Zootaxa 5689 (3): 549–569
https://www.mapress.com/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.5689.3.7
http://zoobank.org/urn:lsid:zoobank.org:pub:826AD628-2606-4E37-A697-1263E7CD784D

On the genus *Iphinoe* (Crustacea, Cumacea) from Japanese waters and the Sulu Sea, Philippines, with the description of two new species

TADASHI AKIYAMA
Ushimado Marine Laboratory, Okayama University, Ushimado, Okayama 701-4303, Japan
akiyama@uml.okayama-u.ac.jp; https://orcid.org/0009-0007-4190-9578

Abstract

Three species of the cumacean genus *Iphinoe* Bate, 1856, *I. sagamiensis* Gamô, 1958, *I. indenticulata*, Kim & Kim, 2020, and *I. wakasaensis* **sp. nov.** from Japan, Northwest Pacific are reported. *Iphinoe sagamiensis* is closely similar to *I. wakasaensis*, but lives in shallower water (4–101 m) than *I. wakasaensis* (96–200 m). *Iphinoe indenticulata*, originally described from the Yellow Sea, was collected from the muddy bottom of the Seto Inland Sea of Japan, at 15 m depth. The female specimens are described. Also described herein is *Iphinoe suluensis* **sp. nov.** from the Sulu Sea, Indo-West Pacific, which is similar to *I. crassipes* Hansen, 1895 and *I. pokoui* Le Loeuff & Intes, 1972, which are regarded as aberrant members of the genus. A key to the species of *Iphinoe* of Japan, Korea and China is provided.

Key words: Crustacea, Cumacea, *Iphinoe*, New species, Northwest Pacific, Indo-West Pacific

Introduction

The cumacean genus *Iphinoe* Bate, 1856 (Family Bodotriidae T. Scott, 1901) currently consists of 41 species from shallow waters of the Mediterranean Sea, eastern Atlantic, Indian Ocean, Indo-West Pacific, and western Pacific (Băcescu 1988; Watling & Gerken 2024). Four of these are known from the Northwest Pacific, i.e., *I. sagamiensis* Gamô, 1958 from Japan and the Yellow Sea (Gamô 1958, 1962; Lee & Lee 1998), *I. tenera* Lomakina, 1960 from the Yellow Sea, Bo Hai, (Lomakina 1960; Liu & Liu 1990; Park *et al*. 1998), *I. gurjanovae* Lomakina, 1960 from the Chinese coast of the Yellow Sea, and *I. indenticulata* Kim & Kim, 2020 from the Korean coast of the Yellow Sea. The present study reports three *Iphinoe* species from Japan, including a species new to science.

The genus *Iphinoe* includes some species characterized by several unusual morphological characters, although they match the generic diagnosis. Among them, *I. crassipes* Hansen, 1895 was originally described based on an immature specimen (3.2 mm) from Togo, western Africa. Thereafter, adult specimens of the species were reported from a wide geographic area, i.e., South Africa, the Mediterranean, Andaman Sea, and Indian Ocean (Stebbing 1910; Kurian 1951, 1954; Jones 1956; Băcescu 1961; Day 1978; Corbera 1994; Mühlenhardt-Siegel 1998). Calman (1904) reported a juvenile specimen from Ceylon and India as *I. macrobrachium*, which was regarded as a synonym of *I. crassipes* (Stebbing 1910; Kurian 1951; Day 1978; Băcescu 1988). This species and *I. pokoui* Le Loeuff & Intes, 1972 from Cote d'Ivoire, western coast of Africa, characterized by an expanded merus of maxilliped 3, were regarded as aberrant members of the genus (Day 1978; Haye 2007). The present study also describes a new *Iphinoe* species from the Sulu Sea, Indo-West Pacific, which is similar to *I. crassipes* and *I. pokoui*. Morphological characters of these species are discussed.

Material and methods

The *Iphinoe* specimens from the Pacific coast of southern Honshu and Kyushu, Japan (except for Misaki and Shimoda) were collected by the R/V *Tansei-maru* of the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), T/S *Toyoshio-maru* of Hiroshima University, and the training boat *Tansui* of the Fisheries Research

Accepted by G. Bird: 16 Jul. 2025; published: 4 Sept. 2025

Laboratory, Mie University. The specimens from Shimoda and Misaki, Sagami Bay, near the type locality of *Iphinoe sagamiensis*, were collected by *Tsukuba II* of the Shimoda Marine Research Center, Tsukuba University, and a small vessel of Misaki Marine Biological Station, University of Tokyo. The gears for the collections were: beam trawl of 3 m span and biological dredge of 1 m span (*Tansei-maru*), a beam trawl of 1.8 m span (*Toyoshio-maru*), a biological dredge of 50 cm span (*Tansui*), a small biological dredge (*Tsukuba II*), and a small epibenthic sledge (the Misaki vessel). The beam trawls attached small ring nets equipped with nylon mesh of 0.5 mm opening, for collecting small animals (Akiyama & Gamô 2012). Sediments collected by the trawls and dredges were sieved through plastic baskets equipped with 0.5 mm nylon mesh (Akiyama & Gerken 2012).

The specimens from Wakasa Bay, the Sea of Japan were collected by T/S *Ryokuyo-marru* of Maizuru Fisheries Research Station, Kyoto University. The sampling gear was the NRIFE-II-type beam trawl of 2 m width (0.2 m in height), attached with small ring nets (nylon mesh of 0.5 mm and 1 mm opening). In the Seto Inland Sea, the specimens were collected using small epibenthic sledge of 46 cm width, equipped with nylon mesh of 0.5 mm. *Iphinoe* specimens from the Sulu Sea were collected by R/V *Hakuho-maru* of JAMSTEC (cruise KH00-1), using a biological dredge of 1 m span.

The collected animals were preserved in 5% formalin/seawater or 70–80 % ethanol. Observation of the specimens were made using a stereo microscope (Leica M165) and a light microscope (Nikon E600) equipped with drawing tubes. The type specimens and some other specimens are deposited in the National Science Museum of Nature and Science, Tokyo (NSMT).

Taxonomy

Family Bodotriidae T. Scott, 1901

Subfamily Bodotriinae T. Scott, 1901

Genus *Iphinoe* Bate, 1856

Type species: *Iphinoe trispinosa* (Goodsir, 1843)

Diagnosis. Five pedigerous somites visible, the first short. Pereopod 2 6-articulated. Uropod endopod 2-articulated.

Remarks. At present, the combination of these morphological characters, in Day's diagnosis (1978), except for " uropod rami shorter than peduncle" (subequal in a *Iphinoe crassipes* specimen *ibid*), is enough for the identification of the genus in the subfamily Bodotriinae. Thereafter, Haye (2007) described rather more detailed morphological characters of the genus but showed that each character exhibits considerable variation between species. Therefore, it is difficult to include other characters in the diagnosis above.

Iphinoe sagamiensis Gamô, 1958

(Fig. 1)

Gamô (1958): 23–24, fig. 1; Gamô (1962): 22–24, fig. 9.

Diagnosis. *Ovigerous female*. Carapace 0.23–0.26 times total body length, 2.1–2.5 times as long as wide, 2.1–2.7 times depth; median dorsal ridge with 8–16 teeth; width of round eye lobe 0.15–0.20 times carapace width, 0.9–1.2 times eye lobe length; antero-lateral angle with 3–6 teeth; inferior margin without teeth. Antenna 1 peduncle article 1 0.90–1.10 times as long as article 3. Pereopod 1 propodus with long seta on inner distal corner; dactylus 0.78–0.89 times as long as carpus. Uropod peduncle with spiniform setae. *Adult male*. Median dorsal ridge of carapace very weak or obsolete, with 1–2 prominent spines; eye lobe 0.20–0.28 times as carapace width, 1.1–1.4 times as long as eye lobe length; antero-lateral angle with 3–6 teeth; inferior margin without teeth. Antenna 1 main flagellum article 1 with 2–4 aesthetascs.

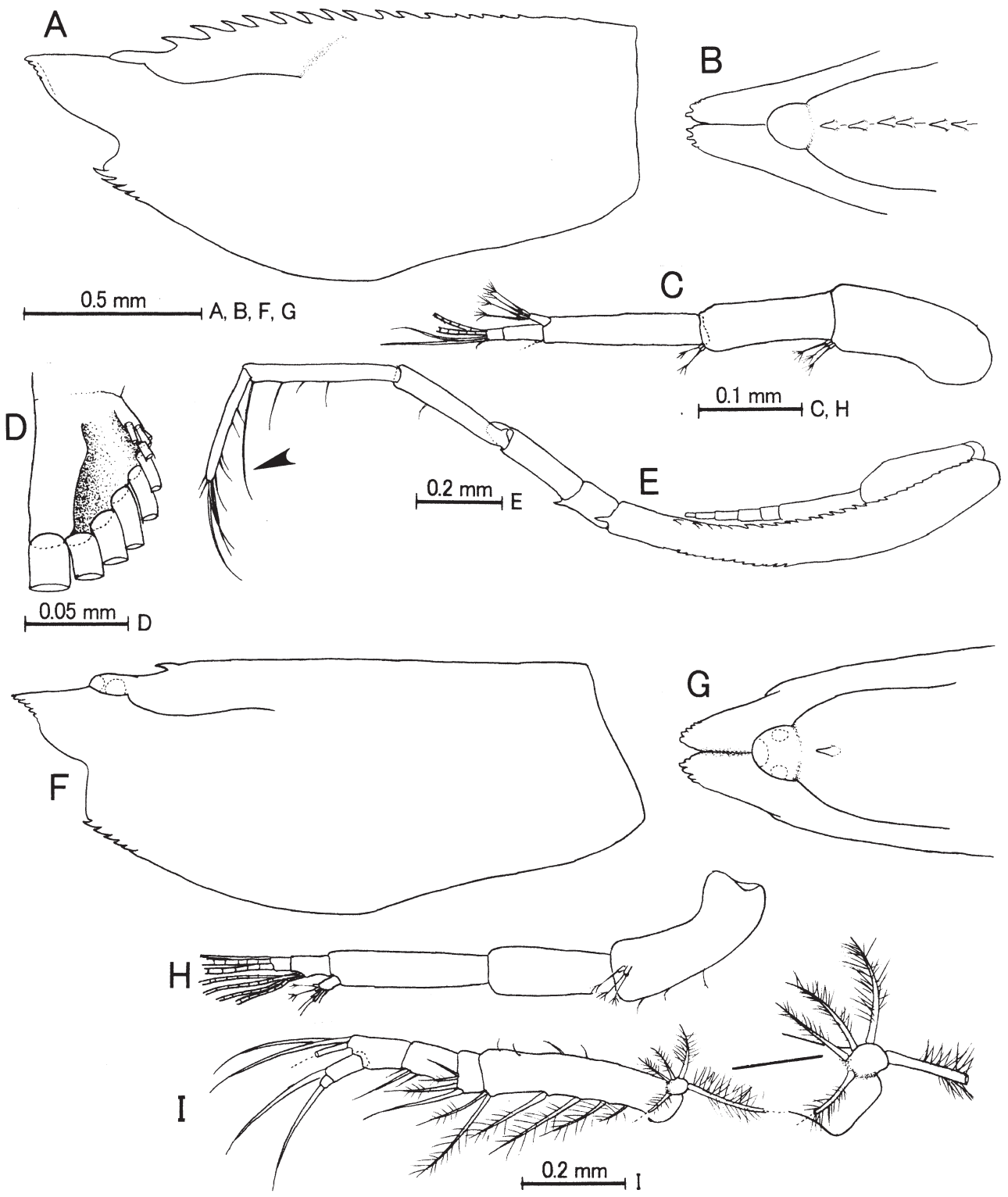

FIGURE 1. *Iphinoe sagamiensis* Gamô, 1958. A–E, ovigerous female; F–I, adult male. A, carapace, lateral view; B, anterior portion of carapace, view from above; C, antenna 1; D, rudimentary oostegite on coxa of maxilliped 2; E, pereopod 1; F, carapace, lateral view; G, anterior portion of carapace, view from above; H, antenna 1; I, pereopod 3.

