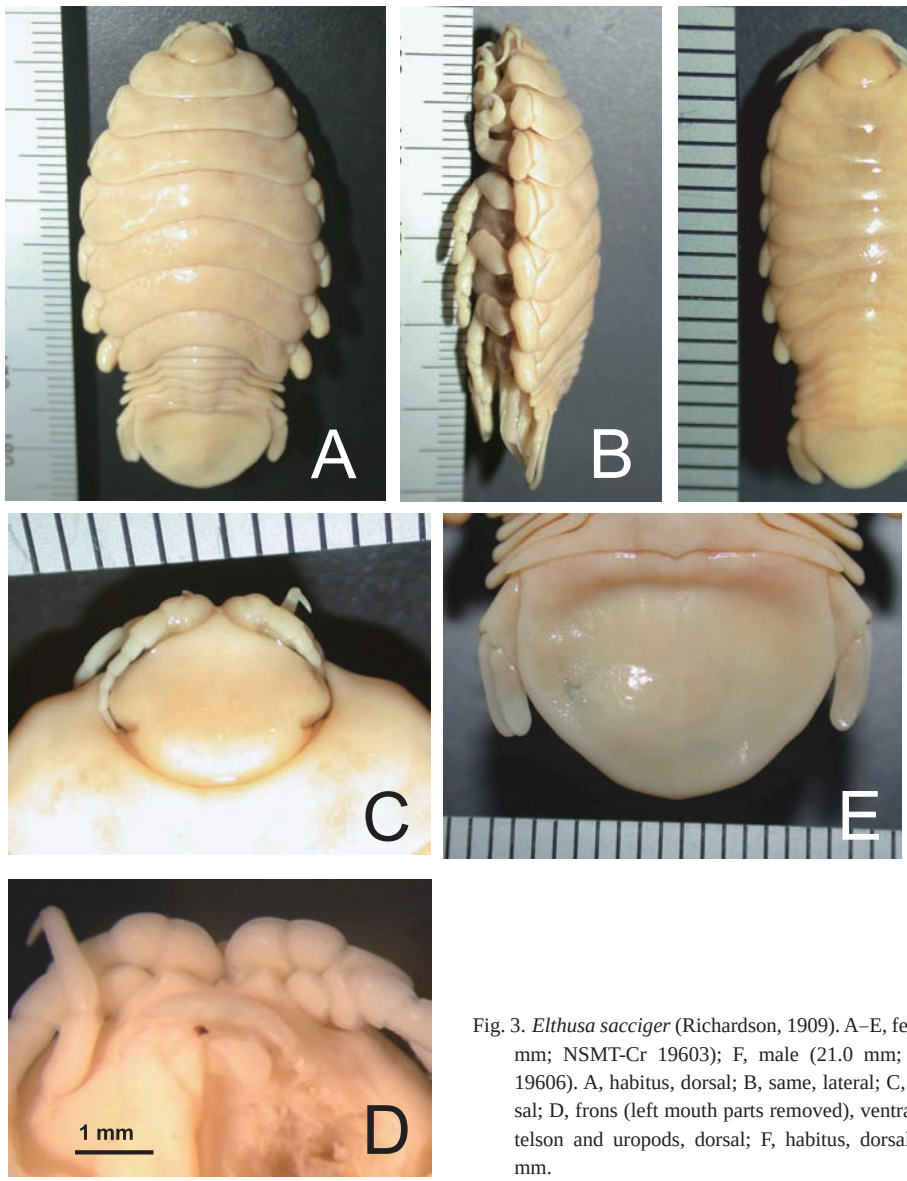


Fig. 3. *Elthusa sacciger* (Richardson, 1909). A–E, female (52.0 mm; NSMT-Cr 19603); F, male (21.0 mm; NSMT-Cr 19606). A, habitus, dorsal; B, same, lateral; C, head, dorsal; D, frons (left mouth parts removed), ventral; E, pleotelson and uropods, dorsal; F, habitus, dorsal. Scale in mm.

Pereopods 1–4 (Figs. 4G–H) slender, without carina on bases. Pereopods 5–7 (Figs. 4I–J) very slender, with weakly developed carina on bases.