Material examined. Five ovigerous females, 6.6–7.6 mm, dissected, 5 adult males, 6.0–7.0 mm, 3 specimens dissected (NSMT Cr-32961), Omaezaki, southern coast of Honshu, 34°38.26'N, 138°17.86'E–34°38.12'N, 138°17.86'E, 70.5–71 m (KT-10-16, St. OM), 13 August 2010; 4 ovigerous females, 4.9–6.1mm, 1 adult male, 5.2 mm, partially dissected, Shimoda, Sagami Bay, 34°39.16'N, 138°57.04'E–34°38.98'N, 138°56.81'E, 42–47 m, 25 October 2017; 3 preparatory females, 5.8–6.3 mm, partially dissected, off Shimoda, 34°41'N, 138°57'E, 14 m, 27 November 2014; 2 ovigerous females, 7.0, 7.2 mm, 3 preparatory female, 6.7–7.7 mm, partially dissected, Misaki, Sagami Bay 35°09.44'N, 139°36.85'E, 4 m, 19 January 2015; 1 ovigerous female, 8.3 mm, 3 adult males, 7.3–8.0 mm, partially dissected, Misaki, Sagami Bay, 35°09.55'N, 139°36.98'E, 4–4.5 m, 13 March 2013; 1 ovigerous female, 6.7 mm, partially dissected, Misaki, Sagami Bay, 35°09.55'N, 139°36.94'E, 4.5 m, 24 January 2014; 1 ovigerous female, 8.2 mm, partially dissected, Enshu-nada, southern coast of Honshu, 34°37.52'N, 137°59.38'E–34°37.46'N, 137°59.53'E, 52–62 m (KT-02-5, St. EN4-1), 27 May 2002; 1 ovigerous female, 8.3 mm, 2 preparatory females, 9.3, 10.0 mm, partially dissected Enshu-nada, 34°34.78'N, 138°04.89'E –34°34.63'N, 138°04.82'E, 69–74 m (KT-02-5, St. EN2-2), 26 May 2002; 3 ovigerous females, 6.1–7.5 mm, 1 preparatory female (damaged), partially dissected, Enshu-nada, 34°34.79'N, 138°04.0' E–34°34.76'N, 138°03.88'E, 84–88 m (KT-10-16, St. EN-1), 13 August 2010; 1 subadult male, 7.1 mm, partially dissected, Cape Toi, eastern coast of Kyushu, 31°20.05'N, 131°17.46'E–31°20.07'N, 131°16.88'E, 101 m (TY02), 22 May 2002, collected by M. Shimomura.

Description of selected characters. *Ovigerous females*, 4.9–8.3 mm. Carapace 0.24–0.26 times total body length, 2.14–2.55 times width, 2.09–2.70 times depth; median dorsal ridge with 8–16 teeth; pseudorostral lobes 0.11–0.16 times carapace length, not in contact at anterior end (Fig. 1B); width of eye lobe (Fig. 1B) 0.15–0.20 times carapace width, 0.93–1.17 times eye lobe length; antennal notch deep; antero-lateral angle (Fig. 1A) rather pointed, succeeded by 3–6 teeth; inferior margin smooth. Pereon 0.96–1.20 times as long as carapace. Pleon 0.48–0.50 times total animal length.

Antenna 1 (Fig. 1C) peduncle article 1 1.1–1.5 times as long as article 2, 0.9–1.1 times as long as article 3; article 3 1.1–1.4 times as long as article 2; main flagellum biarticulate, 0.24–0.34 times as long as peduncle article 3, accessory flagellum uniarticulate, 0.4–0.7 times as long as main flagellum article 1.

Antenna 2 with 2–3 plumose setae.

Maxilliped 2 coxa (Fig. 1D) rudimentary oostegite strongly bent, with 7–13 setae.

Pereopod 1 (Fig. 1E) basis 0.7–0.9 times as long as distal articles together, with one spine on distal end of ventral surface; carpus 1.2–1.4 times as long as merus, 0.7–0.9 times as long as propodus; propodus 1.3–1.6 times as long as dactylus, with long simple seta on inner distal corner (arrowed on figure); dactylus 0.8–0.9 times as long as carpus.

Uropod peduncle with 11–12 spiniform setae on inner margin.

Adult males, 5.2–8.0 mm. Carapace (Fig. 1F, G) 0.24–0.27 times total body length, 2.63–2.98 times as long as wide, 2.29–2.45 times depth; median dorsal surface nearly straight, seen from side; weak median dorsal ridge on frontal lobe, with 1–2 prominent spines, without minute spines; pseudorostrum 0.11–0.16 times carapace length; left and right pseudorostral lobes not in contact at anterior end (Fig. 1G); width of round eye lobe (Fig. 1G) 0.22–0.28 times carapace width and 1.1–1.4 times eye lobe length; antennal notch triangular; anterolateral angle not pointed, succeeded by 3–6 teeth; lower margin smooth.

Antenna 1 (Fig. 1H) peduncle article 1 1.3–1.5 times as long as article 2 and 1.0–1.2 times as long as article 3; article 3 1.2–1.4 times as long as article 2; main flagellum biarticulate, 0.3–0.5 times as long as peduncle article 3; article 1 with 2–4 aesthetascs; accessory flagellum uniarticulate, 0.4–0.6 times as long as main flagellum article 1.

Pereopod 3 (Fig. 1I) basis 1.0–1.2 times as long as distal articles together, globular protrusion near basal end of basis with 4–5 pappose setae.

Remarks. *Iphinoe sagamiensis* was described from specimens from the southern coast of Honshu (female specimens from Sagami Bay, 20 m (Gamô 1958), and male specimens from Tanabe Bay, Kii Peninsula (Gamô 1962). The specimens examined in this study, from the southern coast of Honshu and Kyushu, agree with the description by Gamô.

Iphinoe sagamiensis is similar to *Iphinoe tenera* Lomakina, 1960 from the Yellow Sea, Bo Hai in the shape of the carapace, but is distinguished from the latter by (1) the anterior portion of carapace in females is without a longitudinal ridge in females, (2) the dorsal surface of the carapace has 1–2 spines and the anterolateral corner has teeth in males, (3) the pereopod 1 propodus has a long seta on inner distal corner, (4) the uropod peduncle is without long setae on the inner margin (Table 1).

TABLE 1. Morphological features distinguishing Northwest Pacific species of *Iphinoe*. Japanese species in first three columns.

Feature	*I. indenticulata*	*I. sagamiensis*	*I. wakasaensis*	*I. gurjanovae*	*I. tenera*
Carapace longitudinal ridge from antenna	absent	absent	absent	absent	present (♀) absent (♂)
Carapace teeth on median dorsal region	14–20 (♀) absent (♂)	8–16 (♀) 1–2 (♂)	17–27 (♀) 2–5 prominent, 5–10 minute (♂)	4–5 (♀) absent (♂)	13–15 (♀) absent (♂)
Carapace teeth on anterolateral angle	4–6 (♀), 3–4 (♂)	3–6 (♀♂)	–	7 (♀), 4 (♂)	6 (♀), 0 (♂)
Carapace lower margin	not serrate (♀♂)	not serrate (♀♂)	serrate (♀♂)	not serrate (♀♂)	not serrate (♀♂)
Eye lobe shape	triangular	round	round	–	–
Eye lobe: carapace width	0.12–0.16 (♀)	0.15–0.2× (♀) 0.22–0.28× (♂)	0.11–0.14× (♀) 0.17–0.19× (♂)	–	–
Eye lobe width: length	1.5–1.7 (♀)	0.9–1.2 (♀) 1.1–1.4 (♂)	0.8–0.9 (♀) 0.8–1.0 (♂)	–	–
Pseudorostral lobes anterior end	in contact (♀♂)	Separated (♀♂)	in contact (♀♂)	–	–
Antenna 1 peduncle article 1 (♀): article 3 length	0.9–1.0×	0.9–1.1×	1.1–1.5×	0.9×	0.9×
Antenna 1 main flagellum article 1 aesthetascs (♂)	6–8	2–4	2–4	–	–
Pereopod 1 basis: succeeding articles combined length	longer	shorter	shorter	subequal	longer
Pereopod 1 propodus inner distal long setae	4–6 (♀) 4, 5 (♂)	1 (♀♂)	1 (♀♂)	1 (♀)	3 (♀)
Pereopod 1 dactylus (♀): carpus length	0.8–1.0×	0.8–0.9×	0.9–1.1×	0.7×	1.0×
Long setae on uropod peduncle (♀)	present	absent	absent	present	present

Iphinoe sagamiensis is also similar to *Iphinoe gurjanovae* from the Yellow Sea but is distinguished from the latter by (1) the median dorsal ridge on the carapace has more teeth, (2) the dorsal surface of carapace has 1–2 spines in males, (3) the uropod peduncle is without long setae (Table 1).

Distribution. Pacific coast of Honshu (southern area) and Kyushu Islands, Japan, 4–101 m.

Iphinoe wakasaensis sp. nov.

(Figs 2–4)

Diagnosis. *Ovigerous female*. Carapace 0.25–0.27 times total body length, 2.0–2.3 times as long as wide, 2.2–2.4 times depth. median dorsal ridge with 17–27 teeth present for entire length of carapace; width of round eye lobe 0.11–0.14 times carapace width, 0.8–0.9 times eye lobe length; antero-lateral angle pointed, succeeded by 12–20 teeth on anterior half of inferior margin of carapace. Antenna 1 peduncle article 1 1.08–1.48 times as long as article 3. Pereopod 1 propodus with long simple seta on distal end; dactylus 0.90–1.11 times as long as carpus. Uropod peduncle with spiniform setae. *Adult male*. Carapace with weak median dorsal ridge running for anterior half of carapace, with 2–5 distinct and 5–10 minute spines; width of eye lobe 0.17–0.19 times carapace width, 0.8–1.0 times eye lobe length; antero-lateral angle forming obtuse angle, succeeded by 11–19 teeth on anterior half of inferior margin of carapace. Antenna 1 main flagellum article 1 with 2–4 aesthetascs.

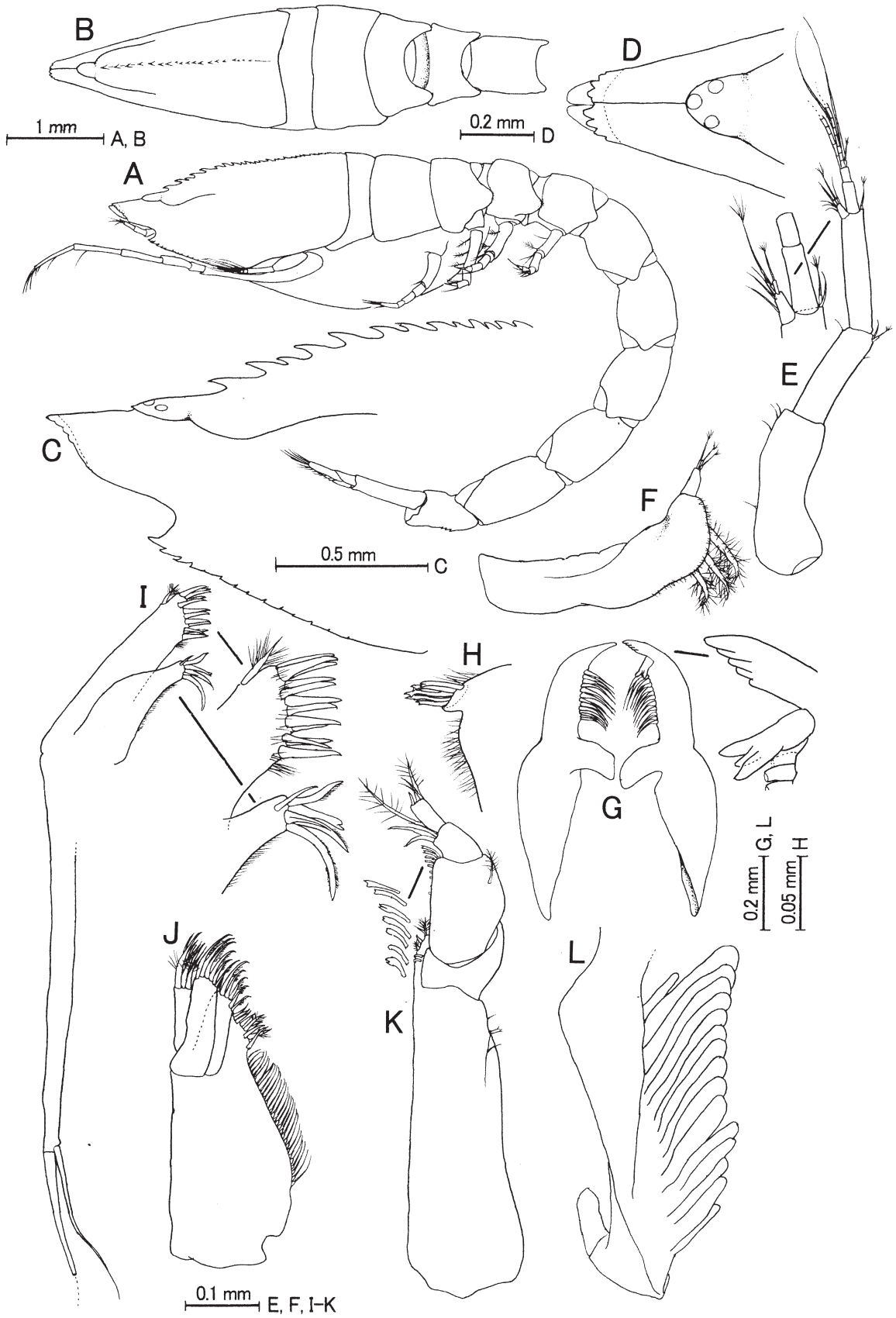

FIGURE 2. *Iphinoe wakasaensis* **sp. nov.**, A–D, holotype ovigerous female; E–L, paratype ovigerous female. A, lateral view; B, anterior portion of body, from above; C, anterior portion of carapace, lateral view; D, pseudorostrum and eye lobe, from above; E, F, antenna 1 and 2; G, mandibles; H, labium, I, J, maxilla 1 and 2; K, L, maxilliped 1, simple setae on ventral surface of carpus omitted.

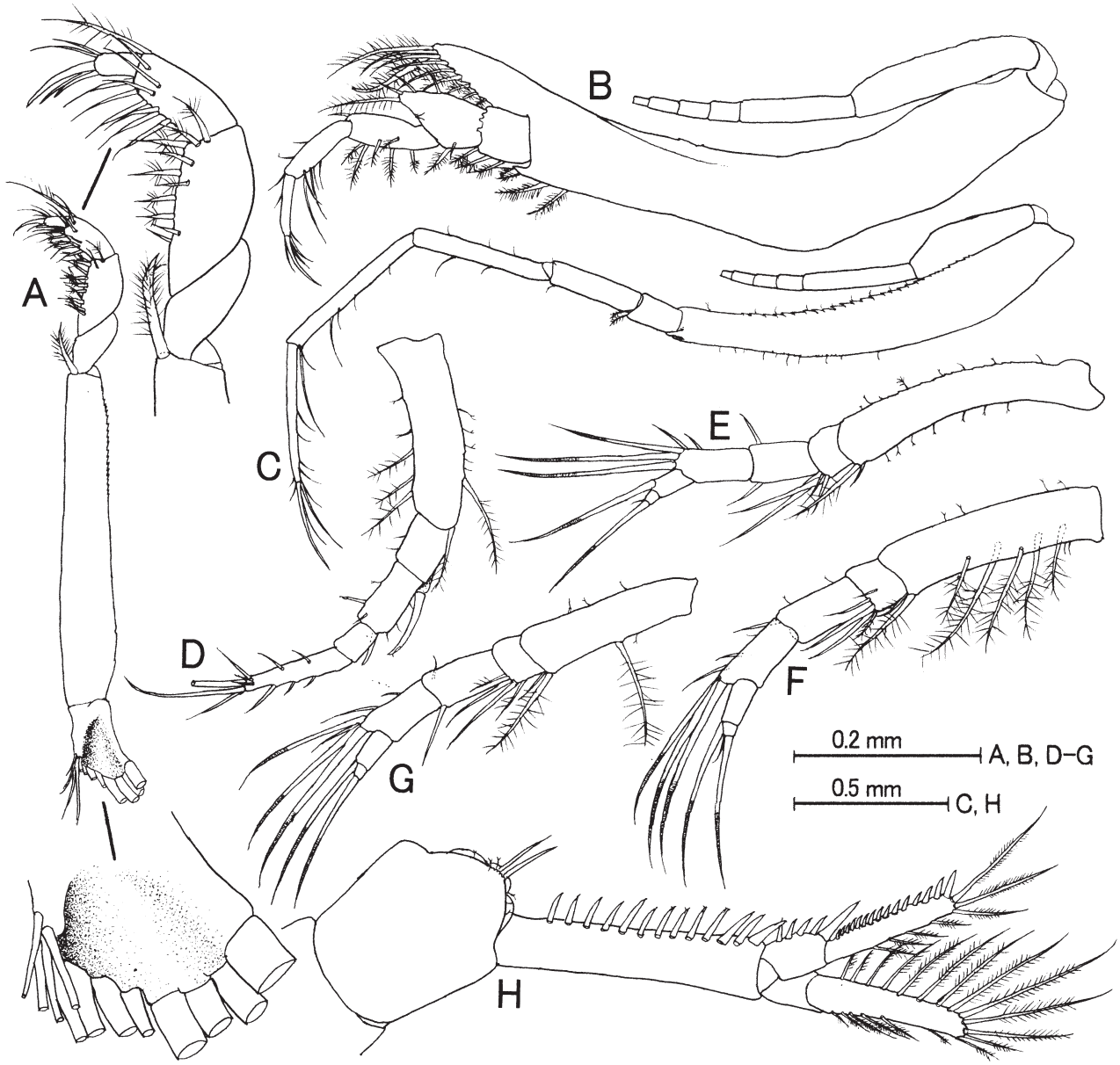

FIGURE 3. *Iphinoe wakasaensis* **sp. nov.**, paratype ovigerous female. A, B, maxilliped 2 and 3; C–G, pereopods 1–5; H, uropod with pleonite 6.

Type material. Holotype ovigerous female, 9.7 mm (NSMT Cr-32962), NE off Nomuro-zaki, western Wakasa Bay, the Sea of Japan, 35°45.26'N, 135°20.88'E–35°45.04'N, 135°21.03'E, 99.2–100 m, 27 May 2013, Collected by H. Saito and Y. Kai.

Paratypes. 30 ovigerous females, 26 preparatory females, 37 adult males, 17 subadult males, 10 juveniles (4 ovigerous females, 8.7–9.8 mm and 3 adult males, 9.3–10.3 mm dissected) (NSMT Cr-32963), same locality and date as the holotype female; 15 ovigerous females, 44 preparatory females, 10 adult males, 11 subadult males, 6 juveniles, 12 manca larvae (1 ovigerous female, 7.9 mm dissected) (NSMT Cr-32964), NE off Nomuro-zaki, western Wakasa Bay, the Sea of Japan, 35°45.09'N, 135°20.44'E–35°45.09'N, 135°20.17'E, 96–96.3 m, 2 September 2010, collected by H. Saito and Y. Kai.

Other material examined. Six ovigerous females, 7.0–7.8 mm, 3 adult males, 8.1–8.2 mm (1 specimen damaged), partially dissected, Enshu-nada, 34°36.11'N, 137°59.06'E–34°36.01'N, 137°59.27'E, 113–172 m (KT-02-5, St. EN4-2), 27 May 2002; 3 ovigerous female, 7.3–7.7 mm, 1 preparatory female, 7.5 mm, partially dissected, western coast of Izu Peninsula, 34°50.88'N, 138°44.78'E–34°50.77'N, 138°44.69'E, 128–136 m (KT-02-5, St. IZW-

1), 29 May 2002;1 ovigerous female, 7.4 mm, 2 preparatory females, 7.1, 7.7 mm, 4 adult males, 8.2–8.5 mm, partially dissected, Kumano-nada, 34°13.12'N, 136°38.98'E–34°13.29'N, 136°39.10'E, 107–109 m (KT-03-1, St. KN-3), 7 April 2003, collected by T. Sasaki; 2 ovigerous females, 7.5, 8.4 mm, 1 preparatory female, 7.9 mm, partially dissected, off Kamogawa, Boso Peninsula, 34°59.11'N, 140°03.29'E–34°59.33'N, 140°03.35'E, 104–108 m (KT-03-17, St. KG-1), 17 Nov., 2003; 1 ovigerous female, 6.7 mm, 2 adult males, 8.0, 8.2 mm, partially dissected, off Kamogawa, 34°58.19'N, 140°05.19'E–34°58.40'N, 140°05.12'E, 169–200 m (KT-03-17, St. KG-2), 17 Nov., 2003; 1 ovigerous female, 7.6 mm, partially dissected, 34°17.71'N, 136°71.92'E–34°17.61'N, 136°71.92'E, 139–140 m, sand, 22 May, 2014, collected by H. Saito and K. Kimura.

Description. *Holotype ovigerous female*, 9.7 mm (Fig. 2A–D). Body moderately calcified, almost naked. Carapace smooth, 0.25 times total body length, 2.0 times as long as wide, 2.3 times depth; dorsal surface with median ridge running for entire length of carapace, with 26 teeth, prominent for anterior half; pseudorostrum (Fig.2C, D) 0.12 times carapace length; distal end in contact each other; width of round eye lobe (Fig2B, D) 0.14 times carapace width, 0.9 times eye lobe length; antennal notch (Fig. 2C) deep; antero-lateral angle pointed, lower margin of carapace with 12 teeth for anterior half of carapace. Pereon 1.08 times carapace length; pereonite 2 well developed; pereonite 3 and 4 with projection at hind margin. Pleon 0.48 times total body length; without ridges or ornaments.

Paratype five ovigerous females, 7.9–9.8 mm. Carapace 0.25–0.26 total body length, 2.0–2.1 times as long as wide, 2.2–2.3 times depth. median dorsal ridge with 18–27 teeth; pseudorostrum 0.12–0.14 times carapace length; width of eye lobe 0.11–0.12 times carapace width, 0.8–0.9 times eye lobe length; antennal notch deep; antero-lateral angle pointed, lower margin with of carapace with 13–20 teeth for anterior half of carapace. Pereon 1.01–1.08 times carapace length. Pleon 0.47–0.49 times total body length; without ridges.

Antenna 1 (Fig. 2E) peduncle almost naked, article 1 weakly curved, 1.4–1.5 times as long as article 2, 1.2–1.4 times as long as article 3; article 3 1.1–1.2 times as long as article 2; main flagellum biarticulate, 0.4 times as long as peduncle article 3, article 1 2.0–2.7 times as long as article 2; accessory flagellum uniarticulate, 0.5–0.6 times as long as main flagellum article 1.

Antenna 2 (Fig. 2F) biarticulate, basal article with three pappose setae on distal margin; article 2 with three broom setae distally.

Left and right mandibles (Fig. 2G) with 14–15, 13 setae, respectively; lacinia mobilis tridentate; incisor process 4-dentate.

Labium (Fig. 2H) distal end slightly projected narrowly, with five dentate setae.

Maxilla 1 (Fig. 2I) outer endite with 12–14 spiniform setae; inner endite with one tridentate, 3–4 setulate, and one simple setae; palp with two terminal setae.

Maxilla 2 (Fig. 2J) narrow endites with 6–7 setae on each; broad endite with 24–29 thin (broad at base) setae.

Maxilliped 1 (Fig. 2K, L) with 16–18 branchial lobules; basis 1.3–1.5 times combined length of distal articles; carpus (numerous setae on ventral surface omitted in Fig. 2K), with seven thin dentate setae on inner margin; propodus with two plumose and one simple setae on inner distal corner; dactylus with three minute terminal setae.

Maxilliped 2 (Fig. 3A) basis 1.7–1.9 times as long as distal articles together, with pappose seta in inner distal corner; carpus with 10–11 setae on inner margin; propodus with 9–11 simple setae on inner margin; dactylus with three terminal and two simple subterminal setae; rudimentary oostegite of coxa strongly bent, with 12–13 setae.

Maxilliped 3 (Fig. 3B) basis 1.7–1.9 times as long as remaining distal articles, with 2–3 plumose seta on inner distal region, outer distal corner strongly projected reaching proximal region of carpus, with 14–16 plumose setae; ischium with 2–3 plumose setae on inner margin; merus outer distal corner projected, with 3–5 setae, inner margin with 1–2 plumose and 0–1 simple setae; carpus with 5–6 plumose setae on inner margin; propodus with 5–6 simple setae on inner margin; dactylus with 4–6 terminal setae; exopod flagellum of five articles.

Pereopod 1 (Fig. 3C) basis 0.7–0.8 times as long as distal articles together, with one spine on distal end of ventral surface, outer and inner margins serrated; carpus 1.2–1.4 times as long as merus, 0.8–0.9 times as long as propodus; propodus 1.1–1.3 times as long as dactylus, with long simple seta on inner distal corner; dactylus 1.0–1.1 times as long as carpus, with four simple terminal setae; exopod flagellum of five articles.