Pleopods (Figs. 4K–L) all lamellar; pleopods 3–5 (Fig. 4L) with weakly developed endopod proximomedial lobes; pleopod 2 with appendix masculina. Uropod (Fig. 3E) rami not extending beyond posterior of pleotelson; exopod longer than endopod, with subparallel margin and abruptly rounded to subtruncate apices.

*Coloration.* Pale tan in alcohol.

*Remarks. Elthusa sacciger* was redescribed in detail by Bruce (1990) based on Australian materials. The preset specimens agree closely with previous descriptions (Richardson, 1909; Shiino, 1951, 1965a; Bruce, 1990). This species is readily distinguished from others of the genus by the bulbous coxae of pereonites 6 and 7.

*Distribution. Elthusa sacciger* was collected from Japan (Richardson, 1909; Shiino, 1951;

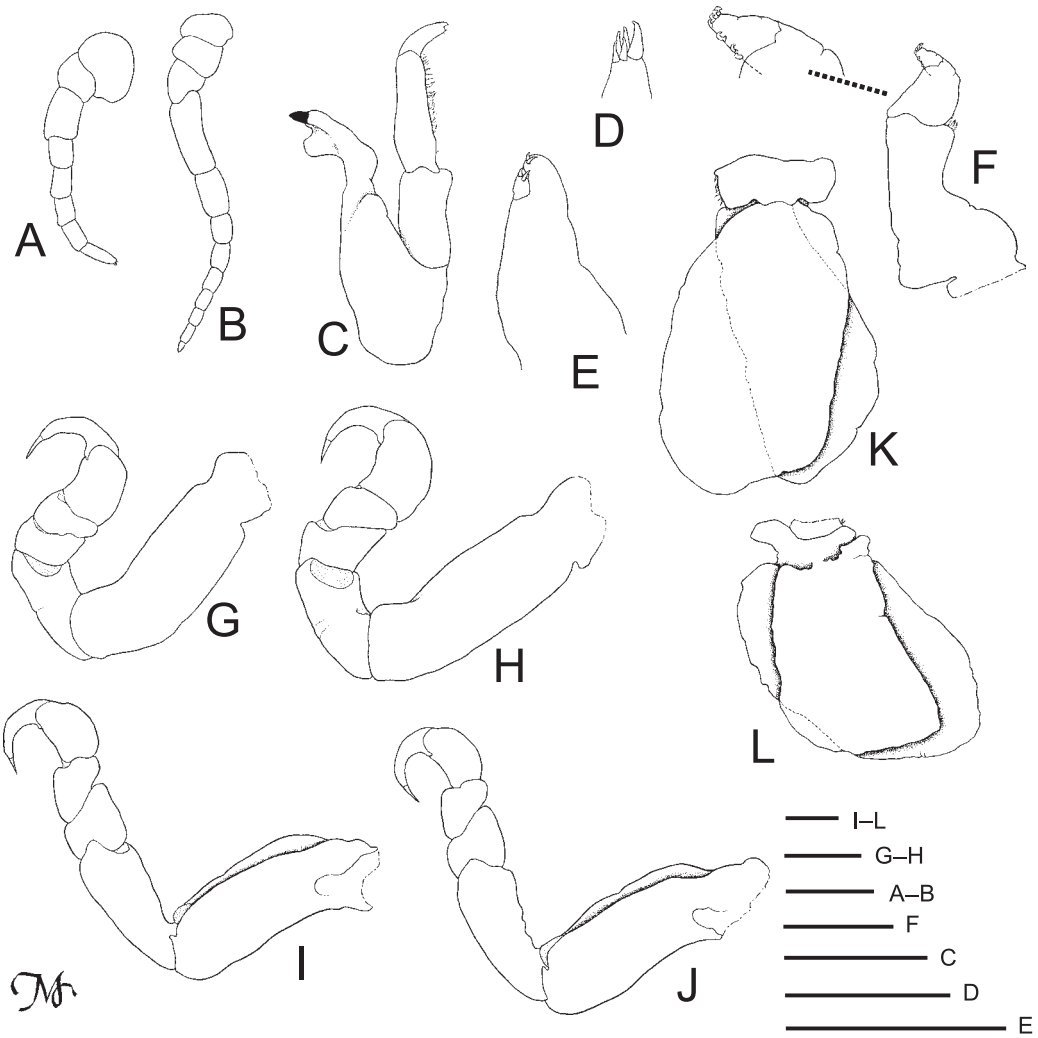


Fig. 4. *Elthusa sacciger* (Richardson, 1909). Female (52.0 mm; NSMT-Cr 19603). A, left antennule, dorsal; B, left antenna, dorsal; C, left mandible, ventral; D, left maxillule apex, ventral; E, left maxilla, ventral; F, left maxilliped, ventral; G, left pereopod 1, ventral; H, left pereopod 2, ventral; I, left pereopod 6, medial; J, left pereopod 7, medial; K, left pleopod 1, ventral; L, left pleopod 5, medial. Scales: A–C, E–L, 2 mm; D, 0.5 mm.

present study) and off the central coast of New South Wales at the depths of 823–995 m (Bruce, 1990). In Japanese water, *E. sacciger* was recorded from Pacific coast of Hokkaido, off Akkeshi and off Muroran (Shiino, 1951), Pacific coast of Hokkaido, lat. 42˚10′40″N, long. 142˚14′E (Richardson, 1909), Pacific coast of northern Honshu (present study), and Bungo Channel, lat. 32˚36′N, long. 132˚23′E (Richardson, 1909), at the depths of 150–786 m (Richardson, 1909; present study).