Pereopod 2 (Fig. 3D) basis 0.7 times as long as remaining articles together, with 3–4 plumose setae on outer margin; merus with large spiniform seta on inner distal corner; carpus 1.0–1.3 times as long as merus, with spiniform seta on inner distal corner; dactylus 1.4–1.8 times as long as carpus and 2.7–3.4 times as long as dactylus, with 8–12 setae.

Pereopod 3 (Fig. 3E) basis 1.1–1.3 times as long as distal articles together, with one plumose and one simple

setae on distal corner; ischium with one plumose and 2–4 simple setae on distal corner; carpus with 4–5 simple setae on distal region; dactylus small.

Pereopod 4 (Fig. 3F) basis 0.8–0.9 times as long as distal articles together, with 5–7 plumose setae on outer margin, plumose seta on distal corner; ischium with one plumose and 4–8 simple setae; carpus with five simple setae on distal region; dactylus small.

Pereonite 5 (Fig. 3G) basis 0.8 times as long as distal articles together, with 1–3 plumose setae on lateral margin, plumose seta on distal corner; ischium with plumose or simple setae on distal corner; carpus with 4–5 simple setae on distal region; dactylus small.

Uropod (Fig. 3H) peduncle 1.3–1.4 times as long as pleonite 6, 1.3–1.4 times as long as exopod and 1.4–1.5 times as long as endopod, with 9–14 spiniform setae on inner margin; exopod 1.0–1.1 times as long as endopod, with four plumose setae on outer margin, 15–17 plumose setae on inner margin and apical end; endopod biarticulate, article 1 0.5–0.6 times as long as article 2; article 1 with five spiniform setae on inner margin; article 2 with 11–15 spiniform setae on inner margin and 6–8 plumose setae on outer margin and apex.

Paratype 1 preparatory female, 8.4 mm. The specimen is similar to the ovigerous females, except that the width of the posterior margin of the carapace is narrow (carapace 2.5 times as long as wide).

Paratype three adult males, 9.3–10.3 mm (Fig. 4). Body moderately calcified. Carapace (Fig. 4A–D) 0.24–0.25 times total body length, 2.6–2.7 times as long as wide and 2.1–2.3 times depth; dorsal surface weakly arched, with very weak median ridge on frontal lobe; 2–5 prominent and 5–10 minute spines on median dorsal ridge; pseudorostrum 0.10–0.12 times carapace length; left and right pseudorostrum in contact at distal end; width of round eye lobe (Fig. 4B, D) 0.17–0.18 times carapace width and 0.9–1.0 times eye lobe length; antennal notch (Fig. 4C) shallow; anterolateral angle (Fig. 4C) not pointed, succeeded by 12–18 teeth on anterior half of lower margin of carapace. Pereon 0.93–0.96 times as long as carapace; pleon 0.52–0.53 times total body length.

Antenna 1 (Fig. 4E) peduncle article 1 1.5–1.6 times as long as article 2 and 1.3–1.5 times as long as article 3; article 3 1.1–1.2 times as long as article 2; main flagellum biarticulate, 0.4–0.5 times as long as peduncle article 3; article 1 2.2–2.6 times as long as article 2, with 2–4 aesthetascs; accessory flagellum biarticulate, 0.5 times as long as main flagellum article 1.

Antenna 2 (Fig. 4F) peduncle article 5 3.6–4.4 times as long as article 4; flagellum exceeds posterior end of pleonite 6.

Maxilliped 3 (Fig. 4G) basis 1.8–1.9 times as long as distal articles together, outer distal corner projected, with 11–19 plumose setae; ischium with three plumose setae on inner margin; merus with 0–1 plumose seta on inner margin, with 2–4 plumose setae, inner margin with one plumose and 0–1 simple setae; carpus with 5–7 plumose and 0–2 simple setae on inner margin; propodus with 3–6 simple setae on inner distal region; dactylus with 3–4 terminal setae.

Pereopod 1 (Fig. 4H) basis 0.8 times as long as distal articles together, with 19–24 spiniform setae on basal region of ventral surface; carpus 1.3–1.4 times as long as merus, 0.8–0.9 times as long as propodus; propodus 1.1–1.2 times as long as dactylus, with long simple seta on distal end; dactylus 1.0–1.1 times as long as carpus, with four terminal setae.

Pereopod 2 (Fig. 4I), basis 0.7–0.8 times as long as distal articles together, with 2–4 plumose setae on inner margin and 4–5 plumose setae on outer margin, 0–2 plumose setae on outer and inner distal corner; merus with robust seta on inner distal corner; carpus 0.9–1.1 times as long as merus, with robust seta on inner distal corner; dactylus 1.5–1.9 times as long as carpus and 2.9–3.3 times as long as propodus.

Pereopod 3 (Fig. 4J) basis 1.2–1.3 times as long as distal articles together, with 5–6 plumose setae on outer margin; globular protrusion with 5–7 plumose setae present near inner proximal end of basis; ischium with one plumose and 3–5 simple setae on distal end; carpus with five simple setae on distal region.

Pereopod 4 (Fig. 4K) basis 0.9–1.0 times as long as distal articles together, with 5–6 plumose setae on outer margin, two setae on outer distal corner; ischium with 0–2 plumose and 2–3 simple setae on distal corner; carpus with 5–6 simple setae on distal region.

Pereopod 5 (Fig. 4L) basis 0.8–0.9 times as long as distal articles together, with plumose seta on lateral margin, two plumose setae on distal corner; ischium with 0–1 plumose and 3–4 simple setae on distal corner; carpus with five simple setae on distal region.

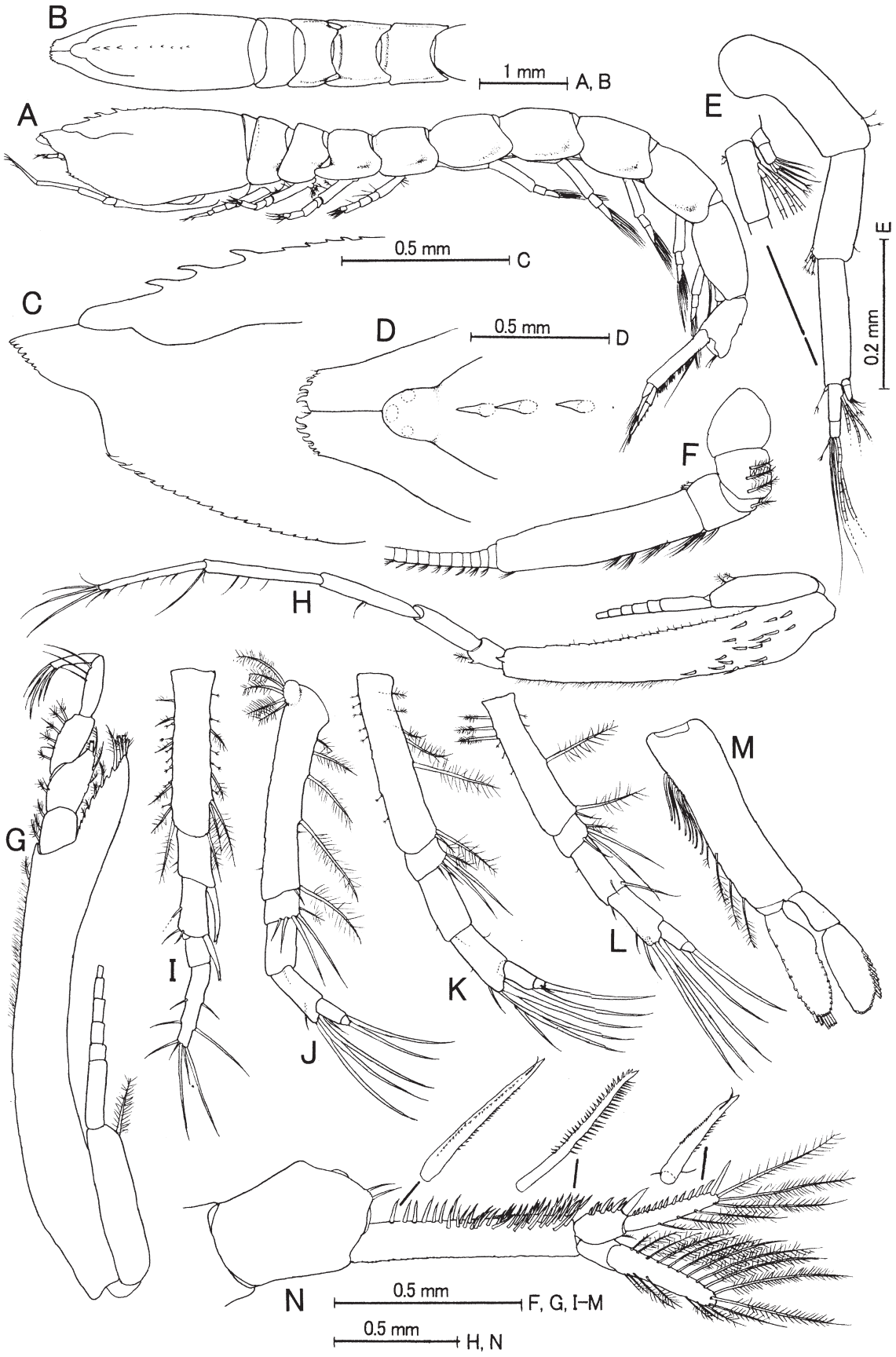

FIGURE 4. *Iphinoe wakasaensis* **sp. nov.**, paratype adult male. A, lateral view; B, anterior portion of body, from above; C, anterior portion of carapace, lateral view; D, anterior portion of carapace, from above; E, F, antenna 1and 2; G, maxilliped 3; H–L, pereopods 1–5; M, pleopod 1; N, uropod with pleonite 6.

Pleopod 1 (Fig. 4M) peduncle 3–4 plumose and 6–7 simple setae on inner margin; inner ramus biarticulate, outer ramus distal article with 25–29 plumose setae; inner ramus without lateral process, with 20–25 plumose setae.

Uropod (Fig. 4N) peduncle 1.4–1.5 times as long as pleonite 6, 1.4–1.6 times as long as exopod, 1.5–1.6 times as long as endopod, with 54–58 stiff setulate or serrated setae on inner margin; exopod 1.0 times as long as endopod, with 24–25 plumose setae; endopod biarticulate; article 1 0.4–0.5 times as long as article 2, with 8–9 spiniform setae on inner margin; article 2 with 12–20 spiniform setae on inner margin, 5–8 plumose setae on outer margin and apex.

Remarks. *Iphinoe wakasaensis* **sp. nov.** is closely similar to *Iphinoe sagamiensis* but is distinguished from the latter by (1) the carapace median dorsal ridge has teeth for entire length of carapace in females, (2) the male dorsal surface of carapace has prominent and minute teeth, (3) the lower margin of the carapace is serrated in both sexes, (4) the eye lobe is smaller, (5) the anterior end of left and right pseudorostral lobes contact each other, (6) the female antenna 1 peduncle article 1 is longer than article 3, and (7) relative length of the pereopod 1 dactylus to carpus is slightly longer (Table 1). *Iphinoe wakasaensis* also lives in slightly deeper habitats, 96–200 m, than *I. sagamiensis* at 4–101 m depths.

Iphinoe wakasaensis is similar to *I. tenera* from the Yellow Sea, but is distinguished from the latter by (1) the anterior portion of the carapace is without a longitudinal ridge, (2) the basis of of pereopod 1 is shorter than combined length of distal articles in females,, (3) the uropod peduncle is without long setae in females, (4) the dorsal surface of carapace has prominent and minute teeth in males, and (5) the anterolateral angle of the carapace has teeth in males (Table 1).

Iphinoe wakasaensis is also similar to *I. gurjanovae* from the Chinese coast of the Yellow Sea but is distinguished from the latter by (1) the median dorsal ridge of carapace has many more teeth, (2) the uropod peduncle is without long setae in females, and (3) the dorsal surface of carapace has 2–5 prominent spines in males (Table 1).

Distribution. Wakasa Bay, the Sea of Japan, 96–100 m. Southern coast of Honshu, Japan, 96–200 m.

Iphinoe indenticulata Kim & Kim, 2020

(Fig. 5)

Kim & Kim, 2020, 307– 316, fig. 1–4, table 1 (male description).

Diagnosis. *Ovigerous female*. Carapace 0.24–0.25 times total body length, 1.9–2.1 times as long as wide, 2.0–2.2 times depth. median dorsal ridge strong at anterior, weak at posterior region, with 14–20 teeth for entire length of carapace; width of triangular eye lobe 0.12–0.16 times carapace width, 1.5–1.7 times eye lobe length; antero-lateral angle succeeded by 4–6 teeth; inferior margin smooth, without teeth. Pereopod 1 basis 1.1–1.2 times as long as distal articles together; dactylus shorter than carpus; propodus with 4–6 long simple seta on inner distal region. Uropod peduncle with long plumose setae and spiniform setae on inner margin. *Adult male*. Carapace median dorsal ridge very weak or obsolete, without spines; antero-lateral angle with 3–4 teeth; inferior margin without teeth. Antenna 1 main flagellum article 1 with 6–8 aesthetascs.

Material examined. 86 ovigerous females, 26 preparatory females, 9 adult males, 3 subadult males (including dissected 5 ovigerous females, 6.1–7.2 mm, 3 adult males, 6.9–7.5 mm) (NSMT Cr- 32965), off Ushimado, the Seto Inland Sea of Japan, 34°35'N, 134°09'E, 15 m, 15 April, 1998.

Description. *Five ovigerous females*, 6.1–7.2 mm (Fig. 5). Body moderately calcified, with few hairs, integument glossy. Carapace (Fig. 5A–D) 0.24–0.25 times total body length, 1.9–2.1 times as long as wide, 2.0–2.2 times depth; dorsal surface with median ridge running for entire length of carapace, posterior half weak, with 14–20 teeth; pseudorostrum (Fig.5B, D) 0.12–0.15 times carapace length; width of rather triangular eye lobe (Fig5B, D) 0.12–0.16 times carapace width, 1.5–1.7 times eye lobe length; antennal notch (Fig. 5C) prominent; antero-lateral angle round, with 4–6 teeth; lower margin of carapace smooth. Pereon 1.06–1.13 times carapace length; pereonite 2 well developed. Pleon 0.48–0.50 times total body length; without ridges.

Antenna 1 (Fig. 5E) peduncle almost naked, article 1 weakly curved, 1.4–1.6 times as long as article 2, 0.9–1.0 times as long as article 3; article 3 1.6 times as long as article 2, with two broom setae on distal corner; main flagellum biarticulate, 0.4 times as long as peduncle article 3, article 1 2.8–3.2 times as long as article 2; accessory flagellum uniarticulate, 0.3–0.5 times as long as main flagellum article 1.

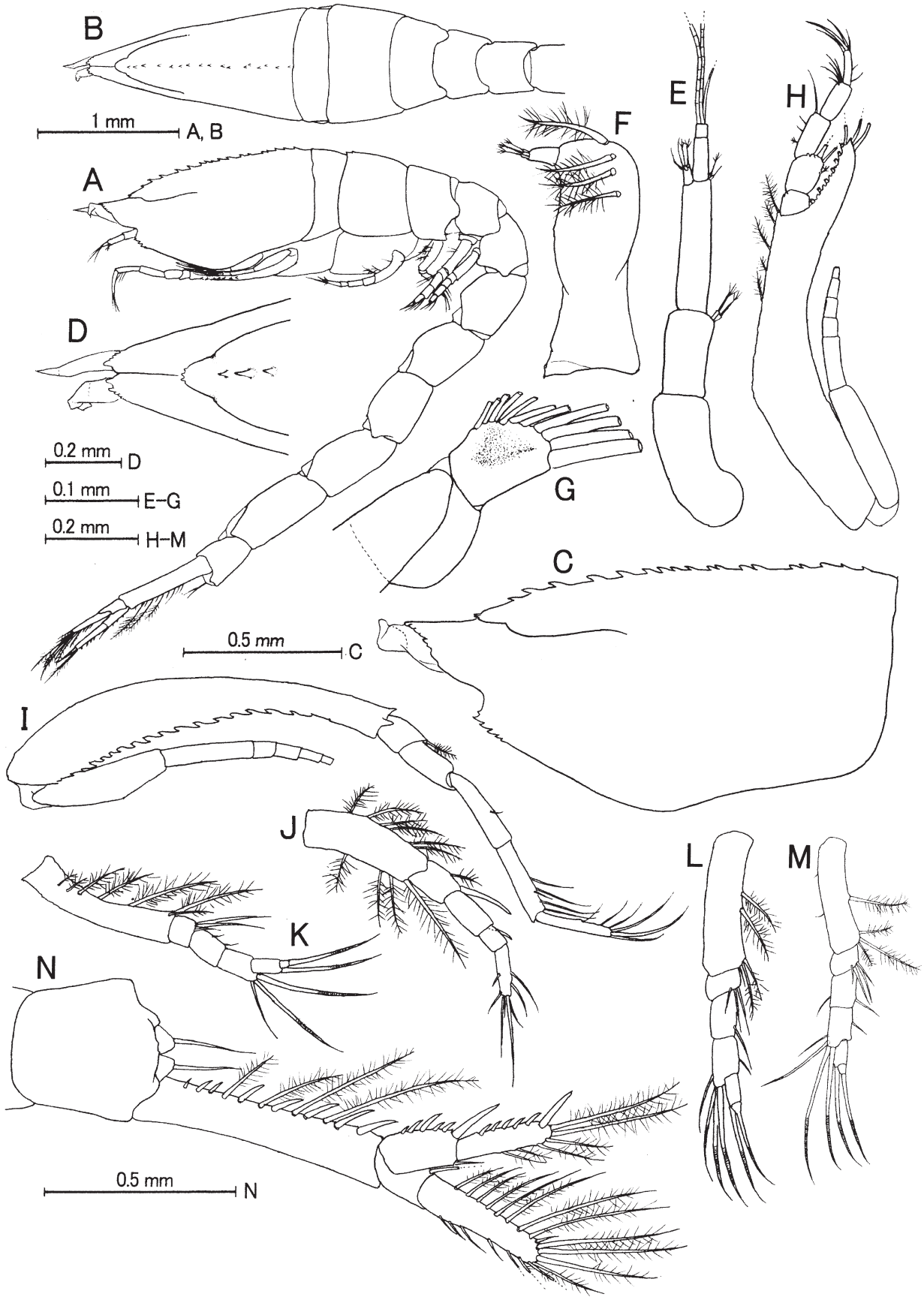

FIGURE 5. *Iphinoe indenticulata* Kim & Kim, 2020, ovigerous female. A, lateral view; B, anterior portion of body, from above; C, carapace, lateral view; D, anterior portion of carapace, from above; E, F, antenna 1and 2; G, basal region of maxilliped 2; H, maxilliped 3; I–M, pereopods 1–5; N, uropod with pleonite 6.

Antenna 2 (Fig. 5F) biarticulate, basal article with 3–4 pappose setae on distal and lower margin.

Mandibles, maxilla 1 and 2, maxilliped 1 similar to males described in Kim & Kim (2020). Maxilliped 2 coxa (Fig. 5G) rudimentary oostegite weakly bent, with 11–13 setae.

Maxilliped 3 (Fig. 5H) basis 1.8–2.0 times as long as distal articles together, with 3–5 plumose setae on inner distal region, outer distal corner strongly projected reaching median region of carpus, with 9–13 plumose setae; ischium naked; merus with one plumose and two simple setae on outer distal region; carpus with 3–4 setae on inner margin; propodus with five simple setae on inner distal corner; dactylus with 3–5 terminal setae; well-developed exopod, flagellum of five articles.

Pereopod 1 (Fig. 5I) basis 1.1–1.2 times as long as distal articles together, outer margin coarsely serrated with 17–21 teeth; ischium with plumose seta on inner distal corner; carpus 1.1–1.6 times as long as merus, 0.9–1.2times as long as propodus; propodus 1.0–1.1 times as long as dactylus, with 4–6 long simple setae on inner distal region; dactylus 0.8–1.0 times as long as carpus, with 3–4 terminal setae; well-developed exopod flagellum of five articles.

Pereopod 2 (Fig. 5J) basis 0.7–0.8 times as long as distal articles together, with 5–7 plumose setae on inner margin and 3–6 plumose setae on outer margin; merus with robust seta on distal end and plumose seta on inner margin; carpus 1.0–1.2 times as long as merus; dactylus 1.0–1.2 times as long as carpus, 2.3–2.8 times as long as propodus, with 6–8 setae.

Pereopod 3 (Fig. 5K) basis 1.1–1.4 times as long as distal articles together, with 4–5 plumose setae on lateral margin; ischium with 3–5 simple setae on distal corner; carpus with 3–5 simple setae on distal region; dactylus small.

Pereopod 4 (Fig. 5L) basis 0.8–1.0 times as long as distal articles together, with 2–3 plumose setae on lateral margin, three plumose setae on distal corner; ischium with 3–4 simple setae on distal corner; carpus with 6 simple setae on distal region; dactylus small.

Pereonite 5 (Fig. 5M) basis 0.8–0.9 times as long as distal articles together, with 0–1 simple seta on lateral margin and 2–3 plumose setae on distal corner; ischium with 3–4 simple setae on distal corner; carpus with 4–6 simple setae on distal region; dactylus small.

Uropod (Fig. 5N) peduncle 1.4–1.8 times as long as pleonite 6, 1.2–1.5 times as long as exopod and 1.3–1.5 times as long as endopod, with 6–10 spiniform seta and 4–5 plumose setae on inner margin; exopod 1.0–1.1 times as long as endopod, with 3–4 simple and 14–16 plumose setae; endopod biarticulate, article 1 0.7–0.8 times as long as article 2; article 1 with 4–6 spiniform setae on inner margin; article 2 with 6–7 spiniform setae on inner margin and 5–7 plumose setae on outer margin and apex.

Remarks. Male specimens of *Iphinoe indenticulata* from the Seto Inland sea agree well with the description given by Kim & Kim (2020). *Iphinoe indenticulata* is distinguished from *I. sagamiensis* and *I. wakasaensis*, the other two Japanese *Iphinoe* species, by (1) the triangular eye lobe, (2) the antenna 1 article 3 is slightly longer relative to article 2 in females, (3) the antenna 1 main flagellum article 1 has more aesthetascs in the adult males, (3) the pereopod 1 basis is longer than combined length of distal articles, and the propodus has more long setae on the inner distal region, (4) the uropod peduncle has long setae on the inner margin in females, and (5) the dorsal surface of the carapace lacks spines (Table 1).

Iphinoe indenticulata is similar to *I. tenera* from the Chinese and Korean coasts of the Yellow Sea but is distinguished from the latter by (1) the anterior portion of carapace in females is without a longitudinal ridge, (2) the inner distal region of the pereopod 1 propodus has more setae in females, and (3) the anterolateral angle of the carapace has teeth in males (Table 1).

Iphinoe indenticulata is also similar to *I. gurjanovae* from the Chinese coast of the Yellow Sea, 0–37 m, but is distinguished from the latter by (1) the dorsal surface of the carapace has more teeth in females, (2) the pereopod 1 basis outer margin is serrated and the propodus inner distal region has more long setae in females, and (3) the anterolateral corner on the carapace in males has teeth (Table 1).

Distribution. Seto Inland Sea of Japan, 15 m, muddy bottom. Korea, 2–5 m.

***Iphinoe suluensis* sp. nov.**
(Figs 6–8)

Diagnosis. *Female*. Carapace 0.25–0.26 times total body length, 1.6 times as long as wide, 1.6 times depth, with 3–4 broad, weak longitudinal ridges on each side; very weak median dorsal ridge present on frontal lobe, without teeth; pseudorostrum 0.14 times carapace length, upturned, truncate at distal end; width of eye lobe 0.25–0.27 times carapace width, 2.2–2.6 times eye lobe length, slightly depressed on median frontal region; antennal notch deep, triangular; antero-lateral angle pointed, succeeded by 10–17 teeth on lower margin of carapace. Antenna 1 main flagellum very thick, article 2 with hard, curved setae. Maxilliped 3 merus greatly expanded. Pereopod 1 dactylus with robust setae directing upward. Pereopod 2 dactylus 1.4–1.6 times as long as basis. Uropod exopod with 4–8 spiniform setae on outer margin; biarticulate endopod article 1 1.7–1.9 times as long as article 2.

Type material. Holotype ovigerous female, 4.8 mm (NSMT Cr-32966), Southern part of the Sulu Sea, Philippine, 06°05.09'N, 118°59.21'E–06°05.21'N, 118°59.10'E, 192 m (KH-00-1, St. B2, DG-2), 22 February 2000. Paratypes; 2 ovigerous females, 5.1, 4.8 mm, dissected, 2 preparatory females, 4.6, 5.0 mm (1 specimen dissected), 1 juvenile female, 4.2 mm, dissected (NSMT Cr-32967), same locality and date as holotype specimen (KH-00-1, St. B2, DG-2).