*Host.* Previous records were only from mouth cavity of cutthroat eels (Synaphobranchidae): *Synaphobranchus* sp. collected from Japan (Richardson, 1909) and grey cutthroats *S. affinis* Günther, 1877 (as *S. pinnats* (Gronow)) (Shiino, 1951). Hence, the present specimens from gill chamber of *S. kaupii* are new host and infection site records for *E. sacciger*. In the present study, a male of *E. sacciger* was collected on the body surface of *Sebastolobus macrochir* among the

captured fishes consisting of various species. However, it is uncertain that *S. macrochir* is the host of *E. sacciger* because the male of cymothoids often abandoned their dying or stressed host (Brusca, 1981).

Genus ***Mothocya*** Costa, in Hope, 1851
［New Japanese name: Era-nushi-zoku］

***Mothocya komatsui*** sp. nov.
［New Japanese name: Shinkai-era-nushi］
(Figs. 5–6)

*Material examined.* Holotype, ovig. female (19.5 mm), WA06-E900, off Kinkazan, Miyagi Prefecture, 38° 29.8′ N, 142° 21.6′ E–38° 29.1′ N, 142° 21.5′ E, 905–908 m, 2 November 2006, NSMT-Cr 19609.

*Description of holotypic female.* Body (Fig. 5A) bilaterally asymmetrical, about 2.5 times as long as maximum width; widest at pereonite 3; Dorsal surface (Fig. 5B) smoothly vaulted. Cephalon (Fig. 5C) deeply immersed in pereonite 1; anterior margin evenly rounded, turned down, but not posteriorly (Fig. 6A). Eyes distinct, occupying about 0.38 width of cephalon. Pleonites 1–4 subequal in length; pereonite 7 shortest. Coxae (Fig. 5B) not produced beyond posterior of respective segments; posterior margins rounded. Pleon (Fig. 5D) immersed in pereonite 7; pleonite 1 largely concealed by pereonite 7. Pleotelson (Fig. 5D) semicircular, about 0.66 times as long as maximum width; lateral margins evenly rounded.

Antennule (Fig. 6B) with 8 articles; antennules set wide apart (Fig. 6A). Antenna (Fig. 6C) with 8 articles. Mandible palp (Fig. 6D) articles without setae. Maxillule (Fig. 6E) with 1 large and 3 small spines. Maxilla (Fig. 6F) with 2 spines each on medial and lateral lobes. Maxilliped (Fig. 6G) article 3 with 3 curved spines.

Pereopods 6–7 (Figs. 6J–K) significantly larger than pereopods 1–5 (Figs. 6H–I).

Pleopods (Figs. 6L–M) approximately equal in size. Pleopod 1 (Fig. 6L) with weakly developed peduncle lateral lobe, those of pleopods 2–5 (Fig. 6M) moderately developed. Pleopods 3–5 (Fig. 6M) with developed endopod proximomedial lobe. Uropod rami (Fig. 6N) not extending

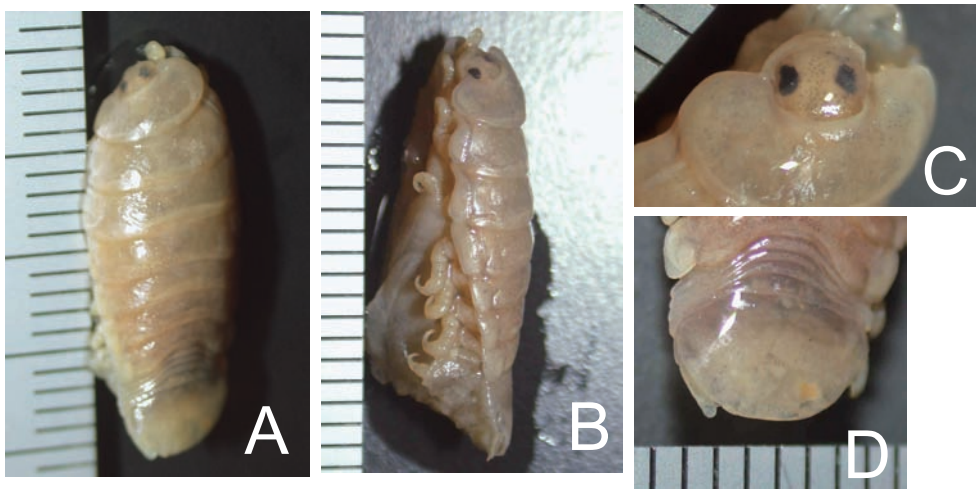


Fig. 5. *Mothocya komatsui* sp. nov. Holotype female (19.5 mm; NSMT-Cr 19609). A, habitus, dorsal; B, same, lateral; C, head, dorsal; D, pleon and pleotelson, dorsal. Scale in mm.