Description. *Holotype ovigerous female*, 4.8 mm (Fig. 6A–D). Body moderately calcified, without setae. Carapace 0.25 times total body length, 1.64 times as long as wide, 1.61 times depth; integument with scale-like sculpture (Fig. 6D), each scale encircled by net-like structure, running just below surface of integument; dorsal surface with very weak median ridge, without teeth; each side with four broad, weak longitudinal ridges (Fig. 6C); pseudorostrum (Fig. 6B, C) 0.14 times carapace length, upturned; distal end truncate, without setae; width of eye lobe (Fig. 6B) 0.25 times carapace width and 2.6 times eye lobe length, slightly depressed at median frontal region; antennal notch (Fig. 6C) deep, triangular; antero-lateral angle pointed, lower margin of carapace with 10 teeth. Pereon 0.93 times carapace length; pereonite 1 visible; pereonites 2 well developed. Pleon 0.52 times total body length; without ridges.

Paratype two ovigerous and two preparatory females. Carapace 0.25–0.26 total body length, 1.62–1.64 times as long as wide, 1.58–1.65 times depth; very weak median ridge on dorsal surface without spines, each side with 3–4 broad, weak longitudinal ridges; pseudorostrum 0.14 times carapace length; width of eye lobe 0.25–0.27 times carapace width, 2.2–2.5 times eye lobe length, slightly depressed at median frontal region; antennal notch deep, triangular; antero-lateral angle pointed, lower margin of carapace with 16–17 teeth. Pereon 0.85–0.92 times carapace length. Pleon 0.52–0.53 times total body length, without ridges; pleonite 6 1.4–1.5 times as long as wide, projecting posteriorly between uropods.

Antenna 1 (Fig. 6E) peduncle article 1 near straight, 1.7–1.9 times as long as article 2, 1.2–1.3 times as long as article 3, with two spines on distal region; article 2 with four small spines and 1–2 feather-like setae; article 3 1.4–1.5 times as long as article 2, with 1–2 feather-like setae on lateral margin. Main flagellum biarticulate, very thick, as wide as distal end of peduncle article 3, 0.3 times as long as peduncle article 3; article 2 with four hard curved setae, two directed laterally (arrowheads in Fig. 6E); button-like accessory flagellum minute. Antenna 2 (Fig. 6F) biarticulate, basal article with three long pappose setae near inferior margin. Left and right mandibles (Fig. 6G) navicular, with 15 setae on inner margin, respectively; lacinia mobilis tridentate; incisor process tridentate. Labium (Fig. 6H) distal end narrow, with five broad setae. Maxilla 1 (Fig. 7A) outer endite broad, with 12 simple or dentate spiniform setae arranged near linearly; inner endite rather narrow distally, with one tridentate and three simple setae; palp with two terminal setae. Maxilla 2 (Fig. 7B, C) narrow endites with 30 and 27 setae, respectively; broad endite distal margin with 27 setae of various shape on upper margin, 28 thin (broad at base) setae on lower margin. Maxilliped 1 (Fig. 7D, E) with 16 branchial lobules; carpus with 13 simple setae on ventral surface and eight non-dentate robust setae on inner margin; propodus rather thin, curved, with two setulate setae; dactylus weakly curved, with three short, spiniform setae with setules. Maxilliped 2 (Fig. 7F) basis 0.7 times as long as distal articles together, with long plumose seta in inner distal corner; carpus with 9–11 setae on inner margin; propodus with 3–7 setae on inner margin; dactylus with three terminal and two subterminal setae; rudimentary oostegite of coxa with 7–8 setae in ovigerous female. Maxilliped 3 (Fig. 8A) basis 0.8–0.9 times as long as distal articles together, with two spines and plumose seta on inner distal corner; outer distal corner projected reaching mid region of carpus, with 3–5 plumose setae on inner margin and two long plumose terminal setae; ischium with 2–4 plumose setae on inner margin; merus greatly expanded, exceeding distal end of carpus, with 1–3 plumose setae on inner margin and 10–11

setae on outer margin; ventral surface of merus, ischium and carpus forming flat area with scale-like sculpture; propodus 1.6–1.9 times as long as carpus and 2.0–2.2 times as long as dactylus, with 3–4 simple setae on inner margin; dactylus with three terminal setae; well-developed exopod flagellum of five articles.

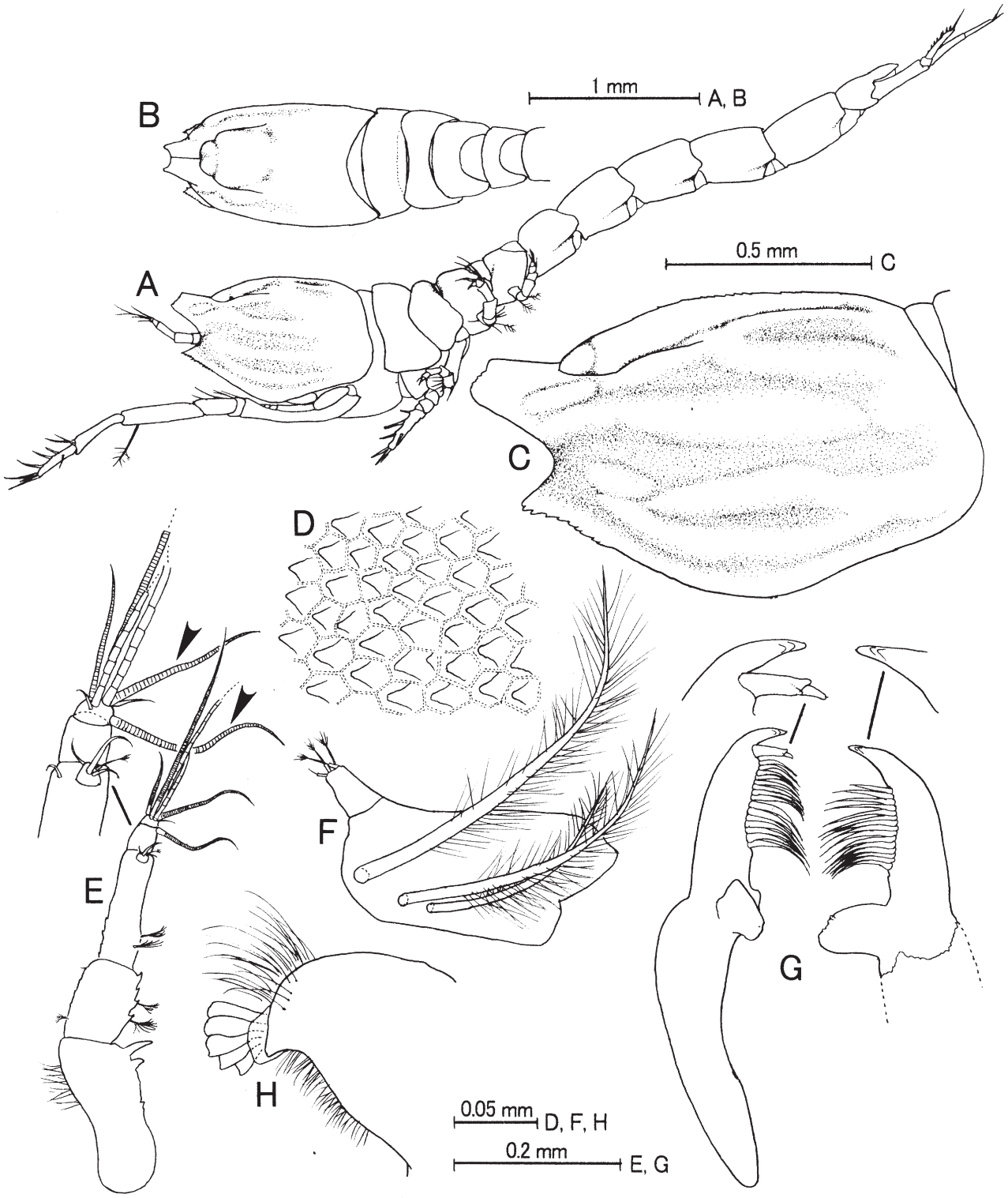

FIGURE 6. *Iphinoe suluensis* **sp. nov.**, A–D, holotype ovigerous female; E–H, paratype preparatory female. A, lateral view; B, anterior portion of body, from above; C, carapace, lateral view; D, sculpture of integument of carapace; E, F, antenna 1 and 2; G, mandibles; H, labium.

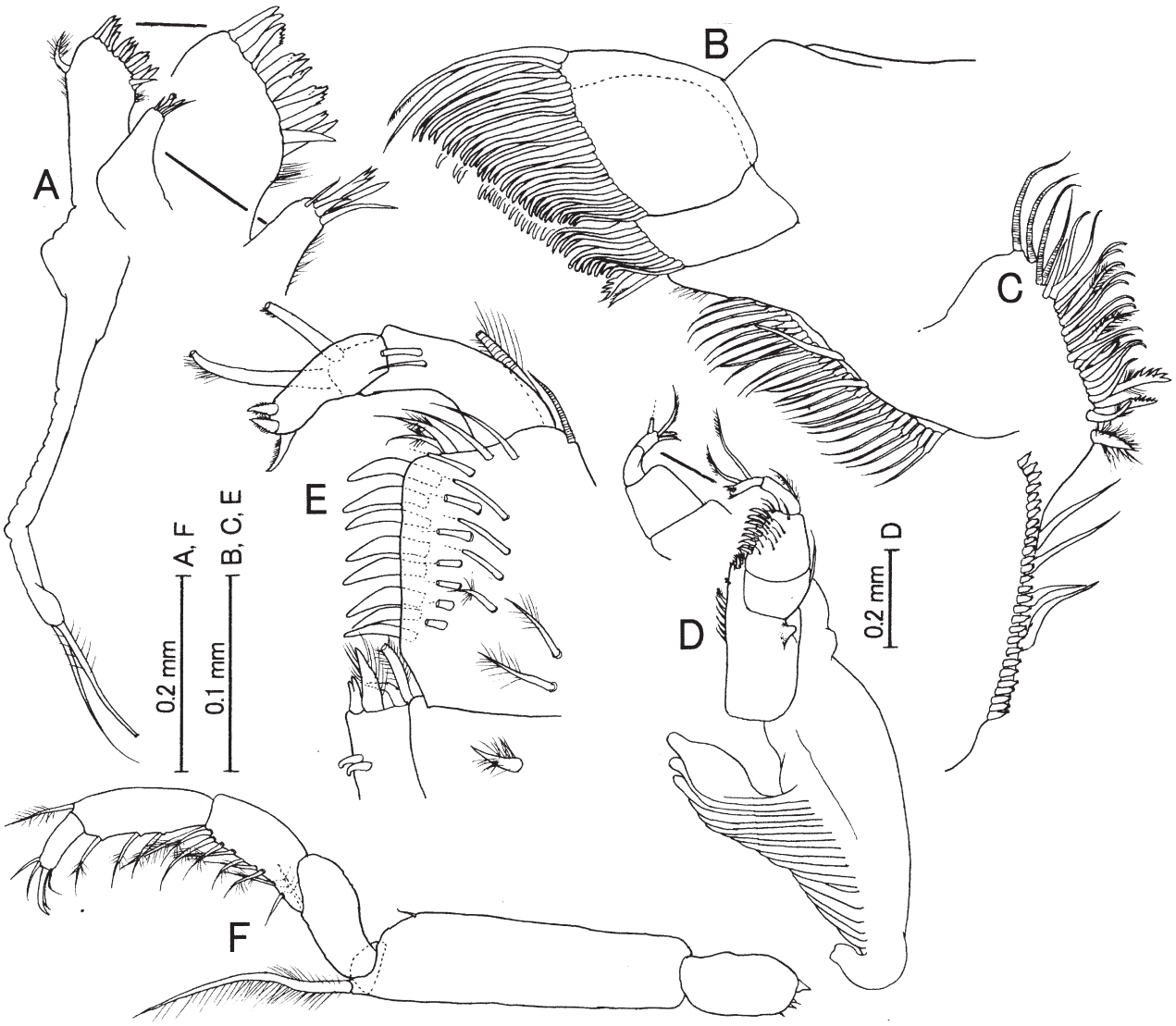

FIGURE 7. *Iphinoe suluensis* **sp. nov.**, paratype preparatory female. A–C, maxilla 1 and 2; D, E, maxilliped 1; F, maxilliped 2.