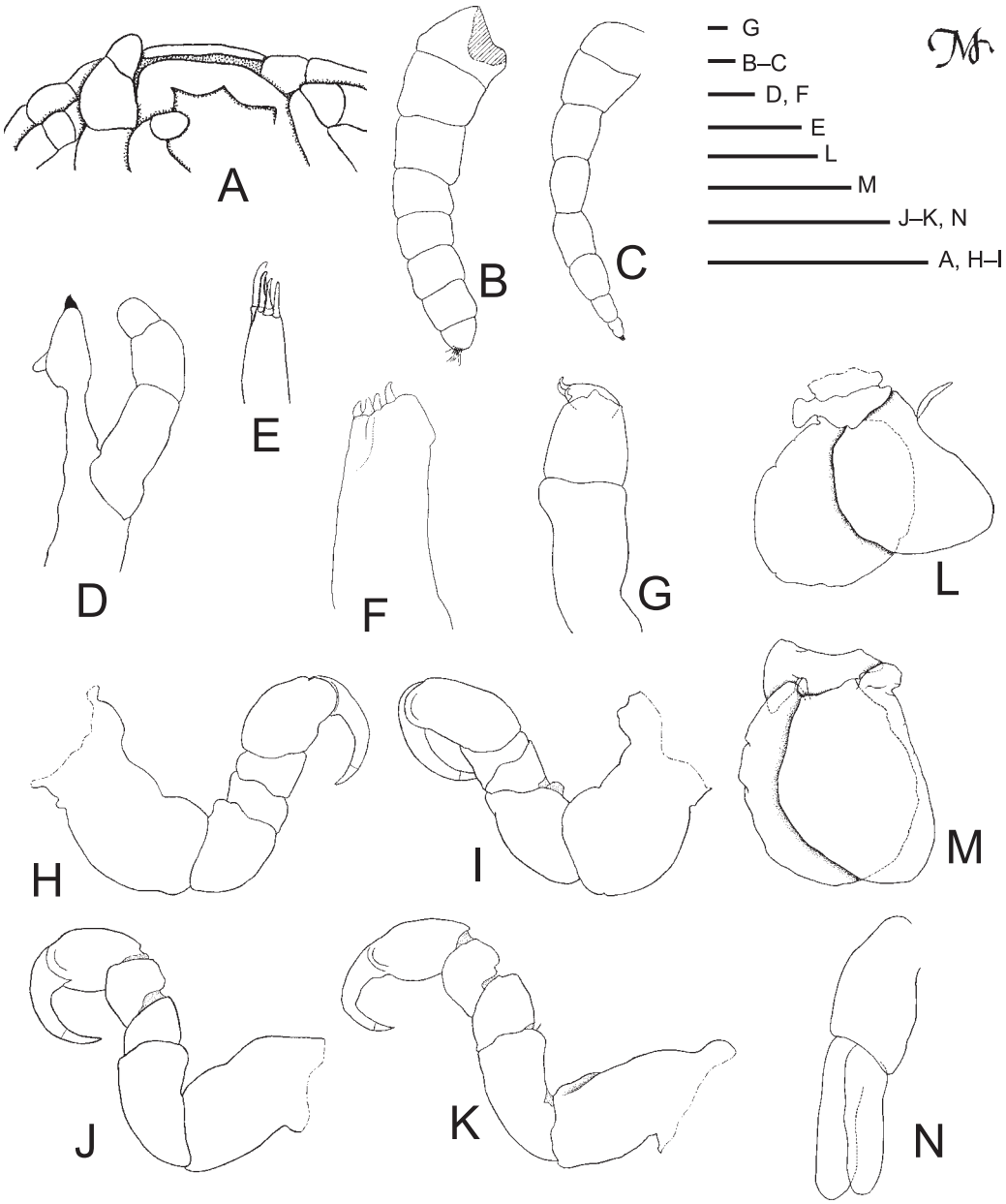


Fig. 6. *Mothocya komatsui* sp. nov. Holotype female (19.5 mm; NSMT-Cr 19609). A, frons, ventral; B, left antennule, dorsal; C, left antenna, dorsal; D, left mandible, ventral; E, left maxillule apex, ventral; F, left maxilla, ventral; G: left maxilliped, medial; H, right pereopod 1, ventral; I, left pereopod 2, ventral; J, left pereopod 6, medial; K, left pereopod 7, medial; L, left pleopod 1, ventral; M, left pleopod 5, medial; N, left uropod, dorsal. Scales: A, H–N, 2 mm; B–G, 0.1 mm.

beyond posterior of pleotelson; exopod longer than endopod, with subparallel margin and rounded apices.

*Coloration.* Pale brown in alcohol, densely covered by chromatophores.

*Remarks.* The present new species is assigned to *Mothocya*, having a set of the diagnostic features described by Bruce (1986b).

*Mothocya komatsui* can be distinguished from its congeners by the elongate body shape, the heavily twisting of the body, and the wide apart antennules set. The new species is similar to *Mothocya panamica* Bruce, 1986, known from the Pacific coast of Panama, and *Mothocya ihi* Bruce, 1986, known from New Zealand, in having the elongate body shape and the wide apart antennules set (Bruce, 1986b). However, the present new species differs from *M. panamica* in the following features (those of *M. panamica* in parentheses): the body heavily twisted (straight); the coxa of pereonite 7 not produced beyond posterior of segment (extending beyond posterior of segment); the pleon immersed in pereonite 7 (pleon not immersed in pereonite 7); the pleotelson about 0.66 times as long as maximum width (about 1.3 times as long as maximum width); the maxilla with 2 spines each on medial and lateral lobes (with 2 spines on medial lobe, 5 spines on lateral lobe); the pereopod 1 posterior margins of ischium to carpus not distinctly convex (distinctly convex); the pleopod peduncle lateral lobes large (extremely large); the uropod rami not slender (slender). *Mothocya komatsui* differs from *M. ihi* in the following features (those of *M. ihi* in parentheses): the body heavily twisted (straight); the cephalon anterior margin evenly rounded (with distinct rostral process); the maxilliped article 3 with 3 spines (with 4 spines); the uropod rami not extending beyond posterior of pleotelson (extending slightly beyond posterior of pleotelson).

*Etymology.* This species is named after Dr. Hironori Komatsu, who collected the holotype of this species.

*Distribution.* This species was collected only from Pacific coast of northern Honshu, eastward to Kinkazan, Miyagi Prefecture, Japan, at depth of 905–908 m (present study).

*Host.* Unknown. It seems that the new species is a gill parasite because of its heavily twisting of the body.

## Genus ***Pleopodias*** Richardson, 1910
［New Japanese name: Kaitei-ginka-zoku］

### ***Pleopodias diaphus*** Avdeev, 1975
［New Japanese name: Kaitei-ginka］
(Figs. 7–8)

*Pleopodias diaphus* Avdeev, 1975: 254–256, figs. 1–11 (type locality: East China Sea); Bruce and Harrison-Nelson, 1988: 600; Trilles, [1994]: 33 (list), 109.

*Pleopodias superatus* Williams and Williams, 1986: 656, figs. 62–68 (type locality: Yui, Shizuoka Prefecture, Honshu, Japan, 50˚06.1′N, 138˚33.7′E).

*Material examined.* 1 ovig. female (23.5 mm), WA05-G350, NSMT-Cr 19610; 1 ovig. female (27.0 mm), WA05-H310, NSMT-Cr 19611; 1 female (12.0 mm), WA06-F380, NSMT-Cr 19612.

*Description of ovigerous female.* Body (Fig. 7A) 3.4–3.9 times as long as maximum width, bilaterally symmetrical; pereon dorsum strongly vaulted (Fig. 7B). Rostrum (Fig. 7C) broad; its anterior margin truncate in dorsal view; its folding area triangular in ventral view, produced between bases of antennae 1 (Fig. 8A). Eyes occupying 0.56–0.57 width of cephalon. Shortest pereonite 2, longest 6. Posterolateral margins of pleonites (Fig. 7D) rounded. Pleotelson (Fig. 8B) about 2.2 times as long as maximum width; lateral margins bent dorsally; posterior margin deeply emarginated; medial longitudinal ridge weakly developed.

Antennule (Fig. 8C) with 8 articles, extending to anterior of pereonite 2; anterodistal margin of article 3 produced; antennule bases contiguous. Antenna (Fig. 8D) with 12 articles, extending to posterior of pereonite 3. Mandibular palp (Fig. 8E) article 2 with numerous setae along lateral margin. Maxillule (Fig. 8F) with 3 spines. Maxilla (Fig. 8G) with 1 large spine and 1 small spine, each on medial and lateral lobes respectively. Maxilliped (Fig. 8H) article 3 with 3 spines.

Pereopods 4–7 (Figs. 8K–L) significantly larger than pereopods 1–3 (Figs. 8I–J). Pereopod 6 (Fig. 8K) carpus and propodus with spines on posterior margin. Pereopod 7 (Fig. 8L) very long, with abundant small spines on inner surface from distal carpus to propodus.

Pleopod 1 peduncle (Fig. 8M) slightly more than 4 times as long as wide; peduncles of pleopods 2–5 (Fig. 8N) becoming progressively narrower towards posterior. Pleopod 1 rami (Fig. 8M) distal margins rounded; pleopods 2–5 (Fig. 8N) with rami becoming progressively narrow; endopod of pleopod 5 (Fig. 8N) with 2 folds in medial surface and a fold in ventral surface. Uropod (Fig. 8O) extending beyond posterior end of pleotelson; rami subequal in length; both rami narrowing gradually to round apexes.

*Coloration.* Dorsal surface with dense chromatophores appearing dark reddish brown in alcohol.