Pereopod 1 (Fig. 8B) basis 0.5–0.6 times as long as distal articles together, with 0–1 plumose setae on inner distal corner; inner and outer margin serrated; ischium and merus with plumose seta on inner distal corner; carpus thick, 2.1–2.6 times as long as merus, 1.5–1.6 times as long as propodus, with pappose seta on inner margin and 4–5 short feather-like setae on outer margin; propodus curved near proximal end, 1.1–1.3 times as long as dactylus, with two robust setae on distal end; dactylus with 6–8 stiff, denticulate setae directing outward and forward; well-developed exopod flagellum of six articles.

Pereopod 2 (Fig. 8C) basis 0.5 times as long as remaining articles together, with 5–6 simple setae on distal corner; merus and carpus short, with two and three robust setae, respectively; propodus triangular, inner region not visible; dactylus 1.4–1.6 times as long as basis, with 3three rows of 3–4 robust denticulate setae.

Pereopod 3 (Fig. 8D) basis 0.8–1.0 times as long as distal articles together, with 3–4 pappose and 2–3 setulate setae on lateral margin, 1–2 plumose setae on distal corner; ischium with 5–6 simple setae on distal corner: merus with two simple setae on distal corner; carpus with 4–5 simple setae on distal corner; dactylus much longer than wide, with robust terminal seta having two rows of denticles.

Pereopod 4 (Fig. 8E) basis 0.5 times as long as distal articles together, with four pappose or simple setae on lateral margin, 1–2 simple setae on distal corner; ischium with 4–6 simple setae on distal corner; carpus with 4–5 simple setae on distal region, dactylus much longer than wide, robust terminal seta with two rows of denticles.

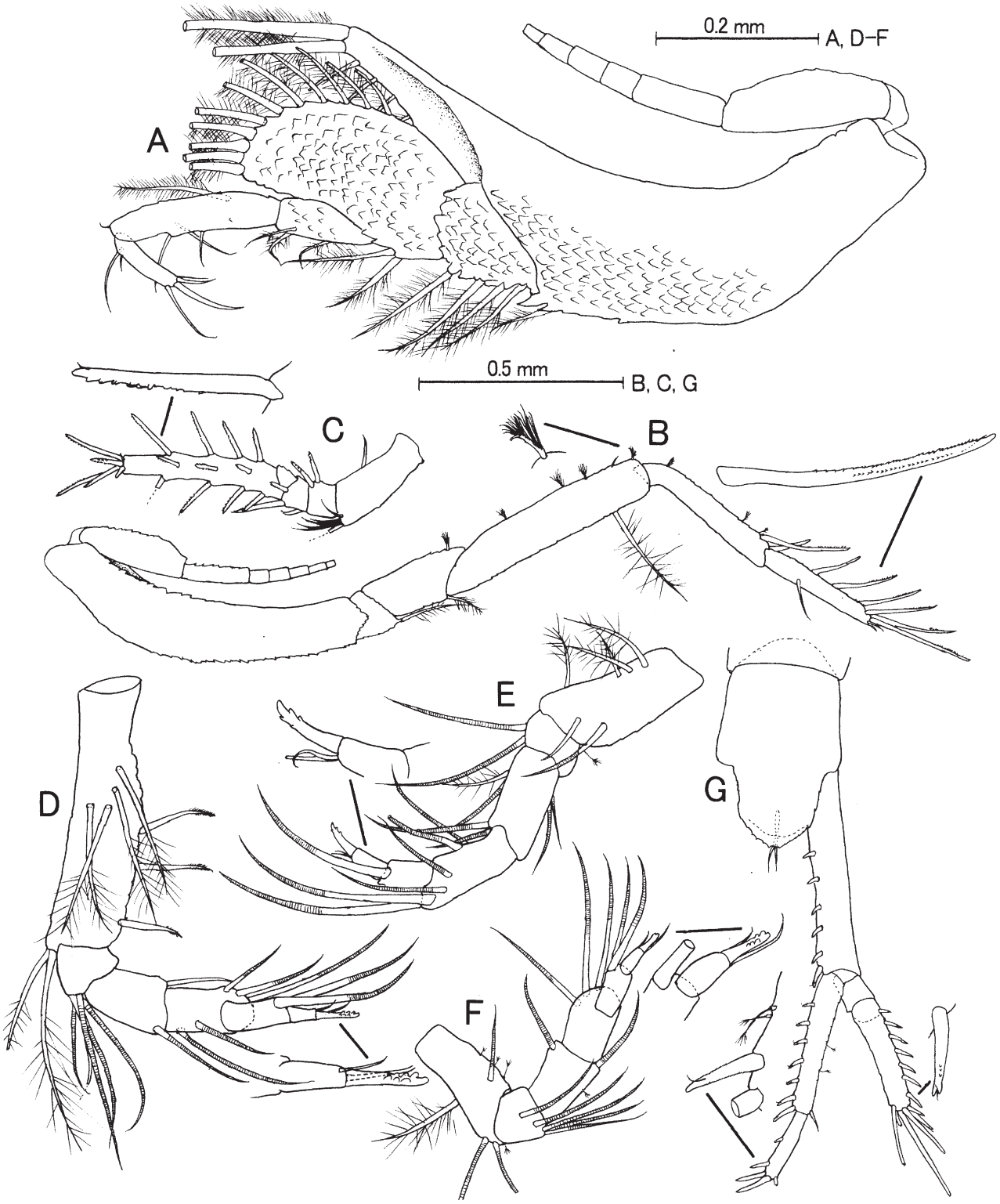

FIGURE 8. *Iphinoe suluensis* **sp. nov.**, paratype preparatory female. A, maxilliped 3; B–F, pereopods 1–5; G, uropod with pleonite 6.

Pereonite 5 (Fig. 8F) basis 0.3–0.5 times as long as distal articles together, with 0–1 pappose seta on lateral margin, two simple or pappose setae on distal corner; ischium with five simple setae on distal end; merus with two simple setae; carpus with five simple setae on distal region; dactylus much longer than wide, robust terminal seta with two rows of denticles. Uropod (Fig. 8G) peduncle 1.0–1.1 times pleonite 6 length, 1.2–1.5 times as long as

exopod, 0.9–1.0 times as long as endopod, with 5–6 spiniform setae; exopod 0.7 times as long as endopod, with 4–8 spiniform setae on outer margin, five robust setae on apex; endopod biarticulate, article 1 1.7–1.9 times as long as article 2, with 6–7 spiniform setae on inner margin; article 2 with 2–3 spiniform setae on inner margin and two terminal setae.

Paratype 1 juvenile female, 4.2 mm. The specimen is very similar to the ovigerous and preparatory females. Dorsal region of pereonite 1 narrow, visible on dorsal region.

Etymology. The species' name refers to the type locality, the Sulu Sea.

Remarks. The new species is closely similar to *Iphinoe crassipes* Hansen, 1895 from the west coast of Africa and the Mediterranean, 6–103m. The adult specimens were well described in Stebbing (1910), Băcescu (1961), Day, (1978), Petrescu (1998), and Corbera (1994). *Iphinoe suluensis* **sp. nov**. is distinguished from *I. crassipes* by (1) having 4–8 spiniform setae present on the outer margin of the uropod exopod (not present in *I. crassipes*), (2) the median-dorsal ridge of the carapace obsolete (discernible, with small teeth in *I. crassipes*), (3) the antenna 1 main flagellum article 2 with 4 stiff simple setae (1–2 simple setae in *I. crassipes*).

Iphinoe suluensis is also similar to *Iphinoe pokoui* Le Loeuff & Intes, 1972 from Cote D'Ivoire, western coast of Africa, 20 m. The former species is distinguished from the latter by (1) the carapace has longitudinal ridges for the entire length (anterior portion in *I. pokoui*), (2) the antennal notch is triangular (round, widely open in *I. pokoui*), (3) the uropod endopod is longer than the exopod (subequal or slightly shorter than exopod in *I. pokoui*), and (4) the uropod exopod article 2 is much longer than article 1 (subequal in length to article 1 in *I. pokoui*).

Key to species of *Iphinoe* from Japan, Korea and China

1. Female; uropod peduncle without long setae on inner margin. Male; carapace dorsal surface with 1 or more prominent spines 2
- Female; uropod peduncle with long setae on inner margin. Male; carapace dorsal surface without prominent spines 3
2. Female; carapace lower margin not serrated, except for near anterolateral corner. Male; carapace dorsal surface with 1–2 spines . . . . . *I. sagamiensis*
- Female; carapace anterior half of lower margin serrated. Male; carapace dorsal surface with 2–5 prominent and some minute spines . . . . . *I. wakasaensis*
3. Female; carapace dorsal surface with 4–5 teeth . . . . . *I. gurjanovae*
- Female; carapace dorsal surface with 13–20 teeth 4
4. Female; carapace with longitudinal ridge running on side running from antennal notch; pereopod 1 propodus with 3 long setae on inner margin. Male; carapace anterolateral corner without teeth . . . . . *I. tenera*
- Female; carapace without longitudinal ridge on side; pereopod 1 propodus with 4–6 long setae on inner distal region. Male; carapace anterolateral corner with teeth . . . . . *I. indenticulata*

Discussion

Remarks on the *Iphinoe* species from the Northwest Pacific

The five *Iphinoe* species from the Northwest Pacific, Japan, Korea and China, are rather similar to each other, characterized by (1) a carapace length of about 2–2.5 times depth (the ratio in *I. tenera* and *I. gurjanovae* is based on the illustrations in Lomakina 1960), (2) the median dorsal ridge has 4–27 teeth in females, and (3) the pseudorostrum is acute, moderately long. Noteworthy characters of these species are:

Eye lobe. Eye lobes of *Iphinoe* are usually round or triangular, not greatly reduced (e.g., Hansen 1895; Băcescu 1950; Ledoyer 1965). Those of the Japanese species have three corneal lenses (transparent windows?), which are not well developed in both sexes. Of the two Japanese species with round eye lobes, those of *I. wakasaensis* are narrower than in *I. sagamiensis*, possibly related to their deeper habitat (96–200 m) than *I. sagamiensis* (4 –101 m).

Female maxilliped 2. In cumacean ovigerous females, the rudimentary oostegite of the maxilliped 2 coxa, with several long setae for cleaning the eggs and embryos (and supplying oxygen?), are usually flat. In three Japanese species, this article is bent (strongly in *I. sagamiensis* and *I. wakasaensis*, weakly in *I. indenticulata*). In ovigerous females of *I. suluensis*, the coxa is not bent (not shown in figure). Such a bent rudimentary oostegite was not observed in other known cumaceans.

Male pereopod 3. A globular protrusion with plumose setae is present on the pereopod 3 basis in adult males of three *Iphinoe* species from Japan (see Fig. 4J; Fig. 4B of Kim & Kim 2020). A similar feature was also observed in *Iphinoe tenella* Sars, 1878, *I. maeotica* (Sowinsky, 1894) and *I. elisae* Băcescu, 1950 from the Mediterranean and eastern Atlantic, which suggests that this sexual character may be common in *Iphinoe*. In other Bodotriidae, a similar protrusion was observed in *Heterocuma ambrizetensis* Bochert & Zettler, 2011.

A sternal process on pereonite 2 and/or pereonite 3 in adult males was regarded as a useful character for the taxonomy *Iphinoe* (Băcescu 1950; Fage 1951; Ledoyer 1965; Corbera & Garcia-Rubies 1998). In this study, this character was not examined.

Additional remarks on *Iphinoe suluensis* morphology

Morphological characters of *I. suluensis*, which is similar to *I. crassipes* and *I. pokoui*, are rather different from those of other *Iphinoe* species, as pointed out in previous studies (Day 1978; Petrescu 1998; Haye 2007). Noteworthy characters of *I. suluensis, I. crassipes* and *I. pokoui* are:

Carapace. The carapace has some weak longitudinal ridges, which are also present in *I. crassipes* and *I. pokoui*. In other *Iphinoe* species, the carapace is without weak ridges on the lateral surface and the pseudorostrum is distally truncated and upturned in the first three species mentioned. The width of the eye lobe is much wider than long, slightly subdivided into a left and right part (also illustrated in *I. pokoui* (Le Loeuff & Intes *op. cit*.). In other *Iphinoe* species, eye lobes are usually round or triangular, not much wider than long.