*Remarks. Pleopodias superatus* was regarded as a junior synonym of *P. diaphus* by Bruce and Harrison-Nelson (1988). The preset specimens agree very well with the original description of *P. diaphus* by Avdeev (1975) and *P. superatus* by Williams and Williams (1986).

Only two nominal species of the genus *Pleopodias* were recorded from the Pacific: *Pleopodias elongatus* Richardson, 1910, recorded from the Philippines, and *P. diaphus*. *Pleopodias diaphus* can be distinguished from *P. elongatus* redescribed by Bruce (1986a), in the following features (those of *P. elongatus* in parentheses): the slender body shape, 3.4–3.9 times as long as maximum width (about 2.5 times), the deeply emarginated posterior margin of pleotelson (rounded posterior margin of pleotelson), and contiguous antennule bases (not contiguous).

*Distribution. Pleopodias diaphus* was collected from East China Sea (= Sea of Japan) (Avdeev, 1975) and Pacific coast of Honshu, Japan (Williams and Williams, 1986; present study), at depths of 310–380 m (present study).

*Host.* Avdeev (1975) recorded *P. diaphus* attached above to the dorsal fin of the blue lantern fish *Diaphus caeruleus* (Klunzinger, 1871) (Myctophidae). In Japanese deepsea, *P. diaphus* is the only cymothoid species attached to the body surface of fishes.

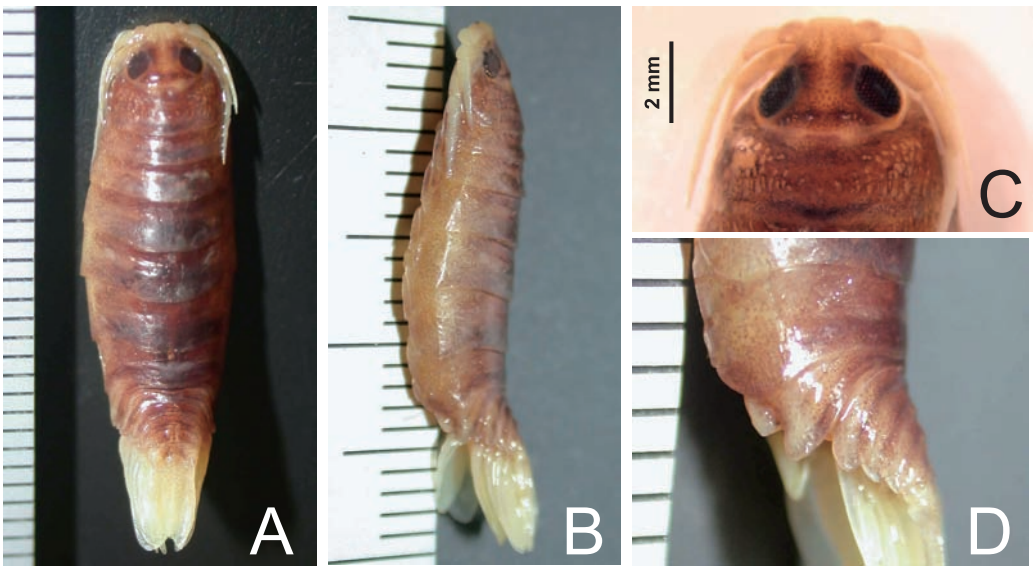


Fig. 7. *Pleopodias diaphus* Avdeev, 1975. Female (27.0 mm; NSMT-Cr 19611). A, habitus, dorsal; B, same, lateral; C, head, dorsal; D, pleon, lateral (all left pleopods removed). Scale in mm.

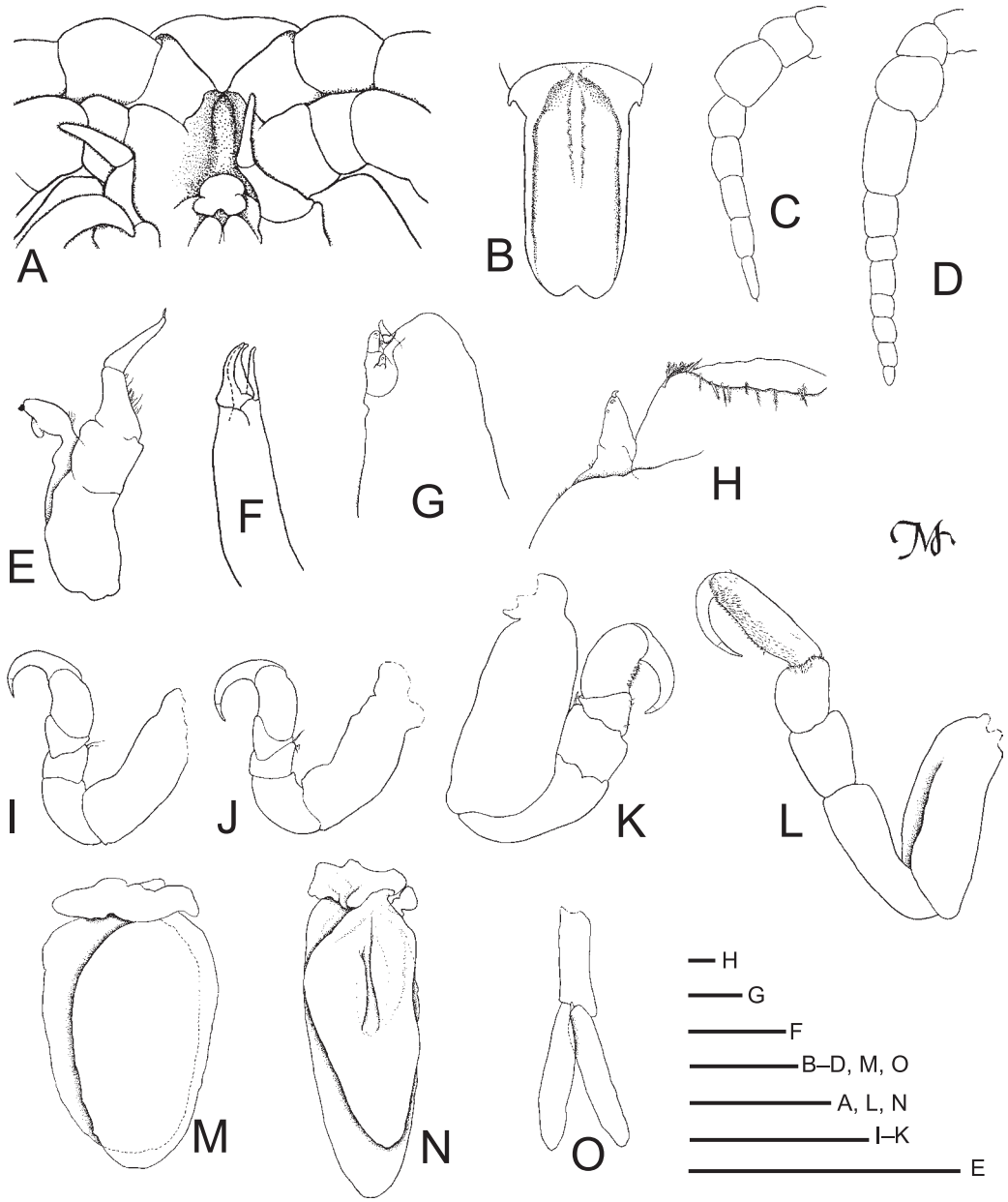


Fig. 8. *Pleopodias diaphus* Avdeev, 1975. Female (27.0 mm; NSMT-Cr 19611). A, frons, ventral; B, pleotelson, dorsal; C, left antennule, dorsal; D, left antenna, dorsal; E, left mandible, ventral; F, left maxillule, ventral; G, left maxilla, ventral; H, left maxilliped, ventral; I, left pereopod 1, ventral; J, left pereopod 2, ventral; K, left pereopod 6, ventral; L, left pereopod 7, medial; M, left pleopod 1, ventral; N, left pleopod 5, medial; O, left uropod, dorsal. Scales: A–E, I–O, 2 mm; F–H, 0.1 mm.

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