Antenna 1. The main flagellum is unusually thick, as wide as the distal region of peduncle article 3. A thick flagellum was also observed in *I. crassipes* by Stebbing (1910), and Băcescu (1961), as well as *I. pokoui* (Le Loeuff & Intes *op. cit*.). However, in other specimens of *I. crassipes* from Africa and Mediterranean, the flagellum is thin (Day 1978; Corbera 1994; Petrescu 1998). In addition, the main flagellum article 2 in *I. suluensis* has four hard setae, two of which are oddly curved (three specimens examined herein show the same feature). The "curved apical spine" was also observed in the male of *I. crassipes*.

Maxilla 1. Outer endite is rather broad, with spiniform setae on the distal margin arranged almost linearly, which was illustrated in *I. crassipes* by Stebbing (1910) and Petrescu (1998). This appendage is unknown in *I. pokoui*.

Maxilla 2. In *I. suluensis*, narrow endites have 30 and 27 simple setae, respectively, forming dense brushes. In other cumaceans, these setae are fewer than ten. In *I. crassipes* from the Tanzanian coast, western Indian Ocean, the narrow endites are normal (ibid.). This appendage is unknown in *I. pokoui*.

Maxilliped 1. Broad setae on the inner margin of the carpus are not dentate (Fig. 7E). Similar setae of *I. crassipes* are illustrated in Stebbing (1910). In *I. crassipes* from Tanzanian coasts, the overall shape of these setae is similar to those of *I. suluensis*, although the tip is dentate (Petrescu 1998). These setae are dentate, with a broad tip in other Bodotriidae species.

Maxilliped 3. The merus is greatly expanded distally, as noted in previous studies as in *I. crassipes* and *I. pokoui* (Stebbing 1910; Day 1978; Corbera 1994), and the ventral side of the basis, ischium, and merus forms a flat surface, which is also observed in some *Eocuma* species.

Pereopod 1. In *I. suluensis*, *I. crassipes*, and *I. pokoui*, stiff setae on the dactylus are directed upward (Fig. 6A; Calman 1904; Stebbing 1910, Le Loeuff & Intes 1972; Day 1978; Corbera 1994). In the other *Iphinoe* species and most cumaceans, these setae are usually deflected, which is possibly useful for crawling. In observing detached pereopods 1 (Fig. 8B), these setae are present on the opposite (inner) margin of dactylus to those in other cumaceans.

Pereopod 3–5. In *I. suluensis*, dactylus terminal setae are with two rows of tubercles.

Uropod. In *Iphinoe crassipes*, *I. pokoui*, and *I. suluensis*, the uropod endopod article 1 is subequal in length or longer than article 2. In other *Iphinoe* species such as *I. pellucida* Hale, 1944, *I. brevidactyla* Hale, 1953, *I. capensis* Day, 1978, it is much longer than article 2; additionally, their maxilliped 3 and pereopod 1 are similar to those of *Bodotria* (Hale 1944, 1953; Day 1978). *Iphinoe insolita* Petrescu, 1995 also has a uropod endopod article 1 longer than article 2. However, the males have two pairs of pleopods, and a possible clasping form of antenna 2, suggesting that this species is also aberrant member of the genus.

At present, *I. crassipes*, *I. pokoui*, *I. suluensis*, with their rather different morphology, particularly in the mouthparts, are placed in the genus *Iphinoe*, partly due to the generic diagnosis being rather brief, based on a

restricted number of characters. In addition, Haye (2007) revealed considerable morphological variation in the genus, and the genus diagnosis should be revised by observation of mouthparts and other appendages of known species but is beyond the scope of the present study

Acknowledgements

I thank directors of the cruises by R/V *Tansei-maru*, R/V *Hakuho-maru*, T/S *Toyoshio-maru*; Dr. K. Ohwada, Dr. T. Oji, Dr. S. Ohta, Dr. S. Ohtsuka. Dr. K. Nakamura made available sediment samples including many *Iphinoe* specimens collected during R/V *Tansei-maru* cruise (KT-02-5). Dr. M. Shimomura made available an *Iphinoe* specimen collected by T/S *Toyoshio-maru.* Dr. T. Sasaki made available *Iphinoe* specimens collected by R/V *Tansei-maru* (KT-03-1). Dr. H. Saito and Dr. Y. Kai made available *Iphinoe* specimens collected by T/S *Ryokuyo-maru* (Wakasa Bay specimens) and the training boat *Tansui-maru*. Dr. H. Nakano, Mr. M. Sekifuji and Mr. H. Kohtsuka planned and carried out the surveys of benthic fauna at Shimoda and Misaki, Sagami Bay, funded by the project, the JAMBIO Coastal Organism Joint Surveys. Mr. W. Godo helped me collecting *Iphinoe* specimens at the Seto Inland Sea. The government of Philippines permitted research cruise of R/V *Hakuho-maru* at the Sulu Sea (KH-00-1), during which *Iphinoe* specimens examined in the present study were collected. Thanks are also due to captains, crews, and researchers on board for every kind of help. Dr. G. Bird and three reviewers improved the manuscript.

References

Akiyama, T. & Gamô, S. (2012) The cumacean Genus *Eudorella* (Crustacea: Peracarida) from Japanese Waters, Northwest Pacific, and *E. suluensis* sp. nov. from the Sulu Sea, Indo-West Pacific. *Zootaxa*, 3319 (1), 1–56. https://doi.org/10.11646/zootaxa.3319.1.1

Akiyama, T. & Gerken, S. (2012) The cumacean (Crustacea: Peracarida) genus *Petalosarsia* from the Pacific Ocean. *Zootaxa*, 3320 (1), 1–35. https://doi.org/10.11646/zootaxa.3320.1.1

Băcescu, M. (1950) Speciile de *Iphinoe* (Crustacei Cumacei) din Marea Neabra - cu un studiu special asupra lui *Iphinoe maeotica* (sov.) si descrierea unei noi specii, *Iphinoe elisae* n. sp. *J. Anaele Academei Republicii Populare Romane - Seria : Geology, Biologie, stinte tehnice si agricole*, 3 (12), 461–514.

Băcescu, M. (1961) Contribution à l'étude des Cumacés de la Méditerranée et particulièrement des Côtes d'Israel. *Raports et procès-Verbaux des Réunions. C. I. E. S. M. M.*, 16, 495–502.

Băcescu, M. (1988) *Crustaceorum catalogus 7*. *In*: Gunner, H.E. & Holthuis, L.B. (Eds.), *Cumacea I*. SPB Academic Publishing, The Hague, pp. 1–173.

Bate, S. (1856) On the British Diastylidae. *Annals and Magazine of Natural History*, Series 2, 17 (102), 449–465. [https://www.biodiversitylibrary.org/page/2246005] https://doi.org/10.1080/00222935608697553

Bochert, R. & Zettler, M.L. (2011) Cumacean from the continental shelf of Angola and Namibia with description of new species. *Zootaxa*, 2978 (1), 1–33. https://doi.org/10.11646/zootaxa.2978.1.1

Calman, W.T. (1904) Report on the Cumacea collected by Prof. Herdman at Ceylon in 1902. *Ceylon Pearl Oyster Fisheries -1904- Supplementary Reports,* 12, 159–180.

Corbera, J. (1994) A new record of *Iphinoe crassipes* Hansen, 1895 (Cumacea, Bodotriidae) from the Catalonian coast (NE Spain). *Scientia Marina*, 58 (3), 273–276.

Corbera, J. & Garcia-Rubies, A. (1998) Cumaceans (Crustacea) of the Medes Islands (Catalonia, Spain) with special attention to the genera *Bodotria* and *Iphinoe*. *Scientia Marina*, 62 (1–2), 101–112. https://doi.org/10.3989/scimar.1998.62n1-2101

Day, J. (1978) Southern African Cumacea. Part 2. Family Bodotriidae, subfamily Bodotriinae. *Annals of the South African Museum*, 75 (7), 159–290. [https://biostor.org/reference/109804]

Fage, L. (1951) *Cumacés*. *Faune de France. No. 54*. Paul Lechevalier, Paris, 136 pp.

Gamô, S. (1958) On some species of cumacean Crustacea from Sagami Bay. *Zoological Magazine*, 67 (12), 21–26.

Gamô, S. (1962) On the cumacean from Tanabe Bay, Kii Peninsula. *Publications of the Seto Marine Biological Laboratory*, 10 (2), 9–66. https://doi.org/10.5134/175314

Goodsir, H.D.S. (1843) On the sexes, organs of reproduction and mode of development of the cirripeds. Account of the Maidre of fisherman, and description of some new species of crustaceans. *Edinburgh New Philosophical Journal*, 35, 88–104.

Hale, H.M. (1944) Australian Cumacea No. 8 The family Bodotriidae. *Transactions of the Royal Society of South Australia*, 63

(2), 225–85. [https://biostor.org/reference/251258]
Hale, H.M. (1953) Two new Cumacea from South Africa. *Transactions of the Royal Society of South Australia*, 76, 45–50. [https://biostor.org/reference/117400]
Hansen, H.J. (1895) Isopoden, Cumaceen und Stomatopoden der Plankton-Expedition. *Ergebenisse der Plankton-Expedition de Humboldt-Stiftung*, 2 (Gc), 1–105, pls. I–V.
https://doi.org/10.5962/bhl.title.10413
Haye, P.A. (2007) Systematics of the genera of Bodotriidae (Crustacea: Cumacea). *Zoological Journal of the Linnean Society*, 151, 1–58.
https://doi.org/10.1111/j.1096-3642.2007.00322.x
Jones, N.S. (1956) Cumacea from the west coast of Africa. Atlantide Report No. 4. *Scientific Results of the Danish Expedition to the Coasts of Tropical West Africa 1945-6*, 4, 183–212.
Kim, S.H. & Kim, Y.H. (2020) *Iphinoe indenticulata* sp. nov. (Crustacea: Cumacea: Bodotriidae), a new Korean cumacean. *Zootaxa*, 4732 (2), 307–316.
https://doi.org/10.11646/zootaxa.4732.2.5
Kurian, C.V. (1951) The Cumacea of Travancore. *Bulletin of the Central Research Institute, University of Travancore*, Series C, 2, 77–118.
Le Loeuff, P. & Intes, A. (1972) Les Cumacès du plateau continental de Côte d'Ivoire. *Cahiers O.R.S.T.O.M., Série Oceanographie*, 10 (1), 19–46.
Ledoyer, M. (1965) Sur quelques espèces nouvelles d'*Iphinoë* (Crustacea Cumacea) discussion et description comparative des espèces Européennes déjà connues (1). *Recueil des Travaux de la Station Marine d'Endoume*, 39, 253–294.
Lee, C.M. & Lee, K.S. (1998) Three species of cumaceans (Crustacea, Cumacea) from Korean waters. *The Korean Journal of Systematic Zoology*, 14 (2), 71–89.
Liu, H. & Liu, R. (1990) Study on Cumacea (Crustacea Malacostraca) of the offshore waters of North China. *Studia Marina Sinica*, 10 (31), 195–228. [in Chinese with English description of three new species]
Lomakina, N.B. (1960) On fauna Cumacea (Crustacea, Malacostraca) coastal zone of Yellow Sea. *Oceanologia et Limnologia Sinica*, 3 (2), 94–114. [in Chinese and Russian]
Mühlenhardt-Siegel, U. (1996) Ein Beitrag zur Cumacea-Fauna aus dem Kustenflachwasser des sudlichen Afrika, mit Beschreibung von *Cumella hartmanni* sp. nov. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut*, 93, 117–140.
Park, M.R., Hong, J.S. & Choi, K.S. (1998) The bodotriid Cumacea (Crustacea: Malacostraca) from the Yellow Sea. *Journal of Fisheries Science and Technology*, 1 (1), 94–112.
Petrescu, I. (1998) Cumaceans (Crustacea: Cumacea) collected by the expedition of "Grigore Antipa" National Muséum of Natural History from the coast of Tanzania (1973–74). Part I. Family Bodotriidae. *Travaux du Museum National d'Histoire Naturelle "Grigore Antipa"*, 40, 227–310.
Sars, G.O. (1878) Nye Bidrag til Kundskaben om Middelhavets Invertebratfauna. II. Middelhavets Cumaceer. *Archiv for Mathematik og Naturvidenskab*, 3, 461–512.
https://doi.org/10.5962/bhl.title.10404
Scott, T. (1901) Notes on Scottish cumaceans. *Annals of Scottish Natural History*, 1901, 215–224.
https://doi.org/10.5962/bhl.title.59822
Stebbing, T.R.R. (1910) Sympoda. *Annals of the South African Museum*, 6, 409–419.
Watling, L. & Gerken, S. (2024) World Cumacea database. Available from: https://www.marinespecies.org/cumacea (accessed 19 October 2024)
https://doi.org/10.14284/